

Swansea University

**2021**

The development and evaluation of a web-based well-being intervention, for inclusion within an existing health promotion programme, to support and encourage health related lifestyle behaviour change

Menna Brown  
Submitted to Swansea University in fulfilment of the requirements for the  
Degree of Doctor of Philosophy

## Abstract

Unhealthy lifestyle behaviours constitute a significant burden of disease, globally. Web-based interventions offer a means to support individuals in adopting and maintaining positive healthy lifestyle behaviours to address and reduce this issue. The health behaviour change literature offers several useful theoretical models which aim to explain or predict the likelihood of successful, individual level, lifestyle behaviour change. Indeed, research findings have shown that digital health interventions informed by these models are more likely to be effective. However, in practice adherence and engagement to web-delivered interventions is often critically low and is associated with reduced effectiveness and cost effectiveness. This thesis developed an emotional well-being intervention (ACTivate your Well-being), for inclusion within an existing lifestyle behaviour change programme ‘Champions for Health’. Thirty-eight anticipated end-users and six stakeholders contributed to a three-staged Participatory Design project which led to the development of a twelve-week intervention, based on Acceptance and Commitment Therapy, and a new study website. Development was informed by two systematic literature reviews. Feasibility and acceptability were proven in a cluster randomised control trial (ISRCTN50074817) which recruited 142 participants. The majority (74%) enrolled on at least one lifestyle behaviour change module and health improvements were observed. Almost half (43%) of those randomised to the intervention arm enrolled onto the well-being intervention. Adherence was low (7%), no one completed the full 12-week programme. A randomised control trial (ISRCTN18190978) then evaluated impact on health behaviour change, adherence and engagement, and well-being. 182 participants were recruited. Adherence remained poor (4%) however some completed the full 12-week programme. Almost half (49%) enrolled on a lifestyle behaviour change module and health improvements were observed in three modules. COVID-19 limited evaluation. The ongoing relevance of the intervention and website is evidenced through its inclusion within the Well-being In work – In work support service, Swansea Bay University Health Board.

## Declarations and Statements

I, Menna Brown, confirm this work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed 

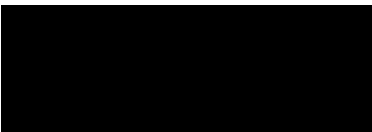
Date 01.08.21

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used, the extent and nature of the correction is clearly marked in the footnote(s).

Signed 


Date 01.08.21

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations

Signed 

Date 01.08.21

The Universities ethical procedures and ethical approval has been granted

Signed 

Date 01.08.21

## Publications

Four chapters of this thesis have been published:

### *Chapter 3*

**Brown M**, O'Neill N, van Woerden H, Eslambolchilar P, Jones M, John A. Gamification and Adherence to Web-Based Mental Health Interventions: A Systematic Review. *JMIR Ment Health* 2016;3(3):e39.

**Brown M**, Glendenning AC, Hoon AE, John A. Effectiveness of Web-Delivered Acceptance and Commitment Therapy in Relation to Mental Health and Well-Being: A Systematic Review and Meta-Analysis. *J Med Internet Res* 2016;18(8):e221.

### *Chapter 4*

**Brown M**, Hooper N, Eslambolchilar E, John A. Development of a Web-Based Acceptance and Commitment Therapy Intervention to Support Lifestyle Behavior Change and Well-Being in Health Care Staff: Participatory Design Study  
*JMIR Form Res* 2020;4(11):e22507

### *Chapter 5*

**Brown M**, Hooper N, James P, Scott D, Bodger O, John A. A Web-Delivered Acceptance and Commitment Therapy Intervention With Email Reminders to Enhance Subjective Well-Being and Encourage Engagement With Lifestyle Behavior Change in Health Care Staff: Randomized Cluster Feasibility Study. *JMIR Form Res* 2020;4(8):e18586.

### **Additional relevant output during candidature**

Learnings and contributions from the work reported in this thesis, undertaken by the primary researcher, also informed several conference and poster presentations.

### **Grant awards**

Menna Brown and Professor Ann John: Saint David's Medical Foundation (SDMF) £6,000 award 2020-2021. The adaptation of a health and well-being intervention for use with graduate entry medical (GEM) students at Swansea University.

### **Conference presentations**

1. **Brown M**, Hooper N, John A. ACBS UK and Ireland chapter, 4<sup>th</sup> conference (online). November 2020.
2. **Brown M**. Swansea University Medical School, Post graduate conference, Swansea University, abstract winner, 1<sup>st</sup> prize. 2020.
3. **Brown M**. SBUHB Peoples development conference. Invited speaker. September 2019.
4. **Brown M**. Collaborate 2018, Taliesin Arts Centre, Swansea University. October 2018 Invited speaker
5. **Brown M**. People Development conference Richard lay Centre, ABM Finance, ABMU HB. December 2016
6. **Brown M**. Swansea University Medical School, Post graduate research students bi-annual conference, Swansea University December 2016
7. **M Brown**, H van Woerden, A John. Faculty of Public Health Conference Committee of the Faculty of Public Health in Scotland. 'Strong voices. Pragmatic public health'. Annual public health conference Dunblane Hydro Hotel. October 2016.

### **Poser presentations**

1. **Brown M**, Hooper N, Bodger O, James P, Jones M, John A. Welsh Psychiatry Society joint meeting with the Royal College of Psychiatrists in Wales. June 2019. The Dylan Thomas Centre, Somerset Place, Swansea. 2<sup>nd</sup> prize
2. **Brown M**, John A. RCPsych joint meeting. The future of Psychiatry, Mecure Holland house hotel, Newport road, Cardiff 2018
3. **Brown M**, van Woerden H, Eslambolchilar P, John A. RCPsych in Wales and The Welsh Psychiatric Society Joint meeting 'Capacity, Consent and Compulsion' Marriot St Pierre Hotel Chepstow Monmouthshire. November 2016

4. **Brown M.** Welsh Public Health conference, Cardiff, Swalec stadium. November 2016
5. **Brown M,** John A. WPS / RCPsych joint meeting. Psychological Therapies. The Liberty stadium, Swansea. May 2016.
6. **Brown M,** John A. Welsh Public Health Conference A Healthier, Happier and Fairer Wales. Cardiff. SWALEC stadium. November 2015.
7. **Brown M,** John A. Mental Health and well-being in medical, dental and veterinary education, Swansea University, The Village hotel. October 2015  
**Poster presentation**
8. **Brown M,** John A. WPS / RCPsych joint meeting, Masterclass, The Imperial Hotel, Llandudno May 2015. 2<sup>nd</sup> prize.

#### **Public engagement activities**

1. **Brown, M.** CRISIS members forum. Champions for Health. Jan 2020. **Oral presentation**
2. **Brown, M.** The MediWales Connects NHS. Collaboration Conference. Bay campus, Swansea university. The great hall. July 2019. **Interactive stand**
3. **Brown, M.** Oriel Super Science Sunday. National waterfront museum, Swansea. February 2020. **Interactive stand.**
4. **Brown, M.** Swansea University, Year 9 Aspiring to Higher education conference. December 2019. **Presenter**
5. **Brown, M.** After Dark, Science festival. Mindful eating. Swansea. October 2019. **Interactive presentation.**
6. **Brown, M** Littlemore, K, John A. Business breakfast. Mind your own business: Mental Health and people managing their own selfcare through digital tools Swansea University, ILS2Hub. August 2018. **Oral presentation.**

## Contents

Title page .....	1
Abstract.....	2
Declarations and Statements .....	3
Publications.....	4
Contents .....	7
Acknowledgements.....	10
List of Tables .....	11
List of Figures .....	13
Definitions and Abbreviations .....	16
<b>Chapter 1: Introduction .....</b>	<b>20</b>
1.1 The Research Context.....	20
1.2 Problem Statement.....	22
1.3 Aim .....	22
1.4 Hypothesis.....	23
1.5 Research Question .....	23
1.6 Objectives .....	23
1.7 Thesis structure .....	24
<b>Chapter 2: Background.....</b>	<b>30</b>
2.1 Health Related Lifestyle Behaviours .....	25
2.2 Mental health, the UK and Global Picture.....	30
2.3 Well-being.....	38
2.4 Web-based Context.....	44
2.5 Participatory Design.....	57
2.6 Current Study .....	71
<b>Chapter 3: Systematic Review .....</b>	<b>81</b>
3.1 Gamification and Adherence to Web-Based Mental Health Interventions: A systematic review	83
3.2 Aim .....	83
3.2.1 Objectives .....	83
3.3 Method.....	83
3.4 Results.....	91
3.5 Discussion.....	113
3.6 A systematic review and meta-analysis examining the effectiveness of web-delivered Acceptance and Commitment Therapy interventions for the management of mental health and positive well-being .....	121
3.7 Aim .....	121

3.7.1 Objectives .....	121
3.8 Method .....	122
3.9 Results.....	127
3.10 Discussion.....	141
<b>Chapter 4: Participatory Design.....</b>	<b>150</b>
4.1 PD .....	150
4.2 Justification for use of PD.....	150
4.3 Aim .....	151
4.3.1 Objectives .....	151
4.4 Method .....	151
4.4 Data Analysis.....	172
4.5 Results.....	175
4.6 Discussion.....	220
<b>Chapter 5: Feasibility Study .....</b>	<b>240</b>
5.1 Randomised Cluster Feasibility Study .....	242
5.2 Champions for Health.....	242
5.3 Methods.....	243
5.4 The Study Website.....	256
5.5 Data Analysis.....	268
5.6 Results.....	270
5.7 Discussion.....	283
5.8 Conclusion .....	295
<b>Chapter 6: RCT.....</b>	<b>297</b>
6.1 Aim .....	297
6.1.1 Objectives .....	297
6.1.2 Study Hypotheses.....	298
6.2 Methods.....	298
6.3 ACTivate your Well-being.....	311
6.4 Data Analysis.....	314
6.5 Results.....	315
6.6 Discussion.....	332
6.7 Conclusion .....	348
<b>Chapter 7: Final Discussion.....</b>	<b>350</b>
7.1 The Research Question .....	350
7.3 Comparison to the Published Literature.....	355
7.4 Study Limitations.....	363
7.5 Interdisciplinary and Cross-organisational Study Context .....	369



7.6 Implications for Research .....	374
7.7 Implications for Policy.....	377
7.8 Future Directions .....	380
7.9 Final Conclusion .....	381
Glossary .....	382
Bibliography .....	383
Appendix.....	424
Appendix 1: MEDLINE Search strategy (EBSCO interface) (SR1) .....	424
Appendix 2: Data extraction (SR1).....	427
Appendix 3: Protocol (SR2).....	435
Appendix 4: MEDLINE Search strategy (SR2).....	436
Appendix 5: Data extraction (SR2).....	437
Appendix 6: Design questionnaire.....	438
Appendix 7: Electronic invitation.....	441
Appendix 7: Study advert feasibility study.....	443
Appendix 9: Registration form, feasibility study website.....	444
Appendix 10: Intervention content used in the feasibility study.....	548
Appendix 11: Updated study website used in the RCT .....	490
Appendix 12: Intervention used in the final RCT.....	517
Appendix 13: Authorship declaration.....	577

## Acknowledgements

For Annabelle my sleeping angel, Verity my super premmie and Rob who kept me going in the difficult times. For Keira, my motivation. You began your primary school journey as I began my PhD, and now we end them together. Thank you, fam, for your patience and for all the hours I missed, especially in lockdown one in the sunshine!

I would like to thank my lead supervisor Professor Ann John without whom this PhD would not have been possible. For your continued patience, guidance, support and knowledge. With thanks also to Professor Matt Jones for his time and Dr Phil James for his time and support with the website.

I would also like to thank the participants who gave their time freely, the Well-being through work team at Swansea Bay University Health Board who were so kind and supportive and Amanda and Lauren for their comradery.

This PhD was funded by Health and Care Research Wales (Grant: SCS-14-11; PI Professor Ann John).

## List of Tables

### Chapter 3

Table 3.1 Main results (SR1).....	94
Table 3.2 Use of each gamification feature per health condition.....	111
Table 3.3 Included studies (SR2) (n=10).....	129
Table 3.4 Comparator characteristics for the trial arms of each of the ten included studies.....	131
Table 3.5 Outcome measures used in the ten included studies.....	133
Table 3.6 ACT core processes per included study.....	135
Table 3.7 Key statistics relating to the summary between-group effect sizes by outcome measure.....	140
Table 3.8 The key statistics relating to the summary within-group effect sizes by outcome measure.....	140

### Chapter 4

Table 4.1 Data sources.....	155
Table 4.2 Timeline of each task and summary of participants included.....	176
Table 4.3 Participant extracts (theme 1).....	185
Table 4.4 Participant extracts (theme 2 sub-theme 1).....	186
Table 4.5 Participant extracts (theme 2 sub-theme 1).....	187
Table 4.6 Participant extracts (theme 2 sub-theme 1).....	188
Table 4.7 Participant extracts (theme 2 sub-theme 2).....	189
Table 4.8 Participant extracts (Theme 4).....	190
Table 4.9 Participant extracts (theme 4).....	191
Table 4.10 Participant extracts (theme 4).....	192
Table 4.11 Participant suggestions (Theme 5).....	193
Table 4.12 Participant extracts FG2 and FG3 (well-being).....	194
Table 4.13 Participant extracts FG2 and FG3 (mindfulness).....	195
Table 4.14 Participant extracts FG2 and FG3 (resources).....	197
Table 4.15 Participant extracts FG2 and FG3 (images).....	199
Table 4.16 participant extracts FG2 and FG3 (structure).....	200
Table 4.17 Design questionnaire data summary.....	202
Table 4.18 Participant extracts (Design questionnaire).....	203
Table 4.19 Participant extracts (Design questionnaire II).....	204
Table 4.20 Hallway task data (n=4).....	206
Table 4.21 Usability errors detected in U1 (n=3) at POW.....	207
Table 4.22 Usability errors detected in the high-fidelity task (n=6).....	208
Table 4.23 Usability errors detected in the low-fidelity task (n=7).....	209
Table 4.24 card sort categories.....	210
Table 4.25 Summary of key survey results and free text feedback.....	212
Table 4.26 Participant extracts (Interviews).....	215

### Chapter 5

Table 5.1 Trial arms and modules available to participants per trial arm.....	243
Table 5.2 Profile messages.....	258
Table 5.3 Weekly motivational suggestion.....	261

Table 5.4	Enrolment questions per module.....	262
Table 5.5	Track your progress data collection points per module.....	263
Table 5.6	Well-being modules.....	264
Table 5.7	Week 3: Values exploration.....	266
Table 5.8	Static social norm messages, per lifestyle behaviour module.....	267
Table 5.9	Participant characteristics.....	273
Table 5.10	Participant extracts.....	274
Table 5.11	Participant extracts (feasibility respondents).....	281
<b>Chapter 6</b>		
Table 6.1	RCT trial arm components.....	299
Table 6.2	Organisation locations and cluster assignment.....	301
Table 6.3	Three-point scale.....	307
Table 6.4	Interventions reviewed and scored (n=19).....	307
Table 6.5	Data extracted from the studies meeting the cut off score (n=3)....	309
Table 6.6	Estimated sample sizes.....	310
Table 6.7	Example week 3.....	313
Table 6.8	RCT participant characteristics (n=182).....	316
Table 6.9	RCT participant characteristics per trial arm (n=182).....	317
Table 6.10	Number of staff allocated to each trial arm per employing organisation.....	318
Table 6.11	Examination of trial arm differences at baseline (n=182).....	319
Table 6.12	Examination of baseline differences for lifestyle modules (n=182,CS).....	319
Table 6.13	Enrolment per trial arm.....	323
Table 6.14	Number of participants who engaged with a module, per trial arm.....	324
Table 6.15	Use of Goal setting function, per module (n=90).....	324
Table 6.16	Lifestyle module, physical health improvements per trial arm....	325
Table 6.17	Participant extracts (Feedback).....	328

## List of Figures

### Chapter 2

Figure 2.1 The single continuum model.....	72
Figure 2.2 Dual continua model.....	73
Figure 2.3 Geoffrey Rose argument applied to mental health and emotional well-being.....	75

### Chapter 3

Figure 3.1 Search terms (SR1).....	85
Figure 3.2 Gamification features included in the review.....	85
Figure 3.3. PRISMA flow diagram (SR1).....	91
Figure 3.4 Risk of Bias summary chart.....	103
Figure 3.5 Forest plot showing the adherence rate of interventions using goal setting as a gamification feature.....	105
Figure 3.6 Forest plot showing the adherence rate of interventions using progress as a gamification feature.....	105
Figure 3.7 Forest plot showing adherence of interventions employing feedback as a gamification feature.....	106
Figure 3.8 Forest plot showing adherence of interventions employing rewards as a gamification feature.....	106
Figure 3.9 Forest plot showing adherence of interventions employing story/theme as a gamification feature.....	107
Figure 3.10 Mean adherence (%) per single gamification feature used.....	107
Figure 3.12 Forest plot showing adherence to intervention compared to adherence to control in interventions employing two gamification features.....	109
Figure 3.11 Forest plot showing adherence of interventions employing one gamification feature (n=58).....	108
Figure 3.13 Forest plot showing adherence of interventions employing two gamification features (n=7).....	109
Figure 3.14 Mean adherence per total number of gamification features used.....	110
Figure 3.15 The bar chart displays the mean (%) adherence per condition (n= total number of interventions) the intervention was designed to treat....	112
Figure 3.16 Search terms (SR2).....	123
Figure 3.17 Data transformation method.....	126
Figure 3.18 PRISMA flow chart (SR2).....	128
Figure 3.19 Risk of Bias summary per domain.....	138
Figure 3.20 Forest plot showing the depression outcome measure in the between-group meta-analysis. The x-axis' units are in Hedges' g.....	141

### Chapter 4

Figure 4.1 Study diagram.....	153
Figure 4.2 Images shown to participants.....	157
Figure 4.3 Images shown to participants.....	157

Figure 4.4 Yoga girl home page layout used in hallway testing.....	160
Figure 4.5 Dashboard well-being home page.....	162
Figure 4.6 Home page designs .....	162
Figure 4.7 Logos.....	163
Figure 4.8 Printed designs.....	164
Figure 4.9 screen shot of the home page.....	167
Figure 4.10 screen shot of week one.....	167
Figure 4.11 screen shot of ‘try at home’ .....	168
Figure 4.12 screen shot of a lesson summary.....	168
Figure 4.13 screen shot of website blog.....	169
Figure 4.14 Word cloud.....	183
Figure 4.15 Shared project plan.....	184
<b>Chapter 5</b>	
Figure 5.1 Recruitment.....	247
Figure 5.2 Study website (home page).....	248
Figure 5.3 Consent form.....	248
Figure 5.4 User dashboard.....	249
Figure 5.5 Graphs displayed in user dashboard.....	250
Figure 5.6 Home page, module view .....	257
Figure 5.7 About Us.....	258
Figure 5.8 Contact Us.....	258
Figure 5.9 Trophies displayed in user dashboard.....	260
Figure 5.10 Feedback displayed in user dashboard.....	260
Figure 5.11 Format of reminder email.....	261
Figure 5.12 Well-being home page.....	265
Figure 5.13 Five, pre-made, well-being films developed by PocketMedic...266	
Figure 5.14 Static social norm message and graph.....	268
Figure 5.15 CONSORT flow diagram.....	272
Figure 5.16 The percentage of participants enrolled onto each lifestyle behaviour change module and the percentage who went on to engage with the module.....	276
Figure 5.17 Shows the percentage of participants enrolled onto each lifestyle behaviour change module and the percentage who went on to engage with the module.....	277
<b>Chapter 6</b>	
Figure 6.1 Updated Intervention home page.....	302
Figure 6.2 Updated control home page.....	302
Figure 6.3 Swansea University internet advertisement.....	303
Figure 6.4 Drop-in session held at Swansea University.....	304
Figure 6.5 Updated website images.....	305
Figure 6.6 Updated User Dashboard.....	305
Figure 6.7 Vertical menu: ACTivate your well-being.....	311
Figure 6.8 Vertical sub-menu.....	312

Figure 6.9 CONSORT flow diagram.....	320
Figure 6.10 Enrolment onto HRLB modules.....	322
Figure 6.11 Enrolment per HRLB module.....	323
Figure 6.12 Number of participants who completed each week, per HRLB module.....	325
Figure 6.13 Percentage of users who enrolled and engaged in a HRLB module per trial arm.....	326

## Definitions and Abbreviations

**ACT:** Acceptance and commitment therapy

**AAQ-II:** Acceptance and Action questionnaire version two

**ABMU HB:** Abertawe Bro Morgannwg University Health Board

**ACBS:** Association for contextual behavioural sciences

**AIS:** Avoidance and Inflexibility Scale

**APMS:** Adult Psychiatric Morbidity Survey

**APS:** Annual Population Survey

**ACBS** Association of Contextual Behavioural Science

**BAI:** Beck Anxiety Inventory

**BDI:** Beck Depression Inventory

**BMI:** Body mass Index

**CeHRes:** Centre for eHealth Research and Disease Management Roadmap

**CES-D:** Centre for Epidemiologic Studies Depression Scale

**cCBT:** computerised Cognitive behavioural therapy

**CBT:** Cognitive behavioural therapy

**CHD:** Chronic Heart Disease

**CMD:** Common mental disorder

**CMO:** Chief Medical Officer

**C-S** Chi Squared test

**CONSORT:** Consolidated Standards of Reporting Trials

**DASS:** Depression anxiety stress scale

**DEMOS:** Democratic Planning and Control in Working Life

**DOH:** Department of Health

**DUE:** Democratic Development and Computer Processing

**EBCD:** Experience-based co-design



**ELS:** Engaged Living Scale

**FFMQ:** Five Facet Mindfulness Questionnaire

**FG:** Focus Group

**GAD:** Generalised anxiety disorder

**GDP:** Gross Domestic product

**GHQ-12:** Twelve item General Health Questionnaire

**GMC:** General Medical Council

**GSI:** Global Severity Index

**HADS:** Hospital anxiety and depression scale

**HB:** Health Board

**HBM:** Health belief model

**HCD:** Human Computer Design

**HCI:** Human Computer Interaction

**HRLBs:** Health related lifestyle behaviours

**HSE:** Health survey England

**iCBT:** Internet delivered CBT

**IPT** Interpersonal psychotherapy

**ISRCTN:** International Standard Randomised Controlled Trial Number

**IWS:** In Work Support service

**MBIs:** Mindfulness based interventions

**MHC-SF:** Mental Health Continuum Short Form

**MNW:** Measuring National Well-being Programme

**M-W** Mann Whitney U test

**NCD:** Noncommunicable disease

**NHS:** National Health Service

**NICE:** National Institute for Health and Clinical Excellence

**NJMF:** Norwegian Iron and Metal workers union

**NPT:** Neath Port Talbot

**MRC:** Medical Research Council

**NMC:** Nursing and Midwifery Council

**OCD:** Obsessive compulsive disorder

**ONS:** Office of National statistics

**PAR:** Participatory action research

**PD:** Participatory design

**PHQ-4:** Patient Health questionnaire -four item

**PHE:** Public Health England

**PHW:** Public Health Wales

**PIPS:** Psychological Inflexibility Scale

**POW:** Princess of Wales

**PR:** Participatory research

**PSD:** Persuasive systems design

**PTSD:** Post Traumatic stress Disorder

**QoL:** Quality of Life

**QOLI:** Quality of Life Inventory

**UK:** United Kingdom

**USA:** United States of America

**UTOPIA:** Training, Technology and Product in Work Quality Perspective

**RCT:** Randomised controlled trial

**RoB:** Risk of Bias

**SAD:** Social anxiety disorder

**SBUHB:** Swansea Bay University Health Board

**SCL-90:** Symptom checklist 90 items

**SCT:** Social Cognitive Theory

**SEM:** Standard error of Measurement

**SES:** Socio Economic Status

**SME:** Small to medium sized enterprise

**SRM:** Standardised Response Mean

**SWEMWBS:** Short form Warwick-Edinburgh Mental Well-being Scale

**SWB:** Subjective well-being

**TAU:** treatment as usual

**TPB:** Theory of planned behaviour

**TRA:** Theory of reasoned action

**TTM:** Transtheoretical Model

**UK:** United Kingdom

**USA:** United States of America

**UX:** User experience

**WLC:** Wait list control

**WEF:** World Economic Forum

**WEMWBS:** Warwick-Edinburgh Mental Well-being Scale

**WHO:** World Health Organisation

**WEF:** World Economic Forum

**WSAS:** Work and social adjustment scale

**W-S-R** Wilcoxon-signed-ranks test

## Chapter 1: Introduction

---

This chapter presents a brief outline of the problem and a problem statement, followed by the research aim, hypothesis, research question and specific objectives. The structure of the subsequent thesis is then outlined.

### 1.1 The Research Context

Mental health is *“a state of well-being in which the individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community”*

(WHO, 2018d)

Mental health status has consequences for health outcomes at both individual and societal level (Prince et al., 2007). At individual level, those with poor mental health and or sub optimal well-being experience significant suffering in the form of stigma (Cruwys & Gunaseelan, 2016), isolation, low self-esteem and self-worth, minimal energy and motivation, reduced autonomy and reduced quality of life (QoL) (Connell et al., 2012). While the social consequences can include poverty, homelessness, inadequate and unsafe housing, lost education and unemployment (Ljungqvist et al., 2016; Ngui et al., 2010; Vecchio et al., 2000).

Equally all mental disorders are associated with an increased all-cause mortality risk compared with the general population (Walker et al., 2015). Poor mental health has an increased risk of physical health consequences including (but not limited to) cardiovascular disease (CVD) (Chida & Steptoe, 2008; Contrada & Baum, 2010), ischaemic heart disease (Benton et al., 2007), poorer immune function (Friedman & Ryff, 2012; Gouin & Kiecolt-Glaser, 2011) poorer illness recovery (Lamers et al., 2012), decreased pain tolerance (Lacourt et al., 2015)

and uptake of poor health related lifestyle behaviours (Lasser et al., 2000); (Crawford & Crome, 2001; Fergusson et al., 2005; McEwen, 2008; Mouchacca et al., 2013; Schneiderman et al., 2005; Van Cappellen et al., 2018). For example, findings have shown that 40% of adults with serious mental health conditions have a tobacco addiction (ASH, 2019) which is significantly higher than amongst the general population (15%) (Szatkowski & McNeill, 2015). Lifestyle behaviours are considered key risk factors for chronic disease globally (Patel et al., 2019; WHO, 2020b). The WHO report that chronic disease / Noncommunicable diseases (NCD) accounted for 70% of deaths worldwide (WHO, 2020a).

At societal level, the economic burden has been widely recognised (GDaIIaP, 2020). In the UK the economic cost of mental health was £94 billion (OECD/EuropeanUnion, 2018), and in Wales, the estimated overall cost of mental health is more than £746 million (NHS, 2019). Furthermore, the National Health Service (NHS) expenditure on mental health in Wales (2017-18) was higher than any other category and accounted for 11.4% of all NHS Wales expenditure in 2017-18 (NHS, 2019). This category also saw the second largest increase in spending from the previous year (4.8%) only surpassed by infectious diseases (NHS, 2019). The financial implications also include significant costs for workplaces as a result of sickness absence due to mental ill health (£8 billion per year), lost productivity (including presenteeism, £15 billion), and staff replacement costs (£2 billion) (Sainsbury-Centre-for-Mental-Health, 2003). Critically those in the public sector workforce have higher staff sickness and absenteeism compared to the private sector (ONS, 2018b).

One approach to address this pressing need, which has seen exponential growth, is that of web-based or web-delivered interventions. Currently a wide range of web-delivered interventions for a range of mental health conditions have been developed and deployed both commercially and publicly across the globe (Neuhauser & Kreps, 2003). The effectiveness (Amstadter et al., 2009; Andersson & Cuijpers, 2009; Barak et al., 2008; Knaevelsrud & Maercker, 2010; Lenhard et al., 2014; Morrell et al., 2016) and cost-effective (Andrews et al., 2010; Donker et al., 2015; Paganini et al., 2018) benefits of evidence based,

web-delivered, therapies that improve common mental disorders (CMD) is well established.

However, poor adherence to and engagement with web-based interventions is of widespread concern (Christensen et al., 2009; Kelders et al., 2012). Rates of dropout vary widely, one review reported dropout between 2-83% for mental health interventions (Melville et al., 2010). And between 0-52% for lifestyle interventions (Aalbers et al., 2011). This is of critical importance as poor adherence limits treatment effectiveness (Donkin et al., 2011; Hilvert-Bruce et al., 2012; Manwaring et al., 2008) and has the potential to reduce cost effectiveness (Christensen et al., 2009). One of the key benefits of this delivery format (Griffiths et al., 2006). A variety of approaches have been explored to address the issue including, persuasive technology, gamification and social interaction. However, none has yet identified a balanced solution (Fleming et al., 2018). Therefore, with the recent acknowledgement of parity of esteem for mental health alongside physical health it is prudent to examine the potential role that positive mental health could play on encouraging adherence and engagement to lifestyle behaviour interventions delivered via the web.

### 1.2 Problem Statement

To date, open access, web-delivered, health promotion programmes have often failed to facilitate sustained or significant change in health related lifestyle behaviour (HRLB) change and/or led to significant improvements in associated health outcomes. Failure to facilitate adequate adherence and engagement to such programmes is considered a critical limitation, one which negates the cost benefits of this delivery format. Individual and societal consequences of poor physical health remain a global concern with far reaching consequences at both individual and societal level.

### 1.3 Aim

Thus, the aim of this PhD was to develop and evaluate a well-being intervention for inclusion within an existing web-based, workplace, health promotion programme called 'Champions for Health'. To provide a multi-faceted programme to support and encourage public sector staff in Wales' sustained

engagement to the programme. In order to increase their ability to make positive changes to their HRLB and well-being.

#### 1.4 Hypothesis

It was hypothesised that the inclusion of an emotional well-being intervention within a lifestyle behaviour change programme would increase well-being and in turn this would increase ability to adhere and engage with the wider programme, which would lead to improvements in HRLB.

#### 1.5 Research Question

Does the inclusion of an emotional well-being intervention within a web-based lifestyle behaviour change programme lead to improvements in; HRLB, adherence and engagement, and well-being, in public sector staff in Wales?

#### 1.6 Objectives

The specific objectives were:

1. Explore anticipated end-user perspective to gain an understanding of well-being in the context of their workplace. Identify criteria, design elements, therapeutic approach, resources and components to be incorporated into the well-being intervention and study website.
2. Conduct a systematic literature review to explore the effectiveness of participant selected criteria identified from objective one.
3. Develop the well-being intervention.
4. Explore acceptance of the well-being intervention within the existing programme and explore feasibility of running the study website at scale to determine whether a Randomised Control Trial (RCT) is warranted.
5. Evaluate the impact of the well-being intervention, using a RCT to identify whether a multifaceted lifestyle behaviour change programme has a positive impact on:
  - i. HRLB
  - ii. Adherence and engagement to the overall programme
  - iii. Emotional well-being

### 1.7 Thesis structure

This thesis is structured by the research undertaken; each research stage is described separately. The information gathered from each stage is then drawn together and discussed with consideration of the cross organisational and interdisciplinary work environment in which this thesis was undertaken. Final research conclusions are reported.



## Chapter 2: Background

---

This chapter explores the wider literature pertaining to the key topic areas highlighted in the problem statement.

### 2.1 Health Related Lifestyle Behaviours

HRLBs refer to the choices that people make in relation to their own individual behaviour across their lifetime (Institute of Medicine (US) Committee on Health and Behavior: Research, 2001). HRLBs include (but are not restricted to): smoking and tobacco use, excessive alcohol consumption, poor diet i.e. low fruit and vegetable intake, poor weight management i.e. high Body Mass Index (BMI) and high cholesterol and limited physical activity. A sixth, sexual health behaviours, is recognised however the inclusion of this is beyond the scope of the current thesis.

Poor HRLBs, such as those described above, are considered key risk factors for chronic disease / NCDs (WHO, 2020a). An estimated 70% of deaths worldwide were attributed to chronic disease (WHO, 2020a) of which cardiovascular diseases caused 17.7 million deaths, cancer 8.8 million, chronic respiratory diseases 3.9 million and diabetes 1.6 million (WHO, 2018b). Key data pertaining to prevalence and impact of the five HRLBs identified above are outlined in turn.

#### 2.1.1 Smoking

More than seven million deaths worldwide each year are attributable to tobacco use and globally the majority (80%) of smokers reside in low to middle income countries (WHO, 2019c). Global prevalence rates were 23.6% in 2018 which equated to 1.3 billion tobacco users (WHO, 2000). While in the United Kingdom (UK) the prevalence rate is 14.1% (ONS, 2019a) with slight regional differences observed. For example, the prevalence of smoking is higher in Wales than in England where rates are 15.5% and 13.9% respectively (ONS, 2019).

The impact of smoking on physical health and disease outcome is widely understood (Murray & Lopez, 1997). Smoking is the primary cause of both preventable and premature death (Lee, 2004), smoking increases the risk of cancer (WHO, 2013a), chronic heart disease (CHD) and a range of cardiovascular conditions all of which reduce life expectancy (Doll et al., 2004). In 2010, the Global Status Report, estimated that smoking caused 71% of lung cancer, 42% of chronic respiratory disease and 10% of CVD globally (WHO, 2010).

Tobacco use is not only associated with significant negative consequences on physical health and disease burden but is also coupled with considerable economic burden (Mokdad et al., 2003). The estimated global cost of smoking, including health expenditure and lost productivity was reported to be US\$1436 billion in 2012, the equivalent of 1.8% global gross domestic product (GDP) (Goodchild et al., 2018). In high income countries it is estimated that health care expenditure on smoking and smoking related outcomes is approximately 15% of expenditure. In the UK it is 5% of the total NHS budget each year, the equivalent of £2.7 to £5.2 billion (Ekpu & Brown, 2015).

Smoking is also associated with health inequalities and there are many social determinants which influence an individual's likelihood of smoking which complicates prevention and cessation interventions. For example, individuals from socioeconomically deprived areas are disproportionately more likely to smoke (Centre, 2015). In addition to this the incidence of smoking is significantly higher in those with a mental health condition (Lê Cook et al., 2014). In the United States of America (USA) the prevalence rate was 42% amongst adults with a diagnosed mental health condition (Lasser et al., 2000). Results from a national survey of Australians aged 16-85 years indicated that smoking rates increased in line with illness severity (Lawrence et al., 2010). While in the UK, smoking prevalence ranged from 28% in those with anxiety or depression, to 40.5% for serious mental disorders (PHE, 2020). This compares to a European general population prevalence rate of 10-38% (WHO, 2018e) and UK prevalence of 14% (ONS, 2019a). As such, tobacco use has been described as "*the biggest public health threat the world has ever faced*" (WHO, 2020a).

### 2.1.2 Physical inactivity

Approximately 3.2 million deaths each year are attributed to insufficient physical activity (WHO, 2011) with women being less active than men (34% compared to 28% respectively) (Guthold et al., 2018). Globally physical inactivity represents the fourth leading risk factor for mortality (WHO, 2009). Physical inactivity is estimated to be the main cause of breast and colon cancers, a significant contributory factor for diabetes and ischaemic heart disease (27% and 30% respectively) (WHO, 2009). Alarming rates of physical inactivity are increasing globally (Knight, 2012) and in the UK, 11% of deaths are associated with sedentary behaviour and physical inactivity (Heron et al., 2019).

Physical activity is defined by the WHO as “*any bodily movement produced by skeletal muscles that requires energy expenditure*” (WHO, 2020c). Exercise is included in this definition but defined differently. Exercise is considered a regular and repetitive component of physical activity (WHO, 2020c). The Department for Health (DoH) UK stipulate recommended physical activity levels based on WHO guidelines. Adults, aged 18-64 years, are recommended to undertake at least 150 minutes of moderate physical activity per week and strength exercises twice a week or 75 minutes of vigorous physical activity per week and strength exercises twice a week or a mixture of moderate and vigorous activity each week which equates to 150 minutes and strength exercises twice a week (CMO, 2019).

Costs associated with physical inactivity have been separated into three distinct categories; direct health care costs of disease, indirect costs realised through lost productivity and compensation payments, and costs associated with premature death from disease attributable to physical inactivity (Pratt et al., 2000; Pratt et al., 2014). The estimated direct cost to the UK was £0.8 Billion (Heron et al., 2019).

### 2.1.3 Alcohol

In 2016, three million deaths worldwide were attributed to excessive alcohol consumption with the European region recording the highest per capita consumption (WHO, 2018c). Alcohol is considered an addictive drug and is the fifth leading risk factor for ill health across all age groups in the UK (PHE, 2016b). Excessive alcohol consumption contributes to (but is not limited to):

liver disease, mouth, throat, stomach, liver and breast cancers and high blood pressure (PHE, 2016b). The Committee on Carcinogenicity of Chemicals (CoC) in Food, Consumer Products and the Environment review reported that any consumption of alcohol increased cancer risk; mouth and throat, voice box, gullet, large bowel, liver, and breast cancer (CoC, 2015). A dose response relationship whereby the more alcohol consumed the greater the risk is observed.

UK alcohol consumption guidelines state there are ‘no safe limits for drinking’ and men and women are recommended not to consume more than 14 units regularly per week. Drinking above recommended limits is associated with a reduction in life expectancy (Wood et al., 2018).

In the UK, alcohol consumption rose steadily until 2004 (CoC, 2015). Since then use has fallen, particularly in those aged 16-24 years old. Data from the Health Survey for England (HSE) indicated a rise in non-drinking from 18% in 2005 to 29% in 2015 (Fat et al., 2018). At which point the average weekly alcohol consumption by adults was 13.7 units. However, a reported 24% of adults in England and Scotland regularly drink more than recommended (Burton et al., 2016).

The burden of excessive alcohol consumption is wide ranging and is observed at individual, societal and economic level. As with physical inactivity there are distinct costs; direct costs resulting from health care treatment expenditure, welfare and justice costs, indirect costs associated with lost productivity of workers and intangible costs derived through pain suffering, poor QoL and low well-being (WHO, 2014). The resulting economic burden in the UK is an estimated 2.5% of GDP (Bhattacharya, 2017).

#### 2.1.4 Diet

3.9 million deaths globally are attributable to low fruit and vegetable intake (WHO, 2019a). An unhealthy diet including inadequate fruit and vegetable intake and low quantities of fibre and high salt/sodium is considered a significant risk factor for a range of chronic diseases including cardiovascular diseases, stroke and ischaemic heart disease, type II diabetes, gastrointestinal cancer and is a risk factor contributing to mortality (Aune et al., 2017).

Recommendations for achieving a healthy diet are widely available (Hooper et al., 2015; WHO, 2018a). Research has established the role of diet as a protective factor in health. Good nutrition lowers the risk of heart disease, stroke, some cancers and diabetes (WHO, 2003).

#### 2.1.5 Weight

1.9 billion adults worldwide and 39 million children under aged five were overweight in 2016 and 650 million were obese (WHO, 2021). Rates of adult and child obesity have steadily increased. For example, in England, 13% of men and 16% of women in 1993 were overweight or obese compared to 67% and 60% respectively in 2020 (NHSdigital, 2020). Obesity (not overweight) is estimated to rise to 60% of adult men, 50% of adult women and 25% of children by 2050 (Gov, 2007).

Obesity is commonly measured using BMI. A BMI greater than or equal to 25 is classified overweight and BMI 30, obese (WHO, 2021). Obesity is associated with significant and wide-ranging physical health complications including: high blood pressure, cardiovascular diseases, type II diabetes, musculoskeletal disorders, sleep apnoea, a range of cancers; endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, colon, and premature death (WHO, 2021). Thus, obesity and high BMI represent a significant public health concern both in the UK and globally. The prevention of this rising global health burden remains a key WHO target. For example, objective three of the Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020 (WHO, 2013a) outlined the importance of positive lifestyle choices across the population.

To complicate the landscape further, HRLBs such as those outlined above tend to occur in clusters (Meader et al., 2016; Noble et al., 2015; Schuit et al., 2002) with an increased negative impact on overall health (Schuit et al., 2002) greater than that of individual or multiple instances of poor HRLBs (McAloney et al., 2013). For example, several population based studies have identified that individuals who use tobacco, also commonly drink alcohol above recommended limits, fail to consume recommended portions of fruit and vegetables and often do not exercise regularly (Berrigan et al., 2003; De Vries et al., 2008; Poortinga,

2007) i.e. individuals are likely to exhibit three or more unhealthy lifestyle behaviours (Poortinga, 2007). Clustering is more common in men, younger cohorts, and those in lower socio-economic groups (Berrigan et al., 2003; Poortinga, 2007).

## 2.2 Mental Health, the UK and Global Picture

In 2014 17% of the population (England) met the criteria for CMD (Baker, 2020; NHSdigital, 2018). Many of which have lifelong relapse rates and all of which are associated with significant disability (NICE, 2011a). CMDs include depression and anxiety disorders such as generalised anxiety disorder (GAD), social anxiety disorder (SAD), panic disorder (PD), obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD) and phobias (NICE, 2011b). Estimates of the proportion of people who are likely to experience specific CMD during their lifetime vary. For example, incidence of major depression is estimated between 4-10%, GAD 5.7%, phobias are 12.5%, SAD 12.1%, OCD 1.6% and PTSD 6.8% (NICE, 2011a).

### 2.2.1 Global burden of disease

Approximately 14% of the global burden of disease is reported to arise as a consequence of poor mental health (Prince et al. 2007). Human suffering associated with poor mental health is significant (Lépine & Briley, 2011). Over 800,000 people die as a consequence of suicide every year (WHO, 2018b, 2020e). At the individual level significant stigma (Cruwys & Gunaseelan, 2016) and discrimination are often experienced. Stigma is associated with hopelessness, poor self-esteem and lost empowerment (Livingston & Boyd, 2010) and critically, it limits access to appropriate and timely care (Thornicroft, 2008). Others experience significant reductions in QoL (Cuijpers et al., 2004). For example, a systematic review of qualitative research studies exploring QoL in persons reporting the following: mood disorders (unipolar and bipolar depression and mania), neurosis, stress related disorders (including anxiety, phobias, post-traumatic stress disorder), personality disorders, schizophrenia, and delusional disorders; found that feelings of distress, lack of control, choice

and autonomy, low self-esteem and confidence, a sense of not being part of society, diminished activity and hopelessness were prevalent (Connell et al., 2012). While the social consequences i.e. poverty, homelessness, inadequate and unsafe housing, social isolation, lost education and unemployment, experienced as a result of poor mental health are also significant and bi-directional (Ljungqvist et al., 2016; Ngui et al., 2010; Vecchio et al., 2000).

In addition to the above, CMDs are widely associated with negative physical health outcomes. For example, increased risk of CVD (Chida & Steptoe, 2008; Goodwin et al., 2009), ischaemic heart disease (Benton et al. 2007), poorer immune function (Gouin & Kiecolt-Glaser, 2011), illness recovery (Lamers et al., 2012) and decreased pain tolerance (Lacourt et al., 2015). A prospective seven year, cohort study of (n=23,282) adults aged 20–54 suggested that self-reported depression (BDI-21 item) and clinical markers of mild to severe depression were associated with an increased risk for CHD, after behavioural and biological markers were accounted for (Nabi, Kivimäki, et al., 2010). Another seven year prospective population-based cohort study of (n=24,128) participants aged 20-54 years concluded that “*somatic symptoms of anxiety were robustly associated with an increased risk of CHD in women*” (Nabi, Hall, et al., 2010, p. 378). Equally a third prospective cohort study of (n=5936) middle-aged men and women indicated that depressive symptoms were associated with an increased risk of all-cause and cardiovascular death in depressive participants with co-morbid CHD (Nabi, Shipley, et al., 2010). While a large prospective cohort study of (n=20,627) stroke-free participants aged 41-80 years, in the UK indicated that increased psychological distress, but not major depressive disorder, was associated with elevated stroke risk (Surtees et al., 2008). Baseline assessment of depressive disorder and well-being (using the Mental Health Inventory, MHI-5) were undertaken.

Equally all mental disorders are associated with increased all-cause mortality risks compared with the general population (Walker et al., 2015). However specific conditions have different reductions in life expectancy. For example, life expectancy is reduced by up to 11 years for those living with recurrent depression (Chesney et al., 2014).

### 2.2.2 Parity of Esteem

In consideration of the above it is critical to recognise the duality of mental health alongside physical health in regard to health status. Mental health and physical health are not separate entities, they are inter-connected components (Bhugra et al., 2014; Das et al., 2016; Hardy & Thomas, 2012; Pressman et al., 2019; Stein et al., 2019; Steptoe, 2019; Trudel-Fitzgerald, Millstein, et al., 2019). A report by The King's Fund identified that 30% of people with a long-term physical health problem also had a mental health problem and 46% of people with a mental health problem also had a long-term physical health problem (Naylor et al., 2012).

In 2015 this relationship was recognised at a global level. Mental health and substance abuse were included in the Sustainable Development Agenda (WHO, 2016), adopted at the United Nations General Assembly: two health targets directly related to mental health and substance abuse. Target 3.4 requested that by 2030 countries; *“reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being;”* Target 3.5 requested that countries: *“Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol”*. In addition, the world saw widespread adoption of the Mental Health Action Plan (WHO, 2013b) adopted by the 66th World Health Assembly. The role of mental health disorders was also documented in the development of physical disease and subsequently considered both a precursor and a consequence of chronic disease, described as an *“important cause of morbidity and contributes to the global burden of Non Communicable Diseases”* (WHO, 2013b, p. 58). This recognition of ‘parity of esteem’ for mental health alongside physical health on a global level was significant.

Several routes through which mental health conditions influence physical health outcomes have been suggested; a direct effect of chronic stress on the cardiovascular, nervous and immune system (Chandola et al., 2008) and indirect routes such as a reduction in ability or motivation to manage physical health conditions including less effective help-seeking behaviours i.e. less likely to



attend regular health screening and check-ups which may identify underlying physical health problems (Corrigan et al., 2014), limited self-report of physical symptoms (Jeste et al., 1996) and barriers to accessing physical health care which arise through stigma, and decreased likelihood that secondary conditions will be managed in combination with the mental health condition (Knaak et al., 2017; A. J. Mitchell et al., 2009; Thornicroft et al., 2007). For example, treatment for smoking cessation, alcohol reduction and weight optimisation are less likely to be offered to those experiencing a mental health disorder (De Hert et al., 2011). Healthy lifestyle behaviours are also less likely to be promoted (Gournay, 1996) or where health education is available it is of poorer quality (Jones et al., 2008).

Equally it is critical to note the role that poor mental health plays on the adoption and utilisation of HRLBs (McEwen, 2008; Mouchacca et al., 2013; Schneiderman et al., 2005; Van Cappellen et al., 2018). For example, anxiety and depression are associated with unhealthy lifestyle behaviours in patients at risk of CVD (Bonnet et al., 2005). Those with mental health conditions are more likely than the general population to smoke (Lasser et al., 2000). Stress, including work stress, has been found to influence dietary choice at individual level (Chandola et al., 2008; Hudd et al., 2000; Oliver et al., 2000). While PTSD is associated with 5% reduction in healthy dietary choices, 22% increased likelihood of obesity, 9% reduction in the likelihood of undertaking physical activity and a 22% increase in the likelihood of smoking behaviour (van den Berk-Clark et al., 2018). Equally positive affect has been associated with increased maintenance of positive HRLBs (Van Cappellen et al., 2018) and higher optimism is associated with engagement in positive HRLBs (Progovac, Chang, et al., 2017; Progovac, Donohue, et al., 2017; Trudel-Fitzgerald, James, et al., 2019).

Likewise, there is evidence to indicate a protective role of well-being on physical health (Sin, 2016; Trudel-Fitzgerald, Millstein, et al., 2019). For example, positive well-being has been associated with increased lifespan (Diener, 2012). Evidence comes from a meta-analysis study which identified an association between positive well-being and reductions in cardiovascular mortality, in a healthy population (Chida & Steptoe, 2008). A meta-review of

several meta-analysis studies, in which findings indicated that levels of subjective well-being predicted longevity (Diener & Chan, 2011). The authors reviewed seven types of evidence and concluded that subjective well-being, in the form of positive affect, was associated with increased longevity even when potential confounders including physical health status and socioeconomic status (SES) were controlled for. In addition to these review studies, empirical research findings using twin pair analyses, have supported the predictive role of subjective well-being in longevity outcomes, independent of genetic factors and shared environment. For example, Sadler et al. (2011) reported that (after adjusting for illness, medications and cognitive condition), increases in positive affect were associated with a 9% reduction in mortality risk and increases in life satisfaction were associated with a (13%) reduction in mortality risk. A review of current evidence relating to positive well-being and CVD indicated that patients with existing CVD, and those with greater positive well-being had a reduced risk of secondary events, myocardial infarction and death (Sin, 2016). Prior to this, Xu and Roberts (2010) reported that high levels of well-being were associated with a 19% reduction in all-cause mortality, in a healthy population. However, this relationship was thought to be mediated by social networks. Likewise, life satisfaction in older adults predicted five year mortality (St. John et al., 2015) and life satisfaction and positive affect predicted mortality over and above sociodemographic factors and physical health status, although negative affect was not associated with mortality in this population of older (40-85 years) German adults (Wiest et al., 2011). Similarly, Gana et al. (2016) reported that positive affect was an independent protective factor regardless of negative affect following a 22-year cohort study. Positive well-being is said to influence health outcomes via the promotion of, adaptive physiological functioning, positive health behaviours, and protection from stress (Sin, 2016).

Equally chronic diseases including psoriasis, pituitary disease, back pain and irritable bowel syndrome are associated with an increased incidence of CMD (Larson et al., 2004; Marrie et al., 2017) and poor well-being. Qualitative and quantitative studies of patients living with pituitary disease report significant negative effect of disease on both emotional well-being and QoL (Crespo et al., 2015; Dekkers et al., 2006) complications associated with diabetes is a

significant predictor of QoL (Jacobson et al., 1997; Jacobson et al., 1994); as is chronic tinnitus. Those living with tinnitus had significantly higher levels of anxiety and depression and lower self-esteem and well-being (Krog et al., 2010).

Likewise, lifestyle factors contribute to this relationship and are critical components of physical health, mental health and well-being (Sarris et al., 2014). For example, a large study of 7,937 participants from the general population in Germany found that HRLBs were important indicators of well-being (Velten et al., 2014). In this study positive mental health and well-being was linked with more frequent and more regular exercise, alcohol consumption within recommended limits, non-smoking, and healthy BMI.

A meta-analysis of HRLB change interventions (which measured psychological well-being as a primary or secondary outcome) conducted by Weiss et al. (2016) reviewed 27 RCTs. The review used the Psychological Well-Being Scales and the Mental Health Continuum, Short Form (MHC-SF) and reported that psychological well-being, as conceptualised by Ryff (1989) could be improved, with moderate effect. Although non-web based, this review has implications for the current study.

Physical activity has long been recognised as a determinant of mental health. Significant research has been published supporting the role of exercise in improving mental health and emotional well-being. For example, a review study conducted by Taylor et al. (1985) identified a range of mental health benefits associated with physical activity and exercise: physical exercise and activity alleviated symptoms associated with mild to moderate depression with wider benefits observed for alcoholism, substance abuse, improved self-image, social skills cognitive function, reduced symptoms of anxiety, and altered physiological response to stressors. A secondary analysis of American and Canadian survey data (Stephens, 1988) identified that individuals who were physically active had lower self-reported anxiety and depression and higher mood independent of SES and physical health. Penedo and Dahn (2005) demonstrated that participants who engaged in regular physical activity displayed more desirable health outcomes across a variety of physical conditions. While participants in a randomised clinical trial of physical-activity

interventions displayed improved health outcomes including better general and health-related QoL, functional capacity and mood states. Other studies have shown that increased physical activity, for example active commuting (walking, cycling to place of work) improved well-being, measured using the twelve item general health questionnaire (GHQ-12), with a dose-response relationship observed (Martin et al., 2014) and self-rated healthy lifestyle predicted survival rates in an elderly population (Ford et al., 2008).

Thus the health benefits of physical activity are far ranging and include reduction in; all-cause mortality (30%), CVD (35%), type II diabetes (40%), colon cancer (30%), breast cancer (20%), depression (30%), hip fractures (68%) and dementia risk (30%) (Guthold et al., 2018; WHO, 2020c). The benefits of physical activity are achieved through improvements to physiological functioning of the cardiovascular system, and glucose and lipid metabolism (Warburton et al., 2006). Only 63% of adults met UK recommendations for physical activity (Gov, 2020). Therefore, there is significant scope for improvement on a national scale.

Regular exercise is not the only HRLB which impacts upon mental health outcomes. Excessive alcohol consumption can act as a precursor to the development of a mental health condition (Kessler et al., 1997). Approximately 40% of alcoholics are considered likely to have an independent major depressive disorder (Shivani et al., 2002). Likewise, mental health conditions are linked with excessive alcohol consumption. Alcohol is often used to manage mood and mental state. Use of alcohol to manage mood over a long term can have serious negative consequences for health status including disturbed sleep, memory loss, and body dis-regulation (VITIELLO, 1997). For example, alcohol is used by some to manage feelings of depression and anxiety. In 80% of treatment seeking alcoholics mood disturbances are present (Brown & Schuckit, 1988), approximately 30-40% reach diagnostic criteria for a comorbid mental health disorder (Anthenelli & Schuckit, 1993) and approximately 60% meet diagnostic criteria for alcohol-induced mood disorder with depressive features (Shivani et al., 2002). Bipolar disorder is the second most common mental health disorder associated with excessive alcohol consumption (Kessler et al., 1997). However,

anxiety disorders are not associated with excessive alcohol consumption (Schuckit & Hesselbrock, 2004).

Diet also has implications for mental health, well-being and physical health. A recent study by Parletta et al. (2019) reported positive effects of a 'Mediterranean-style diet' supplemented with fish oil, on the incidence of depression. Luppino et al. (2010) conducted a systematic review, which reported two-way associations between obesity and depression. Obese individuals were found to have an increased risk of developing depression over time (by 55%) and likewise depression increased the risk of obesity (by 58%). Being classified as obese (category III) is also associated with increased likelihood of self-reported lower well-being (Stranges et al., 2014). In addition to this obesity is strongly associated with impairment to HRQoL (Fontaine & Barofsky, 2001; Hassan et al., 2003; Mathias et al., 1997) and functional status, pain, worry and restricted activity (Stewart & Brook, 1983) with a dose response relationship observed (i.e. greater obesity associated with greater impairment) (Fine et al., 1999; Fontaine & Barofsky, 2001). Thus, these lifestyle factors are critical components of both physical and mental health (Sarris et al., 2014). However, the direction of this two-way relationship remains unclear and causality has not yet been established (Sin, 2016; Trudel-Fitzgerald, Millstein, et al., 2019).

### 2.2.3 Economic impact

At societal level the impact of poor mental health is understood via economic analysis and is widely recognised (Bloom et al., 2011; GDaIIaP, 2020; Murphy et al., 2020). The estimated economic consequences of mental disorders, globally by 2030 are US\$16 trillion (Patel et al., 2018). Previously, in 2010 the direct and indirect cost was an estimated at US\$2.5 trillion (Trautmann et al., 2016). In the US, the total economic burden of mental disorders was estimated to cost US\$ 147.8 billion (in 1990) with anxiety disorders considered the costliest at \$46.6 billion (Rice, 1998). In the Netherlands, costs were comparable to those of physical illnesses, specifically, the annual per capita cost of the mood disorders was €5,009, anxiety disorders €3,587 and alcohol-related disorders

€1,431 in 2003 (Smit et al., 2006). While the total cost of mental health care in France was estimated at €13.4 billion (Chevreul et al., 2013).

Closer to home, in the UK the estimated cost is between £70-100 billion per year, and 4.5% of GDP (Davies, 2014). While in Wales the estimated annual cost was £7.2 Billion in 2007-08 (Friedli & Parsonage, 2009), higher than that spent on all other health conditions. Furthermore, NHS expenditure on mental health in Wales (2018-19) was higher than any other category and accounted for 11.1% of all NHS Wales expenditure in 2018-19. This category also saw the largest increase in spending over the past decade (9.4%) (NHS, 2019). It has been proposed that costs will double over the next 20 years (Trautmann et al., 2016) in line with demographic changes and increased life expectancy (Patel et al., 2016).

### 2.3 Well-Being

The current thesis aligns itself with the WHO definition of mental health (chapter 1). As such the concept of well-being is inextricably linked to mental health from this perspective. Therefore, it is critical to consider the meaning and conceptualisation of well-being. A topic which has received much attention in the academic literature.

Several definitions have been proposed. For example, the oxford dictionary defines well-being as “*the state of being comfortable, healthy, or happy*”. This definition is limited. The Foresight Mental Capital and Well-being project (Jenkins et al., 2008, p. 10) suggested that “*Mental well-being is a dynamic state in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others and contribute to their community. It is enhanced when an individual is able to fulfil their personal and social goals and achieve a sense of purpose in society*”. While the WHO (2012, p. 1) propose that “*well-being exists in two dimensions, subjective and objective. It comprises an individual’s experience of their life as well as a comparison of life circumstances with social norms and values*”. Closer to

home, the Welsh Assembly Government consider well-being to mean “...*you're doing well in all areas of your life, like being happy, healthy and safe*” (WAG, 2014, p. 1).

### 2.3.1 Philosophical underpinnings

Interest in well-being from a health science perspective began in the 1930's with the initial recognition that health was not merely the absence of illness (Larsen, 2021) coupled with post (world) war conceptualisations of health which included the term well-being i.e. the WHO definition outlined in chapter one. However, interest in well-being has been documented as far back as the ancient Greeks (Deci & Ryan, 2008).

Two distinct philosophical approaches are identified in the literature namely, Hedonic and Eudaimonic. These different approaches have led to different conceptualisations of well-being. The 'Hedonic' perspective considers well-being to refer to a state of happiness, whereby happiness is characterised by feelings of high positive affect and low negative affect and a general satisfaction with life (Huta & Waterman, 2014). Hedonic understanding of well-being is based on the notion that increased pleasure and decreased pain lead to the experience of happiness i.e. when individuals experience high positive affective (emotional component) and high life satisfaction (cognitive component) they are said to experience happiness (Huta & Waterman, 2014).

In contrast the Eudaimonic perspective has focused on positive psychological functioning, human development and self-realisation (Waterman, 2008). It has been defined as the subjective experiences associated with living a life of virtue or in pursuit of human excellence (Niemi, 2014). This approach is based on the premise that people have positive well-being if they experience life purpose, challenge and personal growth.

Each perspective is considered in further detail below.

### 2.3.2 Hedonic

In the Hedonic tradition, the focus of well-being is on 'happiness' and the pursuit of actions and activities which generate feelings of pleasure.

For example, Bradburn (1969) conceptualised happiness as the experience of high positive affect and low negative affect and a satisfaction with life. Bradburn specified that an individual will have high well-being in the degree to which he has an excess of positive (over negative) affect and will have low well-being in the degree to which negative affect predominates over positive. Bradburn proposed that positive affect and negative affect were separate dimensions and scores on one did not predict scores on another. This view led to the argument that each are distinct dimensions of well-being and that the balance between them serves as the index of happiness.

Under this conceptualisation, life satisfaction is considered the cognitive component of happiness (Andrews & McKennell, 1980; Andrews & Withey, 2005; Bryant & Veroff, 1982). Life satisfaction surveys have been widely used as measures of national happiness for example in the Gallup world poll and the world value survey, which are considered reliable measures of subjective well-being (Ortiz-Ospina & Roser, 2013).

The Hedonic perspective has been adapted by psychologists in which the predominant view is that well-being consists of subjective happiness (Kubovy, 1999). While the term subjective well-being (SWB) has been used in both Hedonic and Eudaimonic perspectives, it is aligned with Hedonic conceptualisation of well-being (Diener, 1984).

The term SWB emerged from, sociology and QoL perspectives in which research examined SES and factors which affected reported levels of SWB e.g (Bradburn, 1969; Campbell, 1976); Research exploring the view that mental health extended beyond the absence of illness and included happiness and life satisfaction (Jahoda, 1958); personality psychologists who studied happy and unhappy people (Ricks & Wessman, 1966) and social and cognitive psychology (Brickman, 1971; Parnucci, 1995).

Well-being is considered subjective as individuals evaluate themselves and their life position which in turn influences the extent to which they experience a sense of wellness. For example, a judgement of high SWB due to positive cognitive appraisal of life satisfaction, across life domains is said to reflect positive emotions and feelings at an affective level. While low SWB reflects unpleasant



or negative emotions due to an appraisal of dissatisfaction with one's life circumstances (Diener et al., 1999). SWB has been used synonymously with happiness and thus increasing personal levels of happiness is considered to lead to higher levels of positive well-being (Ortiz-Ospina & Roser, 2013).

### 2.3.3 Eudaimonic

In the Eudaimonic tradition, the focus is placed on 'living life in a full' in a deeply satisfying way (Ryff, 1989). This perspective considers well-being to consist of more than the pursuit of happiness and activities that lead to positive affect and pleasure, which is not assumed to mean that individuals are psychologically well. Instead Eudaimonia is concerned with 'living well and actualising one's human potential (Niemić, 2014; Waterman, 2008).

Well-being is considered to be a process of fulfilling or realising ones true nature as opposed to an end goal or state of being. The Eudaimonic view has been traced back to Aristotle and is aligned with humanistic psychology due to its understanding that people have free will to make choices which will in turn influence their personal well-being. Thus, definition's such as "*feeling satisfied and happy, well-being means developing as a person, being fulfilled, and making a contribution to the community*" (Marks & Shah, 2004, p. 2) have been offered.

The Eudaimonic approach considers the importance of a sense of control and autonomy over one's life, the need for meaning or purpose, belongingness and social contribution, personal growth, and self-acceptance beyond the pursuit of pleasure. For example, Ryff (1989) and later Ryff and Singer (1998); (Ryff & Singer, 2000) proposed a multi-dimensional model of psychological well-being. Their approach identified six core dimensions; self-acceptance; purpose in life; environmental mastery; positive relationships with others; personal growth; and autonomy (Ryff & Singer, 2008). Self-determination theory (SDT) (Ryan & Deci, 2000) also falls under this umbrella heading. Three basic psychological needs are identified, autonomy, competence, and relatedness. Fulfilment of these needs is considered essential for psychological growth (e.g. intrinsic motivation), integrity (e.g. internalization and assimilation of cultural practices), and well-being (e.g. life satisfaction and psychological health), as well as the

experiences of vitality (Ryan & Frederick, 1997) and self-congruence (Sheldon & Elliot, 1999). SDT differs from Ryff and Singers approach, Ryan and Deci (2000) proposed that their three factors fostered well-being as opposed to defining well-being.

#### 2.3.4 Continued debate

Discussions of well-being have also focused on integrating these two distinct philosophical approaches. For example, both approaches are thought to constitute well-being and the application of both together has been argued to provide a more thorough assessment of well-being (King & Napa, 1998; McGregor & Little, 1998). To further complicate understanding, well-being (in the health psychology literature) is regarded within QoL. Whereby QoL takes into account measures of well-being. Indeed, strong correlations between QoL and life satisfaction have been reported (Yildirim et al., 2013). Equally, well-being has also been placed within the framework of mental health and has been proposed by some as a means by which to address or prevent the onset of mental ill health. For example, the adaption of the Geoffrey Rose argument (Rose, 1985) places positive well-being on a single continuum with positive mental health at one end and mental ill health at the other. Rose's argument being that if well-being can be increased at population level then the number of individuals experiencing mental ill health will be greatly diminished i.e. less people will meet criteria for a CMD. However, this view is not supported by all. For example, in 2013 the Chief Medical Officer (CMO) advised caution in applying this view (Davies, 2013).

This thesis aligns itself with the definition provided by The Foresight Mental Capital and Well-being project (Jenkins et al., 2008), on the basis that this definition includes both Hedonic and Eudemonic perspectives.

#### 2.3.5 Measurement of well-being

Effective measurement of well-being remains a topic of debate (Allin & Hand, 2017) and, in line with the above, no single measurement tool has emerged. For example, in 2010 the ONS established a new programme to measure national well-being, the programme was called the 'Measuring National Well-being Programme' (MNW). The programme was driven following international discussion e.g. (OECD, 2007; Self et al., 2012) surrounding the usefulness and

limitations of traditional macro-economic approaches i.e. GDP. Increased GDP is not associated with increased well-being (Eckersley, 2000) nor was it developed as a measure of population well-being. Thus, the ONS included measures of societal level well-being, social progress, QoL and environmental impact (Cummins et al., 2003). A 41-item, ten domain tool was implemented measured on a yearly and five yearly basis. The ‘Personal well-being’ component comprised four different subjective well-being assessments: life satisfaction, worthwhile, happiness, anxiety and mental well-being; measured by one question each. These questions were also included in the Annual Population Survey (APS) in 2011. More recently (February 2019) the ONS updated this measurement tool and combined data on personal and economic well-being for the first time.

Across the UK similar, wider measures of well-being have also been introduced. For example, Scotland, introduced the National Performance Framework’ (June 2018) and Northern Ireland moved to a societal level well-being assessment based on the well-being framework of 12 outcomes and 49 supporting population indicators (2016-2017). While Wales released ‘Well-being of Wales’ (2018) in response to the well-being of Future Generations (Wales) Act 2015. The Act established 46 national well-being indicators organised across seven domains. The Act placed a legal responsibility on public bodies to consider the well-being of their populations and preventative measures for change and improvement across five sustainable development principles: Long-term thinking, Prevention, Integration, Collaboration, and Involvement. Population mental well-being is measured by one indicator (#29) across two domains.

In addition to government led measurement tools several others have been developed. The most prominent of which has been the Warwick and Edinburgh Mental Well-being Scale (WEMBWS) (Maheswaran et al., 2012; Tennant et al., 2007), available in a seven (SWEMWBS) and, 14-item format.

### 2.3.6 Prevalence of well-being

Available well-being data remains limited in comparison to prevalence rates for mental health i.e. CMDs which are more widely reported, measured and

considered. However, the ONS reported sustained improvement in UK well-being year on year since 2011. Despite deterioration in two domains i.e. the percentage of people reporting they have someone to rely on, fell from 86% to 84% ('Our Relationships' domain); and job satisfaction, which fell from 56% to 54% ('What we Do' domain) (ONS, 2019c). Equally following the current COVID-19 pandemic national well-being is likely to be negatively impacted (Hisham et al., 2020; ONS, 2020a; Röhr et al., 2020; White & Van Der Boor, 2020).

Personal well-being saw sustained improvement in the UK between 2011 and 2018 (ONS, 2019b). Mental well-being rose by 5%, feeling worthwhile increased by 4% while self-reported happiness did not change. Life satisfaction scores were high 30%, as was life happiness 35% and anxiety was low 40% in the population surveyed.

However, variation in well-being across the UK has been observed. For example, a higher proportion of people in Northern Ireland self-reported high personal well-being compared to those living in Wales, where more people reported low levels of worthwhile and happiness. Greater disparity in life satisfaction in Wales was also observed compared to the UK overall. More people in Wales reported both low levels of life satisfaction and very high levels of life satisfaction (ONS, 2018a).

## **2.4 Web-Based Context**

In response to the significant global health burden associated with HRLBs and poor mental health and well-being, a diverse range of treatments, management plans and interventions have been developed. Traditionally mental health interventions are delivered in a range of face-to-face settings, patients see a clinical specialist for one-to-one or group-based treatments. However, in recent years web-delivered mental health interventions have extended the reach of traditional therapeutic services. Equally HRLB interventions have also extended

to include web-based delivery formats. One systematic review identified 85 interventions (Webb et al., 2010).

Barak et al. (2009, p. 5) define a web-based intervention as:

*“...a primarily self-guided intervention program that is executed by means of a prescriptive online program operated through a website and used by consumers seeking health- and mental health–related assistance. The intervention program itself attempts to create positive change and or improve/enhance knowledge, awareness, and understanding via the provision of sound health-related material and use of interactive web-based components”.*

Barak et al. (2009) also outlined a range of components typically included i.e. therapeutic content, interactive exercises and activities, multimedia content and feedback.

#### 2.4.1 Growth of web-delivered mental health interventions

The key motivation for utilising technology to deliver health treatments via the web centres directly on the need to reduce the public health burden associated with mental and physical health disorders. Financial constraints on the NHS across the UK have meant that access to mental health treatment is limited by long waiting lists, inadequate numbers of trained professionals (Williams et al., 2008); (Smith et al., 2019) and social stigma attached to mental health in general; the experience of social stigma causes many not to initiate or continue effective treatment (Corrigan, 1998; Griffiths et al., 2006; Knaak et al., 2017; Vogel et al., 2007). These issues are thought to reduce the numbers willing or able to attend and receive treatment. One study reported that 75% of urban populations diagnosed with depression experienced at least one barrier restricting their access to treatment, while barriers in rural populations are understood to be significantly higher (Mohr et al., 2010). Furthermore, poor well-being is not a diagnosable condition thus those suffering do not have automatic access to treatment, although tier zero services are increasing (e.g. social prescribing).

As a result, web-based and web-delivered interventions have emerged as an effective (Amstadter et al., 2009; Andersson & Cuijpers, 2009; Barak et al.,

2008; Knaevelsrud & Maercker, 2010; Lenhard et al., 2014; Morrell et al., 2016) and cost-effective (Andrews et al., 2010; Donker et al., 2015; Gräfe et al., 2019; Le et al., 2019) means by which to address some of the barriers to access associated with traditional mental health treatments (Walker, 2006). The issue of inadequate resources and low numbers of trained professionals can be addressed through automated web-delivered interventions which do not require professional support. This delivery format also addresses social stigma. Web-delivered interventions are accessed confidentially and securely via a computer interface in potentially any location at any time chosen by the individual user. Access can be gained from any location with WIFI or 3G network coverage. In 2020, 92% of adults in the UK accessed the internet every day (ONS, 2020b).

Research has suggested that people are more likely to disclose personal information while using text-based computer mediated communication, than during face-to-face communication (Mohr et al., 2011). Web-based interventions do not require users to identify themselves, thus the anonymity afforded through these platforms may encourage higher rates of personal disclosure and could be therapeutically beneficial (Bargh et al., 2002; Lederman et al., 2014). Equally they offer a potential means to increase engagement with mental health treatments across certain sub-groups of the population (Coyle et al., 2007). For example, patients who are geographically dispersed or, have difficulty accessing traditional in person services or who are unable to travel for treatment, can access treatment at a convenient time and location for themselves (Beattie et al., 2009). As such web-based delivery options increase convenience for users (Day et al., 2013). However, it is important to note that specific subsets of the population have limited internet access due to literacy and language barriers, financial limitations and slow or restricted WIFI and broadband services. This has been referred to as the ‘digital divide’ (Neuhauser & Kreps, 2003).

#### 2.4.2 Terminology

Advances in digital technology have led to an unprecedented rise in digital healthcare delivery. For example, the format through which health care is delivered has expanded to include a variety of personal devices including mobile phones, remote monitoring devices and other wireless enabled devices as well

as laptops and PCs. As a result, a host of new terms have emerged. For example, digital health, eHealth, mHealth and connected health.

As the focus of this thesis is on web-delivered interventions it is important to recognise the range of terms being used. For example, web-delivered interventions and treatments based on traditional Cognitive Behavioural Therapy (CBT) have been referred to as computerised CBT (cCBT) and internet delivered CBT (iCBT). Equally non-CBT based therapies have gained prominence more recently, including acceptance and commitment therapy (ACT), positive psychology and mindfulness-based interventions (MBIs). All of which have been implemented in a web-delivered format for the treatment of mental health, well-being and lifestyle behaviour.

#### 2.4.3 Effectiveness of web-based interventions

The effectiveness of web-based interventions has been established for a range of mental health conditions (Barak et al., 2008). For example, cCBT/iCBT for the treatment of depression has been widely demonstrated (Andersson & Cuijpers, 2009; Andrews et al., 2010; Foroushani et al., 2011; Spek et al., 2007), as has treatment for anxiety disorders (Davies et al., 2014; Loughnan et al., 2019; Richards et al., 2015), alcohol and substance abuse (Black et al., 2016; Rooke et al., 2010), insomnia (Ho et al., 2015; Soh et al., 2020), health problems (Cuijpers et al., 2008), PTSD (Lewis et al., 2019; Sijbrandij et al., 2016) and stress (Day et al., 2013; Rose et al., 2013).

Equally ACT in a web-based delivery format is effective for the management of depression, anxiety (Brown, Glendenning, et al., 2016) and health anxiety (Hoffmann et al., 2020). As are MBIs for the treatment of depression, anxiety (Goldberg et al., 2018; Spijkerman et al., 2016) and psychological distress (Ma et al., 2018).

Web-based mental health interventions are delivered in a guided or automated format. Guided interventions refer to programmes which involve an element of human interaction, the guide can be a therapist, a counsellor, or a non-clinical guide for example an administrator (Titov, Andrews, Davies, et al., 2010). The type of guide has not been found to mediate effectiveness (Baumeister et al., 2014). Automated interventions do not include a guide, users interact with the

programme autonomously. Less resources are required for automated delivery. Guided web-delivered CBT is as effective as traditional modes of delivery i.e. face-to-face CBT (Cuijpers et al., 2009; Johansson & Andersson, 2012; Spek et al., 2007), and more effective than automated interventions (Richards et al., 2015; Richardson & Richards, 2012). Although effect size varies, and one review suggested the effect was not as pronounced as previously reported (Baumeister et al., 2014). Equally, systematic review studies have found that guided web-delivered MBIs have significantly higher effect sizes compared to their automated counterparts (Spijkerman et al., 2016). However automated interventions are effective (Cuijpers et al., 2011; Karyotaki et al., 2017).

Web-based interventions are also regarded as effective for the management of well-being. For example, Powell et al. (2013) reported positive findings from a RCT of the widely reported 'Moodgym' intervention, based on CBT self-help principles for the improvement of emotional well-being in the general population. Well-being outcomes were measured using the WEMWBS and results reported significant improvement at six and twelve-week follow-up compared to a wait list control (WLC) group. However only a small proportion (26%) of participants completed the programme. Twomey et al. (2014) conducted another RCT of Moodgym, in the general population. Moodgym was effective at reducing psychological distress compared to WLC. Psychological distress was measured using the Depression Anxiety Stress Scale (DASS) and the Work and Social Adjustment Scale (WSAS). As with the earlier study (i.e. Powell et al., 2013) only 28% completed post assessment measures.

Cobb and Poirier (2014) reported findings from a pragmatic evaluation of a multi-modal online well-being intervention, 1,503 participants from the USA were randomised to receive the 'Daily Challenge' intervention or no treatment. The intervention included a daily health related challenge, which covered a range of health topics. Results indicated that well-being, measured using an individual-level well-being assessment and scoring method (scale: 0 to 100), increased with a dose-response relationship. Higher engagement (with the intervention) was associated with a higher well-being score. Greater improvements were observed in participants who took part in the social networking activities included in the intervention. J. Mitchell et al. (2009)



conducted a three-armed RCT of a positive psychology intervention to promote well-being. Significant improvements in well-being were observed for the strengths-based intervention but not the problem-solving based intervention. As with Powell et al., (2013) attrition was significant (83%). Shandley et al. (2010) evaluated well-being following use of a serious game-based intervention ‘Reach Out Central’, designed to improve the mental health and well-being in young persons aged 18-25 years, using CBT. Positive outcomes for female participants were observed however males did not benefit. Well-being was assessed using the Kessler Psychological Distress Scale (K10) and the Resilience Scale-short form alongside the Coping Strategy Indicator short form. Lappalainen et al. (2013) compared the ‘P4Well’ intervention to WLC to treat stress-related psychological problems in a small RCT (24 participants). The guided (therapist assisted group meetings) intervention combined CBT and ACT with personal health technologies (mobile phone applications, and personal monitoring devices). Findings suggested depressive and psychological symptoms decreased and self-rated health and working ability increased as a result of the intervention programme. Aikens et al. (2014) reported positive outcomes from a workplace MBI designed to treat stress and increase resiliency and well-being. A significant decrease in stress, measured using the Perceived Stress Scale (PSS-14), and increase in well-being, assessed using the Connor-Davidson Resilience Scale, were observed. Other support comes from a meta-analysis of 21 RCTs (Carolan et al., 2017) which reported that web-based interventions improved workers’ psychological well-being and increased work effectiveness. Equally a Meta-analysis of 39 psychological interventions reported positive outcomes for well-being (Bolier et al., 2013). While others (Manicavasagar et al., 2014; Woodworth et al., 2017) report the effectiveness of positive psychology interventions to increase well-being. Although web-based positive psychology interventions are less effective than traditional approaches (Koydemir et al., 2020).

Web-based interventions designed to address lifestyle behaviour change and behavioural health are effective with a small but significant effect on health behaviour reported (Beishuizen et al., 2016; Davies et al., 2012; Kodama et al., 2012; Vandelanotte et al., 2007; Wantland et al., 2004; Webb et al., 2010)

(Myung et al., 2009). However significant heterogeneity and high attrition rates are widely identified as a limitation.

Behavioural health is “*concerned with the maintenance of health and prevention of illness in currently healthy individuals through the use of educational inputs to change behaviour and lifestyle*” (Ogden, 2012, p. 3). Public Health England (PHE) advocate the role and contribution of behavioural and social sciences within the public health agenda (PHE, 2016b) and it is well established that HRLBs predict mortality and longevity (Belloc, 1973; Belloc & Breslow, 1972). As such, theories predicting HRLB have been widely adopted in web-based interventions (Conner & Norman, 2017). Key theories include the Health Belief Model (HBM), the Theory of Planned Behaviour (TPB), the Transtheoretical Model/Stages of change (TTM) and Social Cognitive Theory (SCT). Webb et al. (2010) reported that interventions which applied behaviour change theories were more effective at changing HRLBs. Furthermore, different theories were found to be more effective than others in this setting. For example, the TPB was associated with larger effect sizes than SCT or TTM (Taylor et al., 2006). While the National Institute for Health and Clinical Excellence (NICE) review found the TTM to be the most comprehensive (Taylor et al., 2006).

However, many of the models are not well defined or operationalised, have overlapping constructs (Conner & Norman, 2017; Orji et al., 2012) and often fail to predict behaviour (Norman & Brain, 2005). Taylor et al. (2006) concluded there was no evidence to support these models for improvements in disease mortality. Although they highlighted their contribution to public health in terms of improving and adding to public knowledge and understating of health and personal health responsibility and reduction in mortality following interventions targeting HRLBs. For example, Chakraborty et al. (2018) reported positive effects of a six-month, web-based quit smoking intervention which utilised tailored stories. Lambert et al. (2018) reported positive results from a pilot study of ‘eMotion’. Inactive participants increased their physical activity two-months post intervention. Equally Boß et al. (2018) reported positive effects of a, web-based alcohol intervention, delivered over five-weeks. Mean weekly alcohol consumption was reduced in the German working population. The intervention incorporated feedback, motivational interviewing, goal setting,

problem-solving and emotion regulation. While Brindal et al. (2012) reported positive outcomes for a 12-week web-based weight loss and diet intervention, with more effect found for older female participants. While a meta-analysis identified effective weight loss interventions (Neve et al., 2010).

Others have focused on multi-component interventions for example, Patrick et al. (2011) found a 12-month intervention effective for dietary change and activity in men but weight loss only improved in those who adhered. Wilson et al. (2015) reported that multi-faceted interventions facilitated greater HRLB change and Conner et al. (2016) found that multi-component interventions targeting one key behaviour improved out-comes for other HRLBs.

#### 2.4.4 System design

Face-to-face therapy (regardless of therapeutic approach) usually involves some aspect of personal choice or negotiated choice pertaining to focus and methods used (Wills & Holmes-Rovner, 2006). It has been proposed that this element of individualisation, is important for treatment outcome (Andersson et al., 2011). Web-based mental health interventions have therefore implemented elements of free choice and flexibility via navigation. For example, Carlbring et al. (2011) included individualised advice for module selection within a guided self-help programme. Day et al. (2013) developed five core modules and then offered additional modules for users to select freely and concluded that individually adaptable interventions were effective for the reduction of psychological distress in a student population. Similarly, Andersson et al. (2011) included free selection of all modules to users with comorbid anxiety disorders with positive effect.

In addition to mode of delivery and navigation, persuasive technology, is of interest. Persuasive technology refers to technology that is implemented to change attitudes and or behaviours through persuasion and social influence, but not through coercion (Adams et al., 2009; Fogg, 1998; Hamari, Koivisto, & Pakkanen, 2014). Examples of persuasive features include tailoring, tunnelling, reduction, self-monitoring, personalisation, reminders, simulation and rehearsal, praise, reward, suggestion, similarity, liking and social role (Kelders et al., 2012).

Evidence exists to support the role of some of these features in a web-based mental health (McCall et al., 2021), health and wellness (Orji & Moffatt, 2018) and lifestyle behaviour change (Aldenaini et al., 2020) context. For example tailoring, which refers to the combination of different modules for different patients in response to screening questions, has increased intervention effectiveness (Johansson et al., 2012). Authors compared a tailored intervention for depression against a standard guided intervention in a three-armed RCT and concluded that tailored treatment was more effective for patients with higher levels of depression at baseline and comorbid conditions. Silfvernagel et al. (2012) explored the use of tailoring for panic attack in 57 patients across two age groups using an eight-week guided CBT intervention. They reported that tailoring was feasible and effective for the treatment of panic symptoms and comorbid anxiety and depression. While others reported effectiveness for anxiety disorders (Carlbring et al., 2011) and depression (Meyer et al., 2009). Similarly, depth and personalisation of tailoring has been associated with increased adherence (Strecher et al., 2008).

Use of persuasive design features has varied across mental health interventions. A recent meta-analysis reported between one and 13 features were commonly included, with a mean of 4.95 (McCall et al., 2021). The review also established a dose-response relationship, whereby the inclusion of more persuasive features was associated with greater effect, for depression but not anxiety (McCall et al., 2021). Equally, an earlier study reported mean inclusion of 5.4 features (Kelders et al., 2012). Their study reported that lifestyle interventions often include a greater number of persuasive technology features than mental health interventions. Authors reported that self-monitoring was most widely used (94%) in lifestyle interventions, whereas only 12%, of mental health interventions included it. In contrast tunnelling was incorporated in all mental health interventions compared to only 10% of lifestyle interventions reviewed. Tunnelling refers to the route through which users access content (Oinas-Kukkonen & Harjumaa, 2009). Reminders however were commonly used (74%) across both settings but rewards and rehearsal were not. While personalised communication techniques have been found to support behaviour change; text message reminders employed to promote interaction, encourage

engagement, challenge dysfunctional beliefs, provide a cue to act, had a small but positive effect on behavioural outcomes (Webb et al., 2010).

Another recent review identified tracking/self-monitoring, reminders, personalisation, goal setting, rewards, and social support, as the most effective and frequently implemented persuasive strategies for lifestyle behaviour change. Authors reported that interventions which employed behaviour change theories alongside persuasive system design were the most effective (Aldenaini et al., 2020). While (Orji & Moffatt, 2018) reported variation across lifestyle behaviours. Specifically, persuasive design was more effective in weight and physical activity related behaviour change than in those interventions which addressed smoking and substance related behaviours. Thus the literature base pertaining to system design has moved forward in recent years (since the conception of this thesis) and additional understating has been gained however the call for further research remains (McCall et al., 2021).

#### 2.4.5 Adherence and engagement

Despite significant evidence to support the effectiveness of web-delivered interventions, many studies have failed to produce positive outcomes. For example, Habibović et al. (2014) conducted a web-based distress management program for patients with an implantable cardioverter-defibrillator. The 12-week fixed, six-lesson behavioural treatment intervention was based on CBT and was not effective in improving outcomes for anxiety, depression or HRQoL (Mental Component Scale). A meta-analysis of 11 'Moodgym' intervention studies found only tentative support for its effectiveness for anxiety (Twomey & O'Reilly, 2016). While a meta-analysis of nine web-based intervention studies demonstrated non-significant results for depression and only potential for well-being improvement, in patients with type II diabetes (Hadjiconstantinou et al., 2016). Likewise, Norman et al. (2007) reviewed 47 different physical health interventions designed to improve diet, exercise and weight management, 24 of which did not report positive results. Equally Kelders et al. (2011) reported no positive effects following a RCT designed to improve diet and exercise.

One key reason identified for this, has been poor adherence and engagement to prescribed therapeutic content (Christensen et al., 2009; Postel et al., 2011; Wangberg et al., 2008) and is of widespread concern (Bubolz et al., 2020; Donkin et al., 2011; Hilvert-Bruce et al., 2012). Nonadherence refers to the non-use of the intervention as prescribed i.e. participants do not use the intervention in the way it has been intended, do not use the intervention for the intended duration, or do not engage with the content as intended (Kelders et al., 2012). In line with the behavioural science understanding of the term (Perski et al., 2017).

While reporting of adherence and engagement is varied, and a variety of terms have been used including: dropout, attrition, non-completers, loss and retention rate (Brown, O'Neill, et al., 2016), some interchangeably, this issue remains the same. Poor adherence and engagement have the potential to limit effectiveness (Donkin et al., 2011; Linardon & Fuller-Tyszkiewicz, 2020; Manwaring et al., 2008) and reduce cost effectiveness (Osborne et al., 2019). Reported rates of dropout are significant and vary widely. For example, Melville et al., (2010) reported a range between 2% - 83% with an average of 31%, while Kelders et al. (2012) reported 50% dropout.

Adherence and engagement with mental health treatment is critical to treatment success (Asay & Lambert, 1999). This is of no less importance in web-delivered treatments. Thus, it is critical to design interventions which encourage engagement with content. Without face-to-face support, established via the therapeutic relationship, active ingredients which support continued use play a critical role. For example, 'homework' is a key feature of CBT and indeed many other therapeutic approaches (Kazantzis & Deane, 1999). The inclusion of homework in CBT aims to establish continued engagement with resources and therapeutic strategies by encouraging the adoption and practice of new skills in patients' real word contexts. Equally, psychoeducation plays an important role in improving compliance, promoting engagement and reducing relapse rates (McGorry et al., 2007).

Several researchers (Coyle et al., 2007; Kelders, Bohlmeijer, et al., 2013; van Gemert-Pijnen et al., 2011) have suggested that the reason for this failure is that adequate attention has not been paid towards the technology used in the

development and adaptation of traditional mental health treatments into their web-delivered formats. The focus has mainly resided on the treatment i.e. the intervention content itself and not on the technological aspects involved in delivering treatment remotely. Equally the user experience associated with receiving a web-delivered treatment has not been adequately considered or addressed. As such, research has been directed towards exploring technological aspects of delivery with some focusing on delivery mode (Baumeister et al., 2014), navigation (Strecher et al., 2008), interactive design features (Gliddon et al., 2015), persuasive technology (Kelders et al., 2012), social interaction (Van Kessel et al., 2016), and gamification (Edney et al., 2020).

Schubart et al. (2011) reported that tailored interventions which addressed health concerns at individual level and included feedback were associated with higher adherence and engagement. Their study considered adherence to be the number of users who remained engaged with the intervention and did not dropout. Brouwer et al. (2011) systematically reviewed a range of technological intervention characteristics employed in web-delivered HRLB interventions in relation to adherence and engagement and concluded that guided support, reminder messages and website updates increased adherence and engagement. This review considered adherence in relation to website log in rates, and time spent viewing pages. Kelders et al. (2012) added to this finding, they identified that guided interventions which employed a RCT study design, expected more frequent intended usage, included frequent updates and extensive dialogue support predicted higher adherence and engagement, while social support did not influence adherence. They classified adherence as the extent to which users engaged with the intervention as intended and reviewed interventions designed to treat chronic health conditions, lifestyle behaviours and mental health conditions. However subsequent systematic reviews have highlighted that adherence to guided and automated interventions it is not as clear cut as initially anticipated (Beatty & Binnion, 2016). Others have reported that free navigation (Strecher et al., 2008) and asynchronous email support encouraged adherence (Arnold et al., 2019). Furthermore, a review of 19 web-based health and lifestyle interventions found that more frequent use of reminders or prompts increased adherence (Neff & Fry, 2009). Periodic prompts (e.g. SMS/email reminders)

are defined as “*messages, reminders, or brief feedback communicated to participants multiple times over the duration of an intervention*” (Neff & Fry, 2009, p. 2).

More recently (Linardon & Fuller-Tyszkiewicz, 2020) reported interventions based on ACT, which included financial incentives and used reminders were associated with positive adherence. While social networking features and personalised meal planning recommendations in a web-based weight loss program increased the average number of days that a user engaged with the system (Brindal et al., 2012). Involvement with messages increased engagement and higher engagement predicted weight loss in one study (Hageman et al., 2019)). Equally Gamification has been proposed as a means to encourage adherence and engagement through increased enjoyment facilitated by the inclusion of playful enjoyment (Baranowski et al., 2008; Cugelman, 2013; Hamari, Koivisto, & Pakkanen, 2014). While more recently machine learning has indicated that personalised content can increase use at all engagement levels i.e. low to high (Chien et al., 2020).

In addition, many non-technological characteristics have been explored for their role in influencing adherence and engagement to web-based health interventions. For example, older females and higher educational attainment are associated with higher adherence and engagement (Kohl et al., 2013; Perski et al., 2017). Equally fewer clinical symptoms predicted better adherence (Christensen et al., 2009). While promoting effective engagement has identified the role of intrinsic motivation (Yardley et al., 2016) personal relevance, perceived barriers, expectations, self-efficacy and computer literacy (Beatty & Binnion, 2016; Gulliver et al., 2020; Kazlauskas et al., 2020; Perski et al., 2017). However significant heterogeneity between studies, context, intervention features have meant conflicting findings and a lack of clarity (Yardley et al., 2016).



## 2.5 Participatory Design

*“Participatory design is research”* (Spinuzzi, 2005, p. 163).

Participatory design (PD) is a collaborative research design method interested in the production of artefacts, software, hardware, computer products, systems and computer-based activities (Muller, 2007; Spinuzzi, 2005). Informed by Participatory Action Research (PAR) and Participatory Research (PR) (Greenbaum & Loi, 2012), PD explores conditions for end-user participation in the design and introduction of computer-based systems across diverse organisational and institutional settings (Kensing & Blomberg, 1998; Sanders, 2002).

PD has incorporated theories from diverse fields of research including user-centred design, interaction design, Human computer interaction (HCI), Graphic design, Psychology, Anthropology, and Political science (Greenbaum & Loi, 2012; Gregory, 2003). More recently it has been aligned with notions of inclusive design including, disability design research, cultural sensitivity, and general exclusion issues (Muller, 2007). As a result, a wide range of techniques, tools and methods have been developed and incorporated. For example, ethnographic observation, interviews, interactive group work and analysis of artefacts (Spinuzzi, 2005). Such methods are combined to facilitate an active and iterative design partnership (Muller, 2007) which has the potential to offer critical insight and understanding of user motivation and engagement (Sanders, 2002). A key issue for web-delivered health and well-being interventions.

The motivation to include end-users has come from two key perspectives. Firstly, from a political perspective. The guiding principle of PD is a belief in democracy and a desire to improve and inform the development of products and services which empower the end-user (Kensing & Blomberg, 1998; Muller, 2007; Spinuzzi, 2005). The PD approach attempts to explore and preserve end-user tacit knowledge i.e. knowledge that is learned through experience (Spinuzzi, 2005, p. 164). Preservation of tacit knowledge is thought to ensure

new computer-based systems and products are aligned with existing ways of working. This knowledge is then used to empower end-users (Muller, 2007). For example, (Blomberg et al., 1996) explored the tacit knowledge of document analysts i.e. workers employed to code legal documents. Their study showed that these workers undertook complex interpretative tasks and highlighted the undervalued knowledge of many workers (Clement & Van den Besselaar, 1993). Furthermore, the value of end-user contributions is considered equal to those of the designer and PD researcher. This element of equality and respect underpins the approach to empower users to gain ownership of the output (Muller, 2007).

Secondly, from a technological perspective, the inclusion of end-users in the design process ensures the incorporation of user-specific requirements, user insights and user identified needs, leading to more effective products (Thinyane et al., 2018). In this vein PD has the potential to address poor adherence and engagement to web-delivered interventions (Sin et al., 2019; van Gemert-Pijnen et al., 2011; Yardley et al., 2016).

### 2.5.1 Historical background

PD emerged in Scandinavian workplaces during the 1970s (Spinuzzi, 2005; Kensing & Blomberg, 1998). At the time, workforces were facing large scale automation and subsequent unemployment, as machines and technology replaced traditional skills, craft and techniques employed for generations (Ehn, 1990). Researchers, driven by political concerns, democracy and a desire to empower workers during a time of technological transformation, first facilitated participatory discussions between workers, trade unions and organisations to redress the balance of power and ensure that new technology, was developed in line with worker needs and both valued and preserved their tacit knowledge (Kensing & Blomberg, 1998). This approach was in contrast to existing 'top down' hierarchical approaches (Spinuzzi, 2005). For example, initial introduction of computer-based systems to the workplace were management led, and has been described as lacking in concern for those workers who were displaced, de-skilled and disempowered i.e. a neglect of workers interests and working QoL (Sandberg, 1979). Thus, early PD researchers pioneered a new approach, based on a desire to create positive change in the workplace (Spinuzzi,

2005). Historically it was the importance of this objective, that workers remain empowered within their work setting and retained control over systems implemented, that was critical to its success (Spinuzzi, 2005).

Historically four projects led to PDs onward trajectory (Kensing & Blomberg, 1998) namely the Norwegian Iron and Metal workers union (NJMF) project (Nygaard, 1979), the Swedish Democratic Planning and Control in Working Life (DEMOS) project (Ehn & Sanberg, 1979), the Danish Democratic Development and Computer Processing (DUE) project (Kyng & Mathiassen, 1979) and the Training, Technology and Product in Work Quality Perspective (UTOPIA) project (1981-1984) (Kensing & Blomberg, 1998). This seminal work continued via the ‘Scandinavian challenge’, a research agenda considered a critical element in the historical development of PD (Nygaard, 1987). It explored the consequences of implementation of computer-based systems into the workplace (Kensing & Blomberg, 1998) and established an international research community focused on the “*interface between technology and the workforce*” (Kensing & Blomberg, 1998, p. 170). However, the movement was not wholly successful in its aims and workers continued to struggle to integrate their knowledge and traditional skill set into management-imposed systems (Kensing & Blomberg, 1998).

Outside of Scandinavia the method developed with less emphasis on democracy, Marxism and political workflows. In the US for example, researchers sought alternative ways to introduce the agenda and PD took a slightly different developmental path as a result (Kensing & Blomberg, 1998). Instead it emerged with a focus on functionality opposed to worker empowerment (Kensing & Blomberg, 1998). Early work raised awareness of the impact and consequence of developing new systems which failed to consider the role and knowledge of workers. As a result, nonintrusive techniques and small-scale activities, including one-to-one prototyping exercises and direct worker participation were employed (Kensing & Blomberg, 1998). Research was undertaken with participants and thus remained aligned with the early notions of PD (Kensing & Blomberg, 1998).

PD continued to develop, and the 1980s saw a shift in political culture across Europe which diminished the role and presence of unions (Kensing & Blomberg, 1998). This political shift resulted in a refocus on system design and the inclusion of additional stakeholders i.e. not just workers. For example, in north America the approach incorporated managers and workers as active participants (Korpela et al., 1998; Pilemalm, 2018). PD was increasingly applied to consumerist and commercial settings, which emphasised usability, effectiveness, and acceptability (Orlowski et al., 2015; Pilemalm, 2018). This phase has since been described as a “*second generation PD*” approach (Pilemalm & Timpka, 2008, p. 328) extended to a third generation via the inclusion of secondary stakeholder i.e. all potential system users and administrators (Pilemalm, 2018; Korpela et al., 1998) on the basis that empowering stakeholders, early on would improve end-user engagement through the creation of practical and user friendly systems (Pilemalm, 2018; Pilemalm & Timpka, 2008). However, application of this wider more inclusive approach has been criticised, increased complexity and additional barriers such as time constraints and difficulty accessing stakeholders has impacted research (Pilemalm, 2018).

### 2.5.2 Rapid growth

Recently, rapid growth and utilisation of PD has been documented (Sanders et al., 2010). Increased use and popularity stemmed from its application outside of traditional computer-based fields of work. PD has been adopted across, Commercial product design (Wilkinson & De Angeli, 2014), industrial and architectural design (Caixeta et al., 2013); Government space design programmes (Pilemalm, 2018); Public and Community design (Aguilar, 2015); Development of community health education tools (Schmidt, 2009; Stewart et al., 2008) and Health care (Lindsay, Brittain, et al., 2012; Lindsay, Jackson, et al., 2012; Matthews et al., 2008; Rothmann et al., 2016; Wadley et al., 2013) (DeSmet et al., 2016; Hagen et al., 2012).

Increasingly PD has been incorporated across diverse healthcare contexts. For example, healthcare professionals have been involved in the design of healthcare buildings. Caixeta et al. (2013) undertook a staged redesign of a hospital in Brazil, they included a document review phase, interview, and direct

observations of healthcare staff and patients. User groups (designers, patients and healthcare staff) discussed their needs pertaining to the hospital re-design, representatives of each group then collaborated in a neutral space within the hospital setting to share and communicate their ideas. Patients and healthcare users also completed detailed questionnaires explaining how they undertook workplace tasks; this supported the architect's understanding of the physical hospital space and the services delivered within it. The study realised time efficiencies in healthcare delivery and highlighted the value of user participation.

Healthcare staff and patient views have also been incorporated into experience-based co-design (EBCD) projects which explore end-user reflections and experiences to realise quality improvements within healthcare organisations. For example, (Donetto et al., 2015) applied PD to public health and healthcare improvement. Their six-staged approach utilised observational fieldwork and in-depth interviews to explore patient narratives and experiences. Researchers created a film based on patient narratives to stimulate discussion, among patients, carers and healthcare staff, to derive organisational change.

Equally end-users have shaped the design of health care products (Clemensen et al., 2007; Lindsay, Brittain, et al., 2012; Lindsay, Jackson, et al., 2012), large-scale health information systems (Pilemalm & Timpka, 2008) and discussed the impact of power relations within healthcare contexts to consider health outcomes (Rothmann et al., 2016). Clemensen et al., (2007) used PD to develop an intervention to support the treatment of foot ulcers in the home environment, for people with diabetes. (Berg & Gulden, 2012) used PD to explore patient views of hospital clothing. While (Lindsay, Jackson, et al., 2012) applied PD to engage older persons (aged 65 plus) in the design of technology to support healthy eating, mobility and home safety. Their approach utilised traditional PD tools which they adapted for use with older persons. They emphasised the importance of group atmosphere, approach and language used in scenario work. Users were asked to articulate their own requirements using ambiguous (does not display actual use nor portray right or wrong use) video prompts displaying future technology being used to identify key device features and functionality requirements.

In 2008 Pilemalm and Timpka applied PAR to the field of health informatics. They noted that user involvement led to the development of more effective and usable systems. The study established a design group which included two system designers, ten end-users and two managerial representatives. Twenty half day, meetings were facilitated over a two-year period, during which a design contract and project plan was established based on stakeholder perspectives, organisational analysis and iterative prototyping supplemented with a project diary accessible to all. More recently Pilemalm (2018) applied PD methods, which utilised qualitative enquiry to a civic engagement project which explored the re-organisation of the Swedish emergency response system. The ‘Enhanced Neighbours project’ included 50 volunteers from five rural villages in Sweden to develop collaborative processes and computer technology support for a civil, emergency response programme.

A meta-analysis by DeSmet et al. (2016) reviewed the role of PD on game effectiveness for serious digital games designed to improve lifestyle. The review considered 58 games. Benefits of PD included higher game effectiveness, game challenge and more effective behavioural change (informant role) however not all reported outcomes were positive. The need for further research exploring the role of user involvement was identified.

Rothmann et al. (2016) note PDs emergence and prominence in healthcare, in part, as a result of changes to patient provider relationship. Patients have assumed an active role in their care and taken on responsibility for managing and directing their own health and well-being, a role which was traditionally undertaken by the healthcare provider. This change in status coupled with the changes in demands placed on healthcare systems worldwide; aging population, budget restraints and a rise in complex and comorbid conditions, has facilitated an era where patient (end-user) demands could be incorporated, appreciated and considered in the development of new systems and services.

### 2.5.3 Web-based mental health context

Driving this rapid rise in application across healthcare research is the exponential growth of web-delivered and technology-based mental health interventions (Orlowski et al., 2015). For example, (Montague et al., 2014);

Montague et al. (2015) explored young people's (16-25 years) opinions of technology, and the role of technology to encourage mental health treatment engagement and use. The study included 21 participants across two focus groups. Findings indicated that the most reliable means of engagement could be garnered through identification of mental health client's preferred technology whilst integration of technology must not replace face-to-face time and should highlight the intended benefit of use.

Wadley et al. (2013) designed an online social therapy intervention for use by young persons with first episode psychosis to support and improve well-being. They produced and explored initial paper sketches in focus groups with anticipated end-users, and HCI experts. Delivery mode, functionality and design preferences were identified. A second focus group was run with mental health professionals to discuss clinical requirements of designs proposed. Data from these two sessions led to the development of a high-fidelity prototype which was tested for functionality and suitability by a panel of HCI experts. The design process was culminated in a final focus group presentation of the beta website and a six-week evaluation phase. Feedback advocated 16 design recommendations for use in a mental health context. Key recommendations of relevance included, consideration of end-user's cognitive capacity, system interest and engagement, pseudonymity in social discussions, and assurance of security and privacy. Kelders, Pots, et al. (2013) developed 'Living Life to the full', a web-based, ACT informed, intervention to prevent depression. Authors conducted stakeholder value specification, requirement sessions, rapid prototyping and usability testing. The value specification stage included 18 end-users. Equally a systematic literature review (Orlowski et al., 2015) identified 17 studies focused on the use of co-design and participatory methods in a youth (10-26 years old) mental health context, eight of the studies specified PD or PD as a sub-framework, the remaining studies were informed by user centred design and PAR. Seven studies were treatment focused interventions and ten were preventative. Two of which explored aspects of well-being as a preventative intervention (Lakey, 2014; Schmidt, 2009). The review indicated that participation in this context successfully shaped intervention development and facilitated design specification. However, insights from PD in the context of

technology-based mental health interventions have highlighted the importance of identifying user need and sensitivity to mental health state (Doherty et al., 2010; Matthews et al., 2008). As a result, guidelines have been published to support designers and researchers in non-traditional fields of use i.e. (Coyle et al., 2007; Doherty et al., 2010).

Early guidance for designers working to develop and implement web-based mental health interventions (Coyle et al., 2007) recognised the potential for technology and the critical role of designers and HCI experts in the development of web-based mental health interventions. Initial recommendations centred on the design of systems that complemented or copied existing face-to-face therapies, following which additional complexities and features could be added and incorporated into systems to devise new and specialised ways of working, the final stage proposed the inclusion of user feedback, to inform the theoretical approaches the treatment began from. Later domain specific guidance was provided as a result of research exploring the development of a ‘mobile mood diary’ for use by adolescents in therapist supported mental health relationships (Matthews et al., 2008). The study outlined a multistage process which incorporated designers and therapists as proxys for patients, working in parallel; stage one advocated use of focus groups and paper prototypes to iteratively develop high-fidelity prototypes. Focus groups were used to identify significant user interaction difficulties early in the design process. Stage two advocated a non-clinical user evaluation phase to test the ‘system’ and software at scale, over a short duration (two weeks), supplemented with follow up interview and focus group discussions to identify critical issues and implement changes to the prototype. Stage three introduced a clinical evaluation phase using the final prototype design. The study went on to identify visual design, use of animation, colour and interactive features i.e. rewards, unlocking and feedback, as important design features for use in this context and placed central importance on ease of use and provision of automated technical support.

Later the design and evaluation guidelines were broadened to include mental health technologies more generally (not just those specific to mobile applications) ‘Design for outcomes’ built on their earlier work and paid specific attention to; limited access to end-users and the need to adhere to strict ethical



procedures (Doherty et al., 2010). Three key design processes were identified; Firstly ‘design for outcomes’ identified the underlying need to increase mental health service capacity, increased effectiveness of and engagement with interventions. Achievement of these goals, via collaboration with mental healthcare professionals, in a user-centred, iterative design process incorporating simultaneous protocol development was advocated. Interdisciplinary collaboration was said to afford design advantages however others have noted difficulties associated interdisciplinary approaches, specifically stakeholders from different professional backgrounds do not have a shared language (Newell & Gregor, 2000). To attend to this, Doherty et al. (2010) recommend strategies which facilitate positive and respectful working environments for example, information gathering, role-play and future workshops. They also highlighted the importance placed on understanding and attending to the perspective of both the therapist and the HCI designer. Expert based evaluation strategies were suggested, developed during the course of the project to attend to emerging requirements from both perspectives. Alongside system protocols which included the following information; intended end users, treatment purpose, stage of treatment for which use is recommended, duration of treatment, termination of use, training required for use, and role of mental health professionals if appropriate (Doherty et al., 2010).

The second key consideration covered ‘design recommendations’, related to engagement and adherence. They reiterated the core component of PD approaches and emphasised the inclusion of end-users in the design process highlighting that participant interests should be actively explored to support designs and interactive features for system use. The design process should pay attention to the social and cultural context of intended use, cognitive difficulties and familiarity of technology intended for use. Therapist use should also be considered at this stage for those systems which support face-to-face treatment. Existing skills, knowledge, traditions and daily routines should be attended to, as should time constraints and ethical responsibilities, to guide the system development and support sustained use. At this point they reinforced their earlier guidance on ‘Privacy and security’ by clearly attending to data security and privacy in simple use statements or incorporating access codes for systems and

features like avoiding playing audio without end-user consent (Matthews et al., 2008). Final recommendations covered ‘evaluation’ procedures; ethical approval, evaluation at multiple time points with multiple clinical end-users, and application logs to analyse time, frequency and duration of use including non-use circumstances where the system is not adopted, or engagement is limited. Such data would support revision whilst also attending to the need for increased service capacity to underserved and hard to reach populations. Ethical HCI guidance for use mental health intervention development has also been provided (Roberts & Dyer, 2004).

These guidelines and others have been widely used. For example, Wadley et al. (2013) adopted a two staged design process informed by the work of (Coyle et al., 2007). Stage one involved co-design workshops, one with six mental health clients and a second with HCI and mental health professionals. The co-design workshops used four design sketches while acceptability testing was conducted by experts to refine the design for the final version prior to undertaking a six-week safety and acceptability by clients (who used it for four weeks and were supported by an online tutorial) and clinicians.

Equally, Ospina-Pinillos et al. (2019) reported use of PD with 17 native Spanish speakers, aged 16-30 years attending headspace, Australia’s National Youth Mental Health Foundation to culturally adapt a Spanish version of an Australian mental health eClinic triage service. Authors used The Young and Well Cooperative Research Centre’s guide ‘Participatory Design of Evidence-Based Online Youth Mental Health Promotion, Intervention and Treatment’ (Hagen et al., 2012) to inform the development of a six phased PD process; co-design workshops, knowledge translation, language translation and cultural adaptation, rapid prototyping and usability tests (alpha prototype), rapid prototyping (beta prototype) and user evaluation (delta prototype), and beta website.

Lindsay, Brittain, et al. (2012) modified PD methods for use with persons with dementia to develop a safe walking intervention. The study aimed to empower participants, give them a voice in the design of technologies, and to understand from their perspective how technology could be implemented to best support

their lives. Traditional PD tasks were adapted to explore holistic experiences and the day-to-day context of use as opposed to specific object orientated tasks. A two staged empathetic design process was developed. Stage one explored participants day to day lives to gain a shared understanding of technology use. Brainstorming techniques at the start of successive workshops reinforced shared goals and generated raw ideas. Stage two developed individually tailored prototypes to explore response to designs, thoughts and actual use. Combined with a multiple (3-4) weekly iterative design cycle using story boards and new paper prototypes. Future or imagined use was not included to avoid the need for abstract thought processes. To attend for cognitive impairment a constant review process was incorporated into sessions to ensure participants were accurately understood. Workshops were facilitated by the same researcher for consistency, following focus group processes and an in-depth documentation process involving individual consultation with each participant was used to ensure all had the opportunity to voice their opinion on each topic as it was addressed. Each workshop was mirrored with a caregiver session to attend to inconsistencies in articulation or conflict. Authors concluded that PD enabled them to successfully engage with persons with dementia to co-produce a person and tailored intervention designed to support safe unguided walking in the community.

Despite the need for sensitivity and specific consideration for use within the mental health context, traditional PD tools and many general design tools remain appropriate for use including; “*questionnaires, interviews, paper prototyping, user observation, think aloud protocols*” (Matthews et al., 2008, p. 635). Indeed, research has called for the active involvement of end-users in the development of web based mental health interventions to address poor end-user engagement (de Beurs et al., 2017).

#### 2.5.4 Context, tools and techniques

A central feature of the PD approach is the iterative design process and the application of diverse tools and techniques designed to facilitate continuous empowerment of participants (Spinuzzi, 2005). Two settings are advocated, a work-based or design setting, however ‘a third space’ has been proposed, situated in the work-based context but created for designing (Fowles, 2000;

Muller, 2007). Site selection is understood to influence the experience and perspective of participants (Muller, 2007). However, the choice of setting is based on a mixture of anticipated outcomes, study aims, intended use (Kensing & Blomberg, 1998) and practical considerations such as; budget, travel requirements, and tools required (Sanders et al., 2010).

PD stages are chronological however the approach affords flexibility which allows researchers to revisit stages and to add new users at multiple time points (Spinuzzi, 2005). At all stages it is imperative that participants be given the opportunity to reflect on the implications of the product and not just focus on the specifications and design details (Spinuzzi, 2005). While later design stages use quickly evolving and responsive prototypes (Spinuzzi, 2005).

Historically the tools and techniques have been a central focus of PD (Muller, 2007). However, the proliferation of PD and its extension into non-computer related fields, has meant that a wide range of tools and techniques have been employed under the umbrella of PD (Sanders et al., 2010). For example, Ethnographic observations; interviews; focus groups; workshops, stories and storytelling (including specific methods: CARD; PICTIVE; CUTA; pictureCARD) end-user photography; videos; games (Muller, 2007) and system design focused techniques including: Mock-ups, Scenarios, Simulations and Prototyping (Kensing & Blomberg, 1998). The choice of tools and techniques applied in each design stage is critical to the establishment of a connected, collaborative design process (Kip et al., 2019). For example, the dynamics of the group interview (focus group), necessitate communication between participants, on equal footing (Kitzinger, 1995). Participants concerns and views can be raised, explored and addressed actively to ensure their involvement moves beyond asking and addressing questions in separate analytical spaces. This is achieved via a sustained and continuous process of checking and validating interpretation and understanding (Kitzinger, 1995).

Equally usability and prototyping, components of user experience, are critical considerations. Usability refers to "*the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use*" (ISO-9241-11, 2018). Human-centred

design is characterised by “*the active involvement of users and a clear understanding of user and task requirements; an appropriate allocation of function between users and technology; the iteration of design solutions; multi-disciplinary design*” (ISO-13407, 1999).

Prototyping is incorporated to introduce new experiences for individuals (end-user) which is designed to assist them to consider ‘new’ technologies and future usage of existing technologies (Kensing & Blomberg, 1998). This approach triggers discussions. Low fidelity prototypes, commonly used in early design phases due to cost and time considerations (Kensing & Blomberg, 1998), help bring participants into contact with new technologies and designs early on in the development process. As such they also provide an effective way for participants to directly reshape ideas and designs. High fidelity prototypes focus on engaging the user in reshaping the product and its features. Design through action is facilitated more easily than through low fidelity prototypes. This approach has been effective in a range of settings. For example, Bertelsen and Nielsen (1999) utilised prototyping in a waterwaste treatment plant setting. Here the workplace was studied, and workers were video recorded and interviewed to create scenarios. The prototypes developed were explorative, developed to explore options for new software and ways of working which provided an overview of the plant to workers as they navigated the dispersed site. Prototypes prompted a discussion between stakeholders which enabled them to conceptualise the important issues relevant to their workforce. Design alternatives were identified and explored in a variety of hands on scenarios which incorporated different worker perspectives from across the plant.

Prototyping has also been used to develop software. Here prototypes are offered to participants (end-users) in successive sessions. The prototypes are gradually developed and functionality is added slowly over time. The software developed is an artefact for use by the participants (Muller, 2007). For example, a lifestyle behaviour change programme used in the workspace (current study) or a specific resource like a database (Trigg, 2000). Lim et al. (2008) suggested that prototypes create space to create designs, ask questions of the designs and highlight key issues.

### 2.5.5 User engagement

From the outset PD has focused on the exploration and collaborative inclusion of workers through an exploration of their skill, tacit knowledge and experience to inform the design and implementation of computer-based systems. Underlying this approach is the understanding that use and application of PD methods which include end-users will facilitate and realise a ‘better fit’ which will improve QoL and support end-user engagement (Clement & Van den Besselaar, 1993; Kensing & Blomberg, 1998; Orłowski et al., 2015).

The emphasis on active and collaborative participation, is thought to empower stakeholders to shape outcomes, lead conversations and participate in co-determined tasks i.e. tasks which are not researcher led. Of central importance is the establishment of effective and open communication between researchers and workers in order for each to understand the knowledge held by the other i.e. the worker needs to understand the technology and options available to them and the researcher needs to understand the context of use of the end product (Kensing & Blomberg, 1998). Clement and Van den Besselaar (1993) reviewed ten empirical PD studies and identified five elements critical to facilitate active and collaborative participation, they were; access to information, ability to take an independent standpoint, active participation in decision making, availability of PD tools and space to create a new approach. Others have since developed the guiding principles, for example, Bødker and Iversen (2002) explain that users need to experience future and intended computer based systems/products in order to explore what demands they have of it in order to avoid developing artefacts that merely work around existing issues. “*The practice of the users is [considered] the starting point of design*” (Bødker & Iversen, 2002, p. 12).

The active and collaborative design process is valued for its ability to offer diverse users a voice in the design process. The emphasis on respect and equality enables a shift in focus away from consideration of purely technical requirements towards an understanding of end-user needs and those of the organisation. These components have resulted in a shared understanding that participatory research can enhance recruitment and engagement (Cargo & Mercer, 2008; Jagosh et al., 2012), which reduce the likelihood that the system

will be rejected once in place. However, participation does not guarantee end-user use (Orlowski et al., 2015).

Of course, PD is not the only approach available for use in the development of computer-based systems. Others have developed online mental health interventions without applying PD. For example, Lauder et al. (2013) developed a sequential module based, self-help, online intervention for bipolar disorder, 'MoodSwings'. The adaptation of the program from a face-to-face group-based psycho-social intervention to an internet delivered one included, a psychologist, designers and clinical researchers. Intended end-users were not included. Iterative design cycles were used to develop the web display and content was compiled by experts. While Kelders, Bohlmeijer, et al. (2013) and Kip et al. (2019) followed the Centre for eHealth Research and Disease Management (CeHRes) Roadmap (van Gemert-Pijnen et al., 2011) to develop a web delivered depression interventions for depression and a virtual reality application to treat psychiatric disorders respectively. However, the CeHRes Roadmap explicitly specifies the inclusion of participatory methods and identifies that inclusion of stakeholders should be at both a structural and procedural level. Equally the tool identifies the need to develop technological aspects alongside intervention components and to integrate development processes actively with the healthcare context. The key difference between PD and the CeHRes Roadmap approach lies in the exact role of the participants, the latter includes participants in the initial stages i.e. contextual enquiry and value specification however once values are identified they are prioritised and transformed into requirements to inform the later design stages which are led by a project team (Kip et al., 2019).

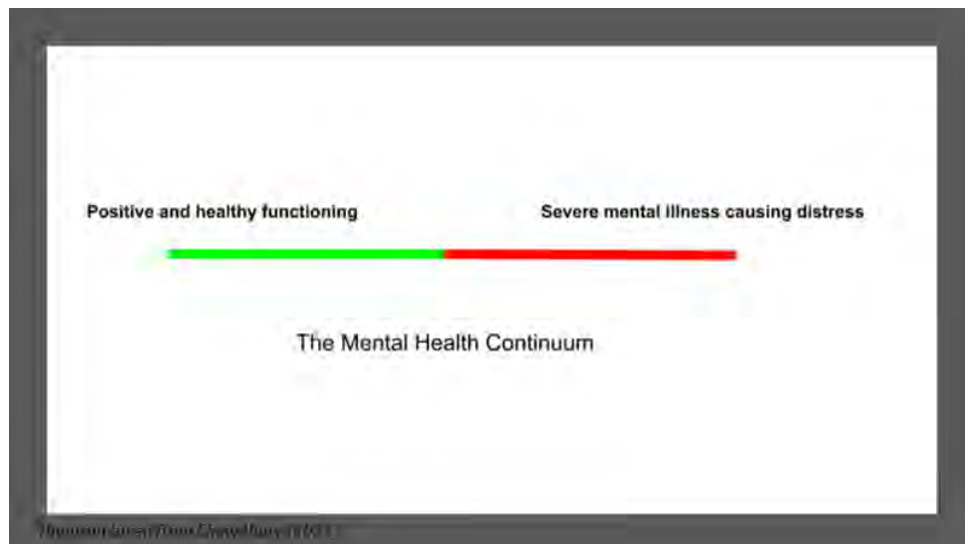
## 2.6 Current Study

Alongside the emergence of parity esteem for mental health, a strong prevention agenda has arisen both in the UK and globally. The prevention agenda refers to the united approach of both local and national government, to make the prevention of mental health conditions a clinical priority in the UK. The Prevention Concordat for Better Mental Health' (PHE, 2016a) outlined the

approach and identified their purpose, to improve public mental health and address inequalities in health status.

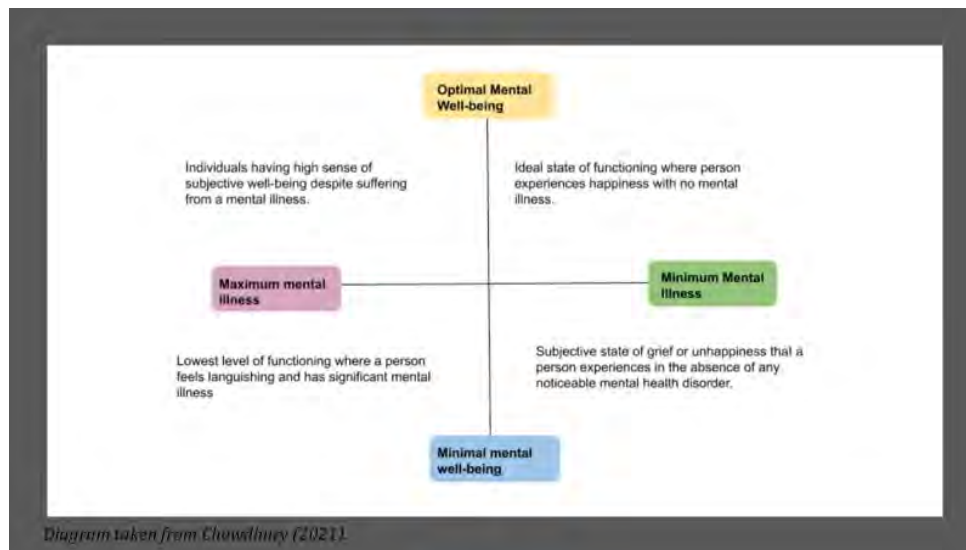
The preventative approach adopts the single continuum model (Fig.1.1) (Allport, 1937) which views positive well-being and mental illness as a continuum. Two approaches exist and in contrast the second, The Dual continua model (Fig.1.2) (Keyes, 2002; Keyes & Lopez, 2009) considers mental health and emotional well-being as separate entities and each are placed on a separate axis, related but distinct (Wang et al., 2011).

**Figure 1.1 The single continuum model**





**Figure 1.2 Dual continua model**



A key part of this prevention approach has been a focus on addressing and improving emotional well-being as a means to address the varied consequences of poor mental health.

In 1999 the UK government made mental health a clinical priority area alongside cancer and heart disease. The National Service Framework for Mental Health (NSFMH) received £1.5 billion in Investment (McCrone et al., 2008) and continued established work to modernise mental health services in England. The introduction of the MNW in 2010 signalled a significant shift in UK government policy. For example, The Department for Health (DoH) (England) published a series of documents outlining the importance of well-being and its role in health outcomes including; ‘Well-being and Why it Matters to Health’ (DoH, 2014c), ‘The Relationship Between Well-being and Health’ (DoH, 2014a), ‘Well-being and Longevity’ (DoH, 2014b). This recent and sustained UK focus on well-being built on global recognition that mental health and emotional well-being are fundamental components of good health (Prince et al., 2007).

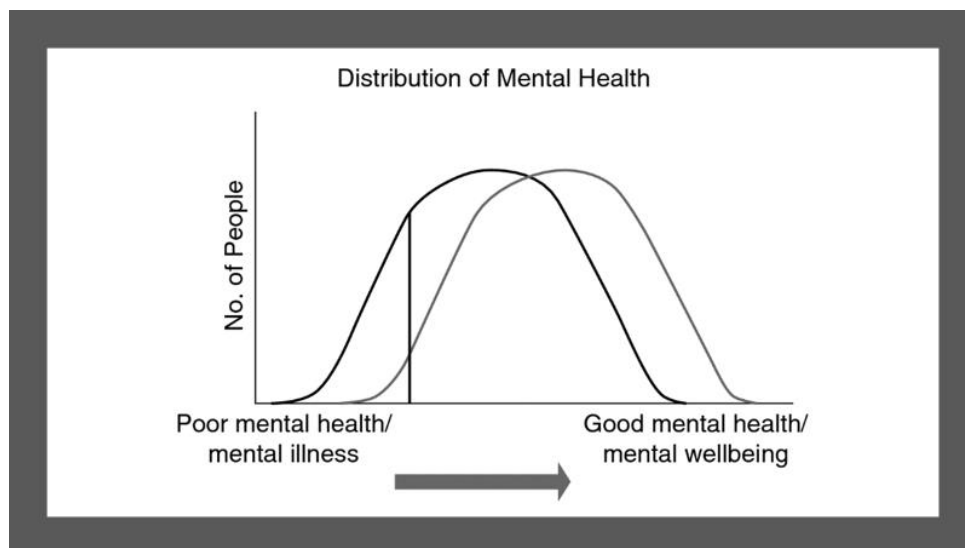
Alongside this, in Wales a well-being agenda arose, evidenced in its appearance and focus within several key government documents including ‘Our Healthy Future’ (WAG, 2009), which recognised the importance of health and well-

being throughout the life course. ‘Thinking Positively: Emotional Health and Well-being in Schools and Early Years settings’ (WAG, 2010) ‘the Health Social Care and Well-being Strategy’ (WAG, 2011) which placed legal duties on health boards and local authorities to improve support for individuals living with mental ill-health. ‘No Health Without Mental Health: A Cross-Government Mental Health Outcomes Strategy for People of all Ages’ (HMG/DH, 2011) placed an increased focus on prevention and early detection of mental ill health and poor well-being and the document outlined a number of potential areas for intervention two of which are of importance to the current thesis: ‘Early identification and intervention as soon as mental health problems emerge’ stated the need for specific focus on early diagnosis of depression at work (point 1.5); and ‘The promotion of positive mental health and prevention of mental health problems in adults’ with a focus on work based mental health promotion (point 3.3); addressing social determinants and consequences of mental health problems with a focus on reducing stigma and discrimination (point 4.4). ‘Together for Mental Health’ (WAG, 2012) and its update (WAG, 2016), promoted ‘better mental well-being’ as a key strategic objective with measurable outcomes and recognised the impact of mental well-being on physical health. The Well-being of Future Generations (Wales) Act (2015) placed a legal responsibility on Welsh public services boards to improve the ‘economic, social, environmental and cultural well-being of its area’. While ‘Prosperity for All’ (WAG, 2017) a five-year national programme set out plans for how the Government will build a more ‘prosperous, secure, healthy, ambitious, united and connected Wales’ through a stronger economy, a more sustainable Wales and reformed public services and A Healthier Wales: our Plan for Health and Social Care (2019). The accumulated effect has been an integration of Health across all government policies, in an effort to address the wider determinants of health.

This preventative approach is based on the argument presented by Geoffrey Rose (1985). Rose outlined a population level approach to address cardiovascular disease. His argument was a defining discussion which continues to be debated (Burton et al., 2012; McLaren et al., 2010). Rose proposed that by tackling ill health at population level (through the utilisation of a broad public

health strategy) as opposed to individual level (targeting of high-risk individuals), greater benefits in health could be realised and social inequalities in health reduced. The premise of the argument rested on the volume of people targeted across the whole population via addressing underlying causes of health concerns. This is in contrast to addressing health at the individual level through strategies directed at high risk individuals whose numbers are less in volume i.e. small changes to lifestyle behaviours at the population level will result in greater benefit than larger changes in high risk persons only (Sniderman et al., 2018). This argument was applied similarly to mental health. Improvements in well-being at population level are thought to reduce the likelihood of individuals experiencing mental ill health (Fig.1.3) and thus will reduce the burden of mental illness through preventative measures (Arango et al., 2018; Saxena et al., 2006).

**Figure 1.3 Geoffrey Rose argument applied to mental health and emotional well-being**



Today's healthcare context is of course very different, it has seen widespread development and advancement in diagnosis, treatment, management and care delivery, however Rose's approach remains relevant and continues to underpin current public health promotion strategies (Buck et al., 2018).

### 2.6.1 Champions for Health

This thesis builds on the earlier work of Public Health Wales (PHW). PHW launched a web-based health promotion campaign for NHS Wales staff in 2012 (Phase I) called ‘Champions for Health’. The programme consisted of five HRLB change modules housed within a website, hosted on NHS Wales servers available via the staff intranet. A significant marketing campaign was undertaken by PHW to launch the campaign. Which aimed to support public sector staff to make positive changes to their own lifestyle behaviours and also to support them as role models for the patients and communities which they serve. PHW ran the campaign a second time in 2014 (Phase II) in two Welsh trusts. After which the content of the five HRLB change modules was made available to the primary researcher for further study and development. Thus, the current thesis builds on the work of PHW.

### 2.6.2 Workplace context

Workplaces offer a vital opportunity for health promotion and early intervention to improve poor HRLB as well as being an appropriate place to provide well-being support and resources. Prevalence of CMD in the working population is high (OECD, 2012; Steel et al., 2014). Full time employees spend upwards of 35 hours per week in the workplace (UK). Equally, the economic benefits of a healthy and resilient workforce are widely documented for example, reduced workplace absenteeism, increased productivity and commitment (Marsden & Moriconi, 2009; Tregaskis et al., 2013).

Absence due to ill health has been assessed in terms of its impact on the UK workforce, both in terms of direct and indirect costs associated with sickness rates (Black & Frost, 2011). Direct costs include statutory sick pay, replacement staff and lost productivity. Indirect costs include poor staff morale, lost training and development opportunities and reduced output. The ONS estimate that 141.4 million working days were lost in the UK in 2018, as a result of sickness (ONS, 2018b). Mental health including stress, depression and anxiety was the fourth reason for sickness absence in the UK and Wales and Scotland had the highest regional sickness absence in 2018 (ONS, 2018b). Employer demographics impact absence rates for example, larger organisations (500 or

more employees) have higher sickness absence (2.5%) compared to (1.7%) smaller organisations (25 employees or less) (ONS, 2018b) as does the public sector which has been consistently higher than that of the private sector since 1995. Current rates were 2.7% and 1.8% respectively in 2018. Equally mental health conditions were more frequently cited in the public sector 10.2% compared to 8.1% in the private sector (ONS, 2018b).

Equally employee demographic characteristics are known to impact on absence rates. For example, women, older workers, those with long-term health conditions and those working part-time have higher sickness absence (ONS, 2020c). However, organisations with positive staff engagement have lower staff turnover and reduced sickness absence rates (Black, 2008). A telephone survey of UK employers reported that the overwhelming majority had positive attitudes towards encouraging staff health and well-being (Steadman et al., 2015) however a third reported they lacked resources, control or time to make lasting improvements. Over half reported taking action when faced with an employee health concern as opposed to adopting a preventative or proactive approach. Although larger organisations (250 plus employees) were more likely to make provisions for employees. For example, the majority of larger organisations provided staff counselling programme (76%) and Occupational health (92%).

Looking at the public healthcare sector specifically (NHS England and Wales), staff health and well-being can have a direct and indirect impact on; overall sickness absence, which was 4% in NHS England and 5.1% in Wales, (NHSdigital, 2020). As with other workforces, poor staff health and well-being in the healthcare sector can have a detrimental impact on sickness absence and staff retention (PricewaterhouseCoopers, 2008). Sickness absence rates for public and private sector staff was 2.7% and 1.8% respectively (ONS, 2018b) and NHS sickness absence rates (England) were 27% higher than the UK public sector average, and 46% higher than the private sector average (CIPD, 2013). Those in Wales and Scotland had the highest sickness absence rates in 2018, at 2.4% while 'mental health conditions' accounted for 12.4% (17.5 million days) of sickness absence (ONS, 2018b). Indirect costs are also higher where staff health and well-being is lower, for example the cost of agency staff to cover sickness absence was £1.45 billion per year (Boorman, 2009). In addition to

staff costs, patient care and healthcare provision are impacted (DoH, 2010b). Poor staff health and well-being is detrimental to patient care (Hall et al., 2016) while positive staff health and well-being has led to improved patient safety and patient care experiences (Boorman, 2009; West & Dawson, 2012).

Further to their own mental health and well-being needs, public sector staff, including healthcare staff, are well placed to promote positive HRLB to others, through effective role modelling and professional behaviour (Boorman, 2009). Personal health behaviours are critical in establishing effective and confident health behaviours (Vickers et al., 2007). Frontline staff have daily contact with patients and members of the public and can exhibit behaviours to be emulated by others.

In the UK, the Nursing and Midwifery Council identified role modelling as a statutory requirement stating, “*take every opportunity to encourage health-promoting behaviour through education, role modelling and effective communication*” (NMC, 2014). Likewise, for UK medical professionals, the General Medical Council (GMC) include clear expectations in ‘Outcomes for Graduates’ (GMC, 2018, p. 23). In addition to this in the UK national expectations are placed on healthcare workers to act as role models for health and well-being promotion for example, The Five Year Forward View stated that all healthcare workers should “*stay healthy, and serve as health ambassadors in their local communities*” (NHS, 2016, p. 11). The plan addressed the health system’s role in health promotion and lifestyle behaviour change and stated that “*nurses and midwives must acknowledge that they are seen as role models for healthy living, and take personal responsibility for their own health*” (DoH, 2010a; Ford, 2010).

Research findings have highlighted the need for on-going support for healthcare workers to improve their own health and to fully realise their potential as credible role models and healthy living advocates for the populations they serve (Blake & Harrison, 2013; Blake & Patterson, 2015; Darch et al., 2017; Lobelo & de Quevedo, 2016; Oberg & Frank, 2009). For example, a study looking at nurse’s health behaviours and attitudes to role modelling identified participants poor health profile and recommended nursing education address the issue (Blake

& Harrison, 2013). In addition two systematic reviews suggested that health promotion skills are related to personal health behaviours regarding tobacco and alcohol consumption (Bakhshi & While, 2014; Duaso et al., 2014) and a further two suggested that the personal body weight of doctors and nurses are related to attitudes towards weight management (D Zhu et al., 2011) and actual weight (DQ Zhu et al., 2011). This is of concern as evidence suggests that physical activity levels are low in nurses, many do not meet recommended levels, a quarter consumed higher than recommended amounts of alcohol and 11% smoked (Bakhshi et al., 2015). While the European Health and Behaviour Survey of Scottish Student nurses reported that 28% were smokers which is 3% higher than that of the general population and the majority (74%) consumed higher than recommended alcohol units (Watson et al., 2006). Equally a significant number of healthcare staff are overweight (Kyle et al., 2017). Health professionals are also known to have higher rates of mental ill health than the general population (Felton, 1998; Kim et al., 2018). All of which has important implications for health care delivery. Thus, the current focus on public sector staff workforce.

### 2.6.3 Summary

As outlined in this chapter HRLBs, mental health and emotional well-being represent a significant, global, public health burden. Significant bodies of research exist in line with these critical fields of health and both have seen significant empirical study utilising a web-based delivery format. However limited research has drawn these two fields of interest together to support positive health and well-being in line with the current UK focus on adopting and promoting a preventative approach to mental health and well-being in a public sector workplace context.

Thus, the aim of this thesis was to develop and evaluate an emotional well-being intervention, for inclusion within an existing, health promotion programme for public sector staff in Wales, to encourage and support HRLB change. On the basis that a multi-faceted intervention which addresses the holistic nature of human health and well-being, will support sustained engagement with the programme, which in turn will enable participants to make meaningful changes to their health status.

This approach, i.e. the provision of resources designed to simultaneously support and develop positive well-being and lifestyle behaviour, in the same multi-faceted intervention has not been well explored previously and is not widely considered in the behaviour change literature.



## Chapter 3: Systematic Literature Review

---

This chapter presents the findings from two systematic literature reviews conducted and published between 2015 and 2016. Each review is described in turn.

### 3.1 Gamification and Adherence to Web-Based Mental Health Interventions: A Systematic Review

An increasing number of web-based platforms have been developed which provide treatment and resources for a wide range of conditions; serious mental health disorders, CMD's, well-being, and lifestyle improvement. However, dropout and non-adherence are often high and vary widely. Reported rates of attrition range between 35-99% (Farvolden et al., 2005; Klein et al., 2011); (Melville et al., 2010; Rothert et al., 2006; Van Den Berg et al., 2004). This is of critical importance as greater adherence to web-based interventions is associated with improved mental health outcomes (Donkin et al., 2011; Manwaring et al., 2008).

A growing body of research has identified a range of technology-driven features which contribute to programme adherence, quality, design and usability of web-based interventions (Morrison et al., 2014; Sharry et al., 2013), persuasive technology (Kelders, Bohlmeijer, et al., 2013) including 'push factors' and SMS message notifications, alerts or personalised reminders (Clarke et al., 2005), weekly tracking (Christensen et al., 2004), incentives (Khadjesari et al., 2011); (Alexander et al., 2008)), interactive features (Doherty et al., 2012), and social networks (Maher et al., 2014). However, variation in reporting and measuring adherence has complicated understanding of the role of technological features (Donkin et al., 2011).

Findings from the gaming literature have suggested that the inclusion and use of gamified features in web-based health interventions may increase interest and enjoyment and improve user experience. This in turn may positively influence engagement and programme adherence and encourage desired health behaviour changes (Baranowski et al., 2008; Cugelman, 2013; Hamari, Koivisto, & Pakkanen, 2014; McGonigal, 2011; Primack et al., 2012). 'Gamification' has

been defined as “*the use of game design elements in non-game contexts*” (Deterding et al., 2011, p. 10). It differs from ‘serious games’ which refers to the use of games in their entirety within non-gaming contexts (as opposed to selected elements or individual features of a game). Thus, gamification is the use of individual features of game design applied in a context not usually associated with video gaming or game play. However, agreement of conceptual understanding remains debated (Seaborn & Fels, 2015) and academic opinion is varied. Gamification has enjoyed a recent explosion of success and increasing interest in a wide array of contexts beyond entertainment, health, education, news, and sustainability (Kapp, 2012; Silva et al., 2013; Werbach & Hunter, 2012). However, interest in game design has been researched in the fields of HCI and motivational psychology for much longer.

Research has called for the continued identification of features and ‘active’ components which are most effective in improving programme adherence whilst ensuring treatment remains effective (Mohr et al., 2013; Primack et al., 2012; Silva et al., 2013). Several important adherence review studies have been published. For example, Kelders et al. (2012) identified predictors of high adherence such as RCT study design, frequency of councillor interaction (frequency of peer interaction was not found to predict adherence), more frequent updates and reminders, more extensive use of dialogue support, and more frequent intended usage. Van Ballegooijen et al. (2014) reported adherence to guided iCBT interventions for depression were equal to that of face-to-face delivery. Prior to that Brouwer et al. (2011) reported that elements of interventions associated with human support (guided) were associated with higher adherence in physical health interventions. Schubart et al. (2011) identified that tailored advice, feedback, and guided programmes increased user engagement in chronic health interventions. Earlier reviews focused on reporting the extent of the problem in the context of mental health interventions (Christensen et al., 2009; Melville et al., 2010). However, no prior reviews were identified that explicitly examined the role of gamification on adherence in the context of web-based health interventions designed to treat CMD and improve well-being.

## 3.2 Aim

To identify whether gamification features have been incorporated into web-based interventions which treat CMD's and/or well-being. The secondary aim was to identify whether inclusion of these features influenced adherence.

### 3.2.1 Objectives

The review objectives were

1. Identify studies which have incorporated ten common gamification features into the design of their intervention to improve outcomes for CMD's and/or well-being.
2. Identify gamification features which influence adherence.
3. Report current rates of adherence.
4. Determine whether effects of the gamification feature on adherence varies across sub-group populations.
5. To identify all terms commonly used to report adherence and maintenance with web-based CMD and well-being and report the extent to which this is commonly reported in studies.

## 3.3 Method

### 3.3.1 Protocol

The protocol was registered with Prospero (16.4.15) (CRD42015017689).

### 3.3.2 Procedure

The primary researcher consulted the university subject librarian on search strategy and search terms. The search was conducted by the primary researcher. Identified studies were exported electronically into EndNote Web where duplicates were removed via examination of title and author. When multiple reports were identified, which reported data from the same study, they were grouped together and considered to represent one 'study' in line with recommended methods (Higgins, 2008).

### 3.3.2.1 Databases

A comprehensive search of seven electronic databases was undertaken by the primary researcher: Medline (Ovid interface), PsychINFO (Ovid interface), Cochrane Library, CINAHL (EBSCO interface), Business Source Complete (EBSCO interface), INSPEC (Ovid interface), and ACM digital library. Search dates were between (database inception) and April 2015.

### 3.3.2.2 Search strategies

Search strategies were customised for each database to allow use of the different subject headings and index terms (appendix 1).

### 3.3.2.3 Search terms

Standardised subject terms were used in each electronic database, to identify all relevant studies meeting the specified inclusion criteria. Database thesauri were explored to identify ‘exploded’ terms along with free text terms. The purpose of which was to facilitate as broad a search as possible while maintaining appropriate sensitivity to search aims.

A combination of search terms was used across four categories: ‘web-based’, ‘intervention’, ‘CMD/well-being’, and ‘adherence’ (Fig. 3.1)

**Figure 3.1 Search terms (SR1)**

Web-based	Intervention	Mental health / Well-being	Adherence
Internet	Cognitive Therapy	mental health	Attrition
Computer-Assisted Instruction	Behaviour Therapy	anxiety	dropout*
web-based web OR computer*	therap*	depression	drop*-out
online	treatment*	well-being	disengag*
web-delivered	intervention	burnout	non-complet*
smart-phone*	CBT	stress	complet*
mobile phone	iCBT	eHealth	adheren*
ipad*	CCBT	e-Health	involvement
web	ACT	e-mental health	usage
computer*	Mindfulness programme	Self help	engagement
	coach	Mood disorders	retention
	e-therap*	generalised anxiety disorder	persist*
	etherap	GAD	Compliance
	e-treatment*	obsessive-compulsive disorder	promot*
	cyber-therapy	post-traumatic stress disorder	foster*
	cybertherapy	PTSD	enhanc*
	e-Interventions		encourag*
			motivativ*
			incentiv*
			improv*
			increas*
			maxim*
			goal setting
			gamification
			challenge
			progress
			progress
			feedback
			rewards
			badges
			game leaders

### 3.3.2.4 Gamification

Ten gamification features were reviewed for inclusion (Fig. 3.2) informed by (Cugelman, 2013) and (Hamari, Koivisto, & Sarsa, 2014). Features included were automated or system generated features i.e., not generated as a consequence of human interaction (clinician, therapist, coach or guide of any form), designed to motivate users to achieve specific behavioural outcomes and conceptualised as motivational affordances. The primary researcher discussed the selection of terms with the first supervisor.

**Figure 3.2 Gamification features included in the review**

<b>Gamification feature</b>	<b>Coded as gamification feature where the intervention applied:</b>	<b>Examples:</b>
Clear goals	Clear goals are identified to or by the user  Goal setting; Agreement of goals and / or behavioural contract	Users informed of goal or are required to set their own goal to achieve over the duration of the programme
Challenge	Capacity to overcome challenge; growth; learning; and development.	Time management;  Time constraints are implemented into the programme; Working against the clock to complete a task or within an allocated time frame.  Action planning
Levels	Incremental challenges, non-linear levelling system	Programme has different levels to be completed by user.  System may allocate different icons or titles to users as they progress through the system
points	Achievement; Points in a game or an in-game item. Points are allocated as a reward for continued use, expertise and knowledge of using the system	Points are allocated to users as a reward. System may or may not identify highest points achievable.
progress;	Progression through the programme or game. Compare progress; monitoring progress with self and others	Showing progress; Progress bars or progress monitoring.  Prompts self-monitoring of behavioural outcome
feedback;	Providing feedback on performance	Feedback on performance is provided;  Receiving constant or periodic feedback through performance, prompts, self-monitoring.  Feedback via visual or audio methods  Prompts self-monitoring of behavioural outcome
rewards;	Achievement; in-game goods or artefacts (functional or non-functional to the programme)	Tangible rewards afforded to the user (points or virtual currency) and intangible rewards (praise or recognition) that users can see and use to benefit themselves.  The more time a user invests in the expected behaviors, the more reward they will receive from websites. Hsu, change and lee 2013 (page 429-430)
Badges / trophies	Achievement; A visual reward for an achievement	Foursquare application allows users to unlock badges once they have visited a real world location. Used to direct behaviour and decision making towards a behaviour.  Q&A quiz giving badges for correct responses or for completion of a task
game leaders;	Competing against others - Leader boards rank individual user progress and achievements as compared to others. Representation of position and ranking relative to others	Results and position of other users are displayed visually
story / theme	Fun and playfulness; playing out an alternate reality	Avatar, illustrated story, fictional characters or descriptive story or cartoons

#### 3.3.2.5 Inclusion criteria

The following inclusion criteria were applied:

1. The study must include one or more gamification feature in the intervention.
2. The study is designed to manage any CMD or improve well-being (including physical conditions which report CMD/well-being outcome).
3. The intervention is delivered via the web (internet).
4. The intervention is designed to be accessed on more than one occasion.
5. RCT study design.
6. The study must report at least one measure of attrition, adherence, engagement, dropout or other term referring to such.

#### 3.3.2.5 Exclusion criteria

1. The intervention is delivered via paper, face-to-face, CD-ROM or other non-web-based methods.
2. Participants are under the age of 18.

#### 3.3.2.6 Review process

Following extraction of the identified articles, a staged review process was undertaken. During stage one the primary researcher and a second researcher (NoN) independently reviewed all study titles for relevance. Stage two involved reviewing the study abstract against the specified inclusion and exclusion criteria. Each reviewer recorded their decision (to include or exclude each article) in their own Excel spreadsheet. The second researcher emailed their spreadsheet to the primary researcher who then copied their decisions into a new column in the main study spreadsheet. Measures of agreement were calculated using the Kappa statistic. A third reviewer (HvW) was then consulted to resolve any disagreements, in line with recommended methods (Higgins, 2008, p. 153). The third reviewer was sent a copy of all titles and abstracts where the first and second reviewer had disagreed and asked to indicate their decision in a separate spreadsheet and to email it back to the primary researcher. Their decision was taken as final. The inclusion of a reviewer familiar with only the methodology rather than topic matter was used to ensure potential bias of topic expert was removed.

Stage three then commenced. The primary researcher made an electronic collection of all included articles. Following this the primary and secondary researchers conducted an independent full text review of all included articles. Each article was systematically assessed against the specified inclusion and exclusion criteria. Articles were excluded when they did not meet a single criterion. The first instance where they did not meet eligibility was recorded as the reason for exclusion and the study was not assessed against additional inclusion criteria (Higgins, 2008, p. 154). The two reviewers discussed articles where agreement was not unanimous to reach a consensus decision.

#### 3.3.2.7 Data extraction

The primary researcher developed and piloted a data extraction spreadsheet (appendix 2) using five studies which met the specified inclusion criteria.

#### 3.3.3 Data analysis

Descriptive and exploratory analyses were conducted in IBM® SPSS® version 22 and Review Manager 5.3 (RevMan, 2020).

##### 3.3.3.1 Reviewer agreement

The Kapa statistic was calculated to indicate the level of agreement between researchers in the review process. Fair agreement is 0.4 - 0.59; moderate agreement 0.6 - 0.74; and substantial agreement >0.75 (Higgins, 2008, p. 155).

##### 3.3.3.2 Included studies

The total number of included and excluded studies was reported numerically. Each RCT was described in terms of its study design, i.e., number of trial arms, participant characteristics, intervention characteristics including intervention name, automated or guided, therapeutic approach, duration and active components and total number of gamification features in use. Frequencies, percentages, mean (M) and standard deviation (SD) were calculated.

- ‘Intervention’ in this review, refers to the web-delivered therapeutic treatment programme.
- ‘Automated delivery’ of an intervention refers to the use of an intervention treatment programme without any human support.
- ‘Guided delivery’ refers to support of a human guide during the course of the treatment.



#### 3.3.3.3 Quality assessment

The primary researcher selected the Cochrane Collaboration 'Risk of Bias' tool to assess the quality of included studies. Implementation of the tool, as described in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins, 2008), was discussed with the second researcher, who conducted the assessment.

Each included study was assessed against six domains and several sub-domains. For each sub-domain a risk level (categorised as either: low, high, or unclear) was identified. In order to produce a summary decision for each of the six domains, the majority risk level was used. For example, if there were four or more sub-domains with a low risk of bias then it would be judged that the study showed an overall low risk of bias. This assessment process generated an overall summary of the risk of bias for each included article. Where the second researcher was uncertain, a final decision was made in collaboration with the primary researcher.

#### 3.3.3.4 Adherence

Adherence to study protocol was calculated for each intervention, to allow comparison. Adherence was calculated as a percentage, i.e., the number of participants who completed a post intervention assessment was divided by the number of participants randomised to the intervention arm and multiplied by one hundred. Adherence was measured in this way since data on total completion rate of interventions is often not well reported.

A series of procedures were carried out:

- 1) The adherence rates of interventions utilising only one gamification feature were visually presented in a series of forest plots, shown in comparison to adherence rates for inactive controls (where available). The mean adherence rate of interventions utilising only one gamification feature was calculated by adding the adherence rate for each study that used this feature and dividing it by the number of these studies. A one-way ANOVA was conducted to identify statistical differences between adherence rates for studies using different, single, gamification features.

2) Adherence rates for interventions using one, two or three (total number of) gamification features were similarly calculated and presented visually in a bar chart. Forest plots showing adherence as compared to inactive control (where available) are also presented. A one-way ANOVA explored statistical differences in adherence.

3) The mean adherence rate was calculated per condition and displayed in a bar chart. A one-way ANOVA explored statistical differences in adherence per condition.

4) Following these comparisons, an independent t-test was conducted to examine statistical differences in adherence as a result of additional interactive features (in dichotomous features i.e., sequential or free navigation and automated or guided delivery). A one-way ANOVA was conducted to explore differences in features which included three or more categories (intended duration and modules, total number of interactive intervention characteristics). Values within each were re-categorised to form three distinct categories.

#### 3.3.3.5 Gamification and adherence

Use of gamification features was considered against adherence for included articles. The total number of gamification features was reported, and studies were categorised and compared in line with the number of features employed in the intervention. Data were entered into Review Manager and Forest plots were used to present the adherence per intervention arm in comparison to its control condition (where a control condition was used as opposed to an active intervention).

The Forest plots included two columns, one for the intervention arm and one for the control group.

- The term ‘events’ is used to refer to the number of randomised participants remaining at post assessment.
- The term ‘total’ refers to the total number randomised to that intervention at the start of the trial.
- Where a score of 0 is recorded, either the data was unavailable or there was no control group to compare against. For example, in some of the included trials

the comparator group was another treatment intervention or a modified version of the same intervention and was therefore included as an intervention and examined.

The weight was automatically calculated by Review Manager based on the total number of participants in the trial. Mean adherence is reported, this does not include the control arm data (unlike the Forest plots).

#### 3.3.3.6 System features

A standard multiple regression analysis was performed to explore the role of interactive intervention characteristics in explaining adherence. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. Independent variables were entered into the model as a block using the enter method (total number of gamification features, guided or automated, sequential or free navigation, intended duration, modules, and total number of interactive intervention features). Adherence was entered as the dependent variable. It is recommended that 15 cases are included per predictor variable in social sciences (Stevens 1996).

### 3.4 Results

#### 3.4.1 Reviewer agreement

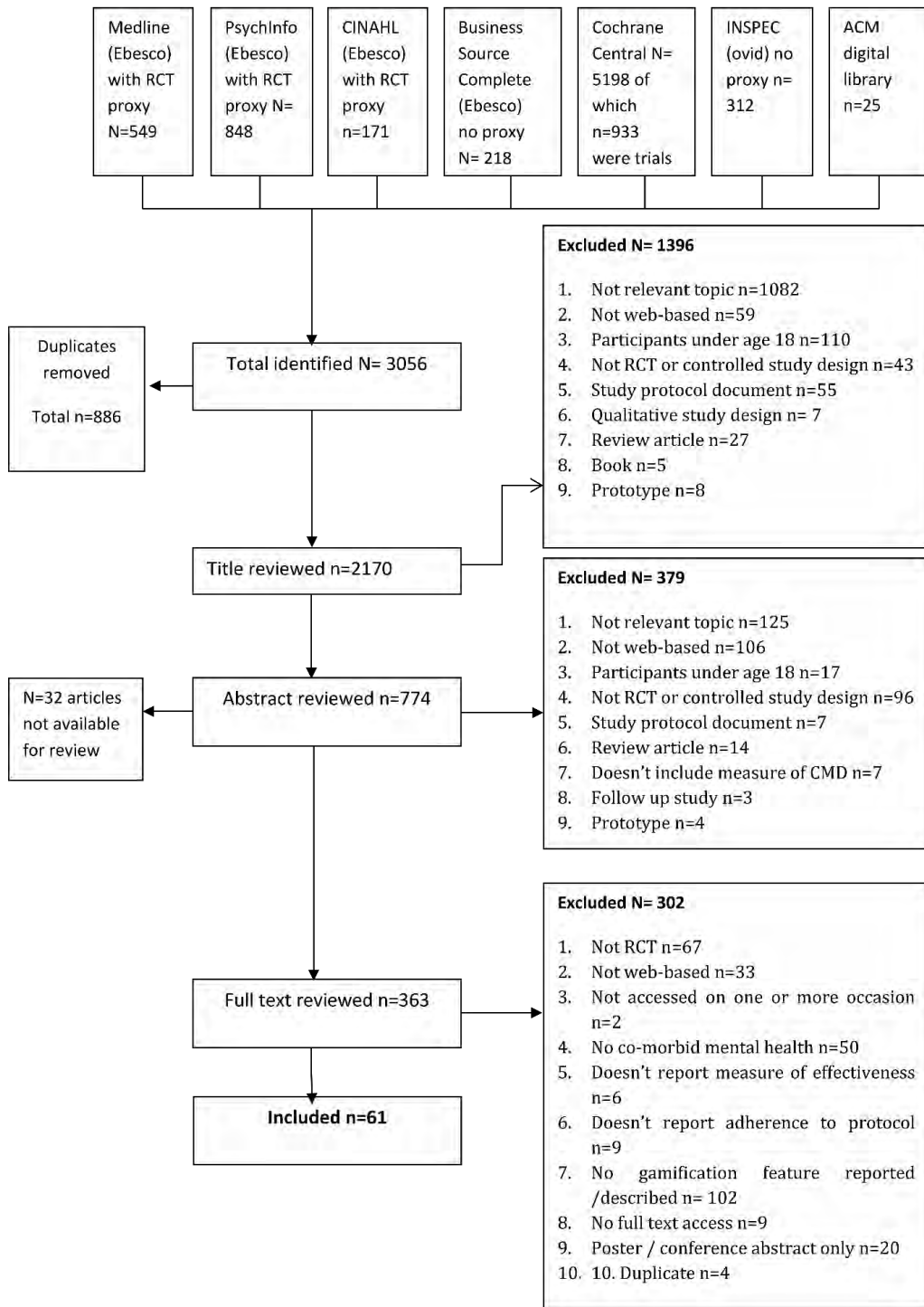
The F. Kappa statistic showed substantial agreement between reviewers at the title (.933), moderate agreement at abstract stage (.694).

#### 3.4.2 Included studies

A total of 3,056 articles were identified from the systematic search of seven databases. After 886 duplicates were removed a total of 2,170 titles and 774 abstracts were independently reviewed. Following exclusions 363 full text articles were independently reviewed and a total of 61 articles met the specified inclusion criteria (Fig. 3.3).

**Figure 3.3 PRISMA flow diagram (SR1)**

Flow diagram: Included and excluded articles



#### 3.4.2.1 Trial arms

Of the 61 included RCTs, 47 were two armed trials (77%), 12 were three armed trials (20%), one was a four-armed trial (2%) and one a six-armed trial (2%).

Of the 47 two-armed trials, 21 compared to WLC (45%), three to treatment as usual (TAU) (6%), one placebo (2%), one reported no treatment, and 20 used an active comparator (42%). The active comparator included 11 interventions and nine attention controls. Of the 12 three armed trials, two compared to two inactive controls (17%), nine compared to an active intervention plus WLC or TAU (75%) and one included two interventions utilising different therapeutic approaches (8%). The four-armed trial compared the intervention to the same web-based intervention plus tracking features and two inactive conditions. The six-armed trial consisted of six versions of the same active intervention (Moodgym).

As several articles included active interventions as a different trial arm these additional interventions were included in the current review. This led to the inclusion of 82 different interventions across the 61 articles. The main results (Table 3.1) report a summary of key characteristics for all interventions.

**Table 3.1 Main results**

Authors / year	Trial arms	Primary Condition	Active Comparat or	Inactiv e compa rator	N total	1 GF	2 GF	3 GF	Automated / Guided	Sequential / free navigation	Duration	Modules	Interventio n Adherence to protocol %	Control Adherence to protocol %	Intervention Completion rate %
Saunders et al., 2014	2	Well-being	Paper based Intervention		193	Goal Setting			Automated	Sequential	>1	8	91.75	92.70	*
Williams et al., 2013	2	Depression		WLC	69	story / theme			Automated	Sequential	11	13	52.63	70.90	*
Dear, Zou et al., 2015	2	Anxiety		WLC	72	story / theme			Guided	Sequential	8	5	90	86	*
Litz et al., 2007	2	PTSD	CBT Intervention		45	Progress			Guided	Free navigation	8	7	70	n/a	*
Litz et al., 2007	2	PTSD	Supportive counselling Intervention			Progress			Guided	Free navigation	8	7	70	n/a	*
Knaevlsrud et al., 2007	2	PTSD		WLC	96	Goal Setting			Guided	Sequential	5	10	83.60	97.87	*
Twomey et al., 2014	2	Well-being		WLC	201	story / theme			Automated	Sequential	5	5	27.70	38	27.30
Anderssen, et al., 2003	2	Headache	Guided plus telephone vs guided plus email		44	Progress			Guided	Free navigation	6	6	69.2	n/a	*
Anderssen, et al., 2003		Headache	Guided plus telephone vs guided plus email			Progress			Guided	Free navigation	6	6	62.50	n/a	*
Andrews, et al., 2011	2	Social phobia	F-2-F		37	story / theme			Automated	Sequential	6	6	60.80	78.50	*
Carrad et al., 2011	2	BED		WLC	74	Feedback			Guided	Sequential	20	11	75.70	*	37.80
Newby et al., 2014	2	GAD		WLC	99	story / theme			Guided	Sequential	10	6	89	*	89

Powell et al., 2012	2	Well-being		WLC	3070	Progress			automated	Sequential	6	5	26.50	79.20	10
Imamura et al., 2014	2	Depression	Attention control (email messages)		762	story / theme			Guided	Sequential	10	6	70.90	88.20	*
Strom et al., 2013	2	Depression		WLC	48	Goal setting			Guided	Sequential	9	9	100	100	58
Beauchamp et al., 2005	2	Depression		TAU	329	Rewards			Automated	Free navigation	4	3	90.80	90.80	*
Glozier et al., 2013	2	Depression	Attention control: Health watch		562	Progress			automated	Sequential	12	12	93	99	*
Titov, et al., 2009	2	SAD	Automated		168	story / theme			Automated	Sequential	8	6	89.20	n/a	66
Titov, et al., 2009		SAD	Auto plus telephone reminders			story / theme			Automated	Sequential	8	6	85.70	n/a	78
Titov, et al., 2010	2	GAD		WLC	86	story / theme			Guided	Sequential	8	6	85.70	81.80	71.40
Lindvet et al., 2013	2	Depression		WLC	163	story / theme			Automated	Sequential	8	6	51.80	71.90	*
Høifødt et al., 2013	2	Depression		WLC	106	story / theme			Guided	Sequential	8	6	71.50	87	60
Watts et al., 2013	2	Depression	Mobile app version		52	story / theme			Guided	Sequential	8	6	50	45.40	68
Berger et al., 2009	2	Social Phobia		WLC	52	Progress			Guided	Free navigation	10	5	90.30	90.40	*
Mahoney et al., 2014	2	OCD		TAU	86	story / theme			Guided	Sequential	10	6	54.50	83.30	75
Herbec et al., 2014	2	Smoking with depression	Attention control: advice website		200	story / theme			Automated	Sequential	8	0	63.60	64.60 / 69.60	*
Mananes & Vallejo 2014	2	Smoking with depression	Attention control PDF document		23213	Progress			Automated	Sequential	0	4	3.37	5.98	2.99

Antypass & Wanberg 2014	2	Physical activity in cardiac rehabilitation patients		WLC	69	Goal setting			Guided	Free navigation	7	7	48.20	47.5	*
Zetterqvist et al., 2013	2	stress		WLC	100	Goal setting			Automated	Free navigation	7	6	46	80	*
Schover et al., 2013	2	Cancer	Guided		72	Rewards			Automated	Free navigation	12	11	66.60	n/a	*
Schover et al., 2013		Cancer	Automated			Rewards			Guided	Free navigation	12	11	50	n/a	*
Ritterband et al., 2012	2	Insomnia		WLC	28	Feedback			Automated	Sequential	9	6	100	100	86
Titov et al., 2009	2	Social Phobia	Guided plus telephone		85	story / theme			Guided	Sequential	8	6	93	n/a	79
Titov et al., 2009		Social Phobia	Guided plus forum			story / theme			Guided	Sequential	8	6	85	n/a	79
Greene et al., 2012	2	Weight loss	Attention control		1689	Goal setting			Automated	Sequential	10	10	64.50	68.80	84
Kajiyama et al., 2013	2	Stress	Educational control		150	Goal setting	story / theme		Automated	Sequential	12	8	61.30	76	*
Cooper et al., 2001	2	Depression		TAU	24	Progress	Feedback		automated	Sequential	8	8	75	66.60	50
Brief et al., 2013	2	PTSD		WLC	600	Progress	Goal setting		Automated	Sequential	8	8	48.20	61	34
Richards et al., 2013	2	Depression	Email delivered intervention		101	Progress	Feedback		Automated	Sequential	8	8	41.10	50	52
Thorndike et al., 2013	2	Insomnia		WLC	45	Progress	Feedback		Automated	Sequential	9	6	95.40	95.60	*
Aitkens et al., 2014	2	Well-being		WLC	90	Progress	Feedback		Guided	Sequential	7	7	81.80	93.30	*
Santucci et al., 2014	2	Depression and anxiety	Automated plus email reminders		44	Feedback	story / theme		Automated	Sequential	8	8	47.60		12
Santucci et al., 2014		Depression and anxiety	Automated no email Reminders			Feedback	story / theme		Automated	Sequential	8	8	78.20		12
Carlbring, et al., 2006	2	Panic Disorder		WLC	60	Progress	Feedback		Guided	Sequential	10	10	93.30	96.6	80
Moritz et al., 2012	2	Depression		WLC	210	Rewards	story / theme		Automated	Sequential	8	10	76.10	85.70	81.90



Bossen et al., 2013	2	Physical activity		WLC	199	Goal setting	Challenge		Automated	Sequential	9	8	84	85	*
Cook et al., 2007	2	Stress	Paper based delivery		480	Goal setting	Progress		Automated	Free navigation	6	5	84.60	90.10	*
Phillips et al., 2014	2	Weight loss	Attention control website		637	Story / theme	Progress		Automated	Sequential	6	6	53.70	58.90	*
Irvine et al., 2013	2	Physical activity in older adults		No treatment	405	Progress	Goal setting	Feedback	Guided	Free navigation	12	12	62	87.80	70
Sheeber et al., 2012	2	Depression		DI/TAU	70	Progress	Feedback	Rewards	Guided	Sequential	8	8	97.10	100	*
Cohn et al., 2014	2	Depression	Emotion reporting WLC with email reminders		49	Challenge	progress	Rewards	Automated	Sequential	7	8	86.20	85	72
Cobb & Poirier 2014	2	Well-being		Placebo control	1503	Challenge	Badges	Points	Automated	Free navigation	8	0	67.50	69.70	50
Titov et al., 2010	2	SAD	Auto plus motivational strategies		113	Challenge	story / theme	Goal setting	Automated	Sequential	6	6	85.70	n/a	56
Titov, et al., 2010		SAD	Auto			Challenge	story / theme	Goal setting	Automated	Sequential	6	6	89.40	n/a	75
MacKinnon et al., 2008	3	Depression	Attention control	Placebo	525	story / theme			Guided	Sequential	6	5	74.70	89.30	*
Robinson et al., 2010	3	GAD	Guided intervention	WLC	150	story / theme			Guided	Sequential	10	6	90	98	80
Robinson et al., 2010		GAD	Guided intervention	WLC		story / theme			Guided	Sequential	10	6	98	98	74
Clarke et al., 2005	3	Depression	Auto plus telephone reminders	TAU	255	Rewards			Automated	Sequential	7	7	73.30	93	*
Clarke et al., 2005		Depression	Auto plus post card reminders	TAU		Rewards			Automated	Sequential	7	7	76.20	93	*
Mitchell et al., 2009	3	Well-being	Auto strengths / Placebo		160	Progress			automated	Sequential	3	3	35	42.50	35
Mitchell et al., 2009		Well-being	Auto plus problem solving Placebo		160	Progress			automated	Sequential	3	3	15.5	42.50	15.5
Proudfoot et al., 2013	3	Depression and anxiety	attention control	WLC	720	Feedback			automated	Free navigation	7	12	52	78.60	*

Thompson et al., 2010	3	Depression	telephone delivered intervention	WLC	53	Rewards		Automated	Free navigation	8	8	75.40	*	30
Titov et al., 2010	3	Depression and anxiety	Auto / Auto plus email reminders	WLC	274	story / theme		Automated	Sequential	8	5	86.80	78.10	35
Titov et al., 2010		Depression and anxiety	Auto / Auto plus email reminders	WLC		story / theme		Automated	Sequential	8	5	84	78.10	58
Titov et al., 2010	3	Depression	WLC / Guided - technician		141	story / theme		Guided	Sequential	8	6	78.70	86.60	70.20
Titov et al., 2010		Depression	WLC / Guided - clinician			story / theme		Guided	Sequential	8	6	83.60	86.60	65.30
Berger et al., 2011	3	Depression	Guided	WLC	76	story / theme		automated	Free navigation	11	10	88	84.60	36
Berger et al., 2011		Depression	Automated	WLC		story / theme		Guided	Free navigation	11	10	100	84.60	56
Titov et al., 2008	3	Social Phobia	Guided	WLC	98	story / theme		Automated	Sequential	6	6	87	97	33
Titov et al., 2008		Social Phobia	Automated	WLC		story / theme		Guided	Sequential	6	6	93.70	97	77
Botella et al., 2010	3	Social Phobia	Auto Intervention and F-2-F	WLC	127	Progress	Feedback	Automated	Sequential	8	5	48.30	62.20 / 61.10	*
Yan-Yee Ho et al., 2014	3	Insomnia	Automated plus telephone reminders	WLC	312	Goal setting	Progress	Automated	Sequential	6	6	56.30	61.90	64
Yan-Yee Ho et al., 2014		Insomnia	Automated	WLC		Goal setting	Progress	Automated	Sequential	6	6	57.60	61.90	66.30
Farrer et al., 2011	4	Depression		Tracked / TAU	155	story / theme		Automated	Sequential	6	6	71.05	77.10	15.80
Farrer et al., 2011		Depression		Tracked / TAU		story / theme		Guided	Sequential	6	6	44.40	77.10	17.80
Christenssen et al., 2006	6	Depression	6 versions of MoodGYM		2794	story / theme		Automated	Sequential	6	1	78.40	n/a	*

Christenssen et al., 2006		Depression	6 versions of MoodGYM			story / theme			Guided	Sequential	6	2	79.40	n/a	*
Christenssen et al., 2006		Depression	6 versions of MoodGYM			story / theme			automated	Sequential	6	3	79	n/a	*
Christenssen et al., 2006		Depression	6 versions of MoodGYM			story / theme			automated	Sequential	6	4	82	n/a	*
Christenssen et al., 2006		Depression	6 versions of MoodGYM		2794	story / theme	Feedback		Guided	Sequential	6	3	78	n/a	*
Christenssen et al., 2006		Depression	6 versions of MoodGYM			story / theme	Feedback		automated	Sequential	6	6	82	n/a	*

### 3.4.2.2 Participant characteristics

Across the 61 RCT's, 14,726 participants were randomised to either an intervention or control condition. The RCT's varied widely in size, from a total of 24 to 23,213 randomised participants. Forty-one (n=41/62, 67%) RCT's had sample sizes less than 200, 15 had sample sizes between 200 and 999 (n=15/62, 24%) and five had sample sizes over 1,000 (n=5/62, 8%). Four (n=4/62, 6%) RCT's included females only. Four (n=4/62, 6%) RCT's restricted inclusion to those aged over 45 years and one (n=1/62, 2%) included a sample of those between the ages of 18 and 24 years, the remainder (n=56/61, 92%) recruited participants who were aged 18 years and above. Participants were recruited from the general population (n=39/61, 64%), clinical populations (n=11/61, 18%), students (n=4/61, 6%), military (n=2/61, 3%), and organisational workplaces (n= 5/61, 8%). The majority of RCT's were conducted in Australia (n=20/61, 33%) and the USA (n=18/61, 29%). The majority of participants self-referred into a trial (n=54/61, 88%).

### 3.4.2.3 Intervention characteristics

From the 61 RCTs, a total of 82 active intervention arms were identified. As such the following section presents the adherence and gamification results from 82 interventions.

All interventions were web-based and available via personal computers, laptops and internet enabled devices. A total of 47 different interventions were identified. Five interventions were used in different RCT's or were used as the active comparator i.e., Moodgym, Beating the blues, Moodgym and Bluepages combined, Deprexis, SHUTi, and the Shyness Programme.

#### 3.4.2.3.1 Condition

Interventions were designed to treat a range of symptomology, depression (n=30/82 36.5%), depression with comorbid anxiety (n=5/82, 6%), anxiety including SAD, GAD (n=9/82, 11%), well-being (n=7/82, 8%), social phobia (n=7/82, 8%), PTSD (n=4/82, 5%), OCD (n=1/82, 1%), panic disorder (n=1/82, 1%), stress (n=3/82, 4%), binge eating disorder (BED) (n=1/82, 1%), and physical conditions (n=14/82, 17%). Less than half (n= 37/82, 45%) reported use of clinical diagnostic interview.

The 14 interventions designed to treat a physical health condition were: physical activity (n=3/14, 21%), smoking cessation (n=1/14, 7%), sexual dysfunction in female cancer patients (n=2/14, 14%), headache (n=2/14, 14%), insomnia (n=4/14, 28%) and weight loss (n=2/14, 14%).

#### 3.4.2.3.2 Automated / Guided

Over half the interventions were automated (n=50/82, 61%). The remainder were guided. Guided interventions included therapeutic telephone contact (n=13/32, 41%), face-to-face therapy (n=5/32, 16%), and therapeutic emails (n=21/32, 66%).

#### 3.4.2.3.3 Therapeutic approach

The majority (n=59/82, 72%) of interventions were based primarily on CBT, one of which used CBT in combination with psychoeducation and interpersonal psychotherapy (IPT). Two interventions used cognitive restructuring without behavioural activation (n=2/82, 2%), two were based on mindfulness (n=2/82, 2%), two on positive psychology (n=2/82, 2%), one on a stress and coping model (n=1/82, 1%), two used internet psychotherapy (n=2/82, 2%), five employed health behaviour change techniques (n=5/82, 6%), and nine did not specify a therapeutic approach (n=9/82, 11%).

Several articles reported use of additional elements employed in the intervention being examined. Additional elements reported were Cognitive Bias Modification online, internet delivered supportive counselling, psychoeducation, IPT, problem solving, motivational interviewing or motivational principles, and physical activity.

#### 3.4.2.3.4 Format of delivery

The majority (n=63/82, 77%) of interventions were designed for sequential use in a pre-determined order. A small percentage allowed free navigation (n=16/82, 19%) and two presented modules in sequence but allowed participants free navigation should they wish (n=2/82, 2%) and one included free navigation once a specific module had been completed (n=1/82, 1%).

#### 3.4.2.3.5 Duration

The intended duration ranged between three and 20 weeks (n=81, M=7.85, SD=2.4). One did not specify the intended duration (Sanders et al., 2012)

although it clearly stated that the intervention was to be used more than once. The majority were either eight weeks (n=25/81, 31%), six weeks (n=22/81, 27%), or ten weeks (n=8/81, 10%) in duration.

#### 3.4.2.3.6 Modules

The number of modules within each intervention ranged from zero to 13 (M=6.49, SD=2.6). Three (n=3/82, 4%) interventions did not use a modular format. The most common number of modules was either six (n=30/82, 36%), eight (n=11/82, 11%), or five (n=9/82, 11%) modules.

#### 3.4.2.3.7 System features

A variety of information was reported which detailed any interactive intervention elements. Textual information was included in all interventions, accompanied by a range of additional elements: automated email reminders (n=36/82, 44%), SMS reminders (n=13/82, 16%), telephone reminders (n=12/82, 15%), interactive quizzes (n=37/82, 45%), social media (n=11/82, 13%), and homework tasks (n=47/82, 57%).

#### 3.4.2.3.8 Gamification

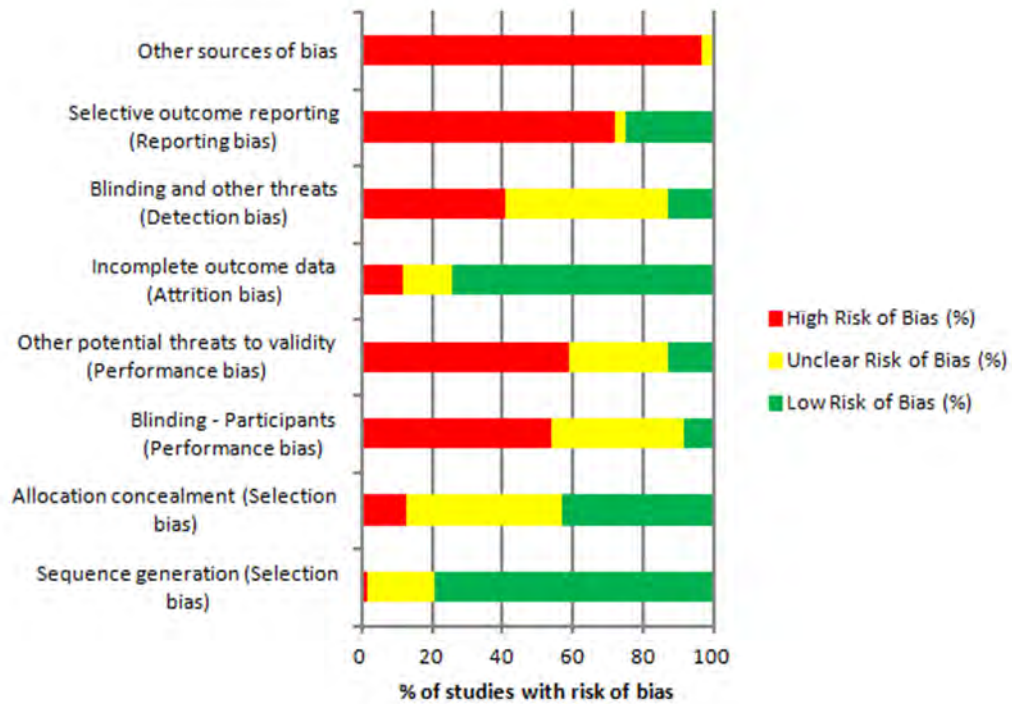
Eight of the ten gamification features reviewed were identified in use, '*Story / theme*', '*Progress*', '*Feedback*', '*Goal Setting*', '*Rewards*', '*Challenge*', '*Badges/trophies*', and '*Points*'. '*Levels*' and '*Game leaders*' were not used in this context. The majority of interventions used only one gamification feature (n=58/82, 71%), the maximum number used in any one intervention was three. Of the interventions employing only one gamification feature '*story/theme*' was most commonly used (n=33/58 57%), followed by '*Progress*' (n=10/58, 17%), '*Goal setting*' (n=6/58, 10%), '*Rewards*' (n=6/58, 10%), and '*Feedback*' (n=3/58, 5%). Of those using more than one feature (n=24/82, 29%), 19 used two features (n=19/82, 23%) and five incorporated three features (n=5/82, 6%). A one-way ANOVA did not reveal any statistical difference (p=0.279, df=5).

#### 3.4.3 Quality assessment

Of the 61 RCT's included the majority (n=37/61, 62%) were judged to be of high risk of bias, eight (n=8/61, 13%) were judged to be of low risk of bias, and an unclear risk of bias was assigned to the remainder (n=16/61, 26%). Sources of bias included inconsistent implementation of interventions, follow-up

methods, completion rates and studies being underpowered to statistically detect intervention effects, and self-selected study populations (Fig. 3.4).

**Figure 3.4 Risk of Bias summary**



### 3.4.4 Adherence

A wide variety of terms were used to report adherence: adherence, attrition, dropout, non-completers, lost to follow up, participant withdrawal, non-response, completion rate, did not complete, retention rate, loss, and compliance.

As such an adherence rate was calculated for each intervention (‘intervention’ as described in the data analysis section) to facilitate comparison. Overall adherence to study protocol ranged from 3% to 100% (n=82, M=71.7%, SD=20.3). Adherence to control groups ranged from 6% to 100% (n=58, M=78.2, SD=19.1). Adherence for excluded studies excluded (no gamification feature) was M=75% (n=102, SD=19.6) with a range of 5-100%. There were differences between the ways in which studies classified adherence and reported their data, making meaningful comparison complicated. The limitations of such are addressed in the discussion.

As comparison of adherence was complicated, usage data was also examined. However, data reporting use of the intervention as intended varied. For example, less than half (n=39/82, 47%), reported the average number of modules completed, and just over half (n=45/82, 55%) reported programme completion and log data. The mean completion rate was 54% (n=45, SD=24.6). The way in which log data was reported varied further, average time spent per visit in minutes was reported in four trials (n=4/82, 4%), average log-on rate by five (n=5/82, 6%), total time duration by two (n=2/82, 2%), and only one trial reported total page views (n=1/82, 1%), or activities opened (n=1/82, 1%). Furthermore, one trial only reported data for those participants who completed the entire intervention (due to a programming error).

Reasons for non-adherence was provided in over half (n=33/61, 54%) of the RCTs and included: lack of time, disinterest, no need for treatment, hardware or technical issues, program perceived as non-effective, life events, felt better after a few modules, disappointed by group assignment, holiday, work commitments, poor health, and no longer wish to participate. Irvine et al. (2013) reported removal of 19 participants due to fraudulent participation.

### 3.4.5 Gamification and adherence

#### 3.4.5.1 Gamification and Adherence per type of gamification feature used

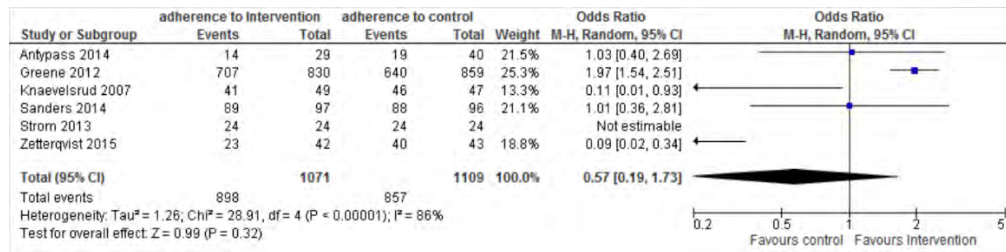
Adherence was examined per intervention employing only one gamification feature. Therefore, the following data refers to a sub-set of the overall data (n=58/82, 71%). Adherence was compared across studies which employed the same gamification feature, in an effort to draw a comparison. Five different gamification features were used as standalone gamification features within an intervention and the results of each are presented in turn (Fig. 3 describes how each term was operationalised).

##### 3.4.5.1 Goal setting

Six (n=6/58, 10%) interventions incorporated ‘*Goal setting*’ as the sole gamification feature. The mean adherence was (M=72%, SD, 22.8). Adherence compared to control is shown (Fig. 3.5)



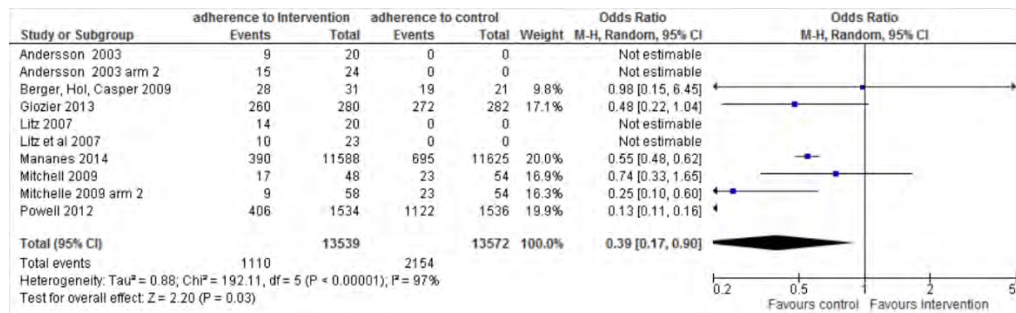
**Figure 3.5 Forest plot showing the adherence to intervention compared to adherence to control in interventions using goal setting as the sole gamification feature**



### 3.4.2.2 Progress

Ten (n=10/58, 17%) interventions incorporated ‘Progress’ as the sole gamification feature. The mean adherence was (M=53%, SD, 31.29). Adherence compared to control is shown (Fig. 3.6).

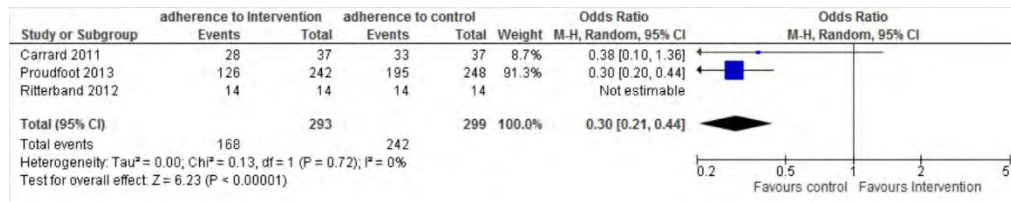
**Figure 3.6 Forest plot showing adherence to intervention compared to adherence to control in interventions using progress as the sole gamification feature.**



### 3.4.2.3 Feedback

Three (n=3/58, 5%) interventions incorporated automated ‘Feedback’ as the sole gamification feature. Mean adherence was (M=76%, SD, 24). Adherence compared to control is shown (Fig. 3.7).

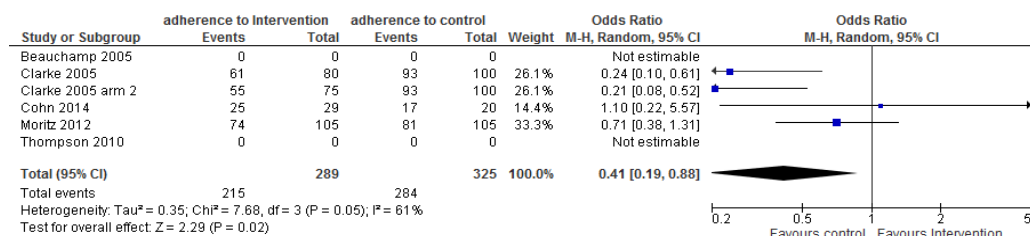
**Figure 3.7 Forest plot showing adherence to intervention compared to adherence to control in interventions using feedback as the sole gamification feature**



#### 3.4.2.4 Rewards

Six (n=6/58, 10%) interventions included ‘*Rewards*’ as the sole gamification feature. The mean adherence was (M=72%, SD, 13.3). Adherence compared to control is shown (Fig. 3.8).

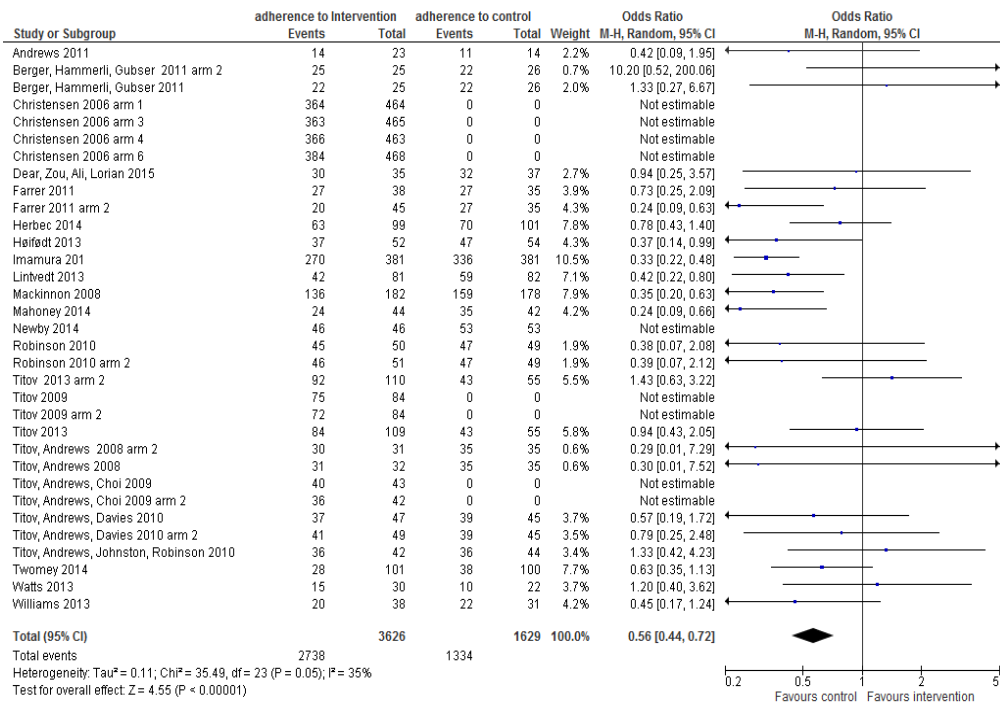
**Figure 3.8 Forest plot showing adherence to intervention compared to adherence to control in interventions using rewards as the sole gamification feature**



#### 3.4.2.5 Story/theme

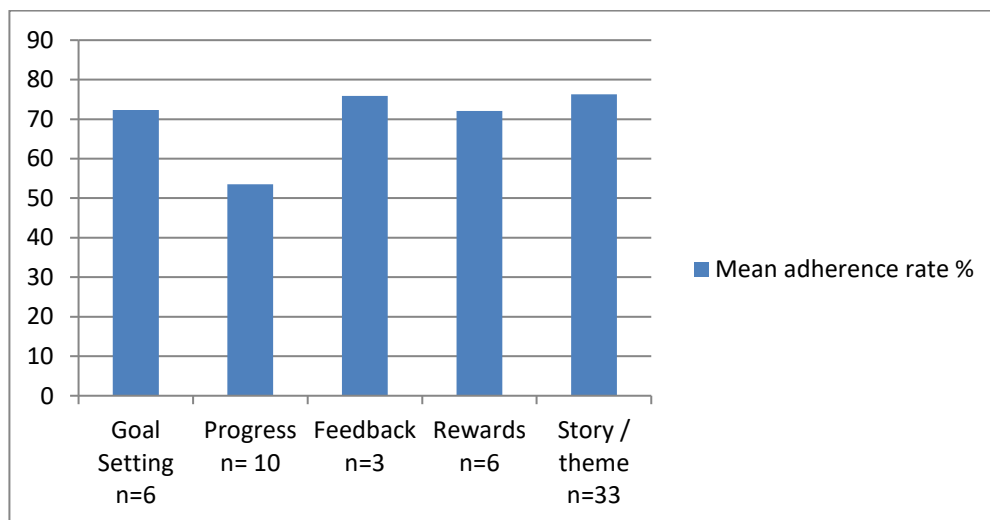
Over half (n=33/58, 57%) of the interventions used ‘*Stories/theme*’ as the sole gamification feature. The mean adherence was (M=76%, SD, 17.04). Adherence compared to control is shown (Fig. 3.9).

**Figure 3.9 Forest plot showing adherence to intervention compared to adherence to control in interventions using story/theme as the sole gamification feature.**



No statistical differences were detected using a one-way ANOVA for mean adherence across the interventions employing only one gamification feature (Fig. 3.10) (n=58, P=0.064).

**Figure 3.10 Mean adherence (%) per single gamification feature used**



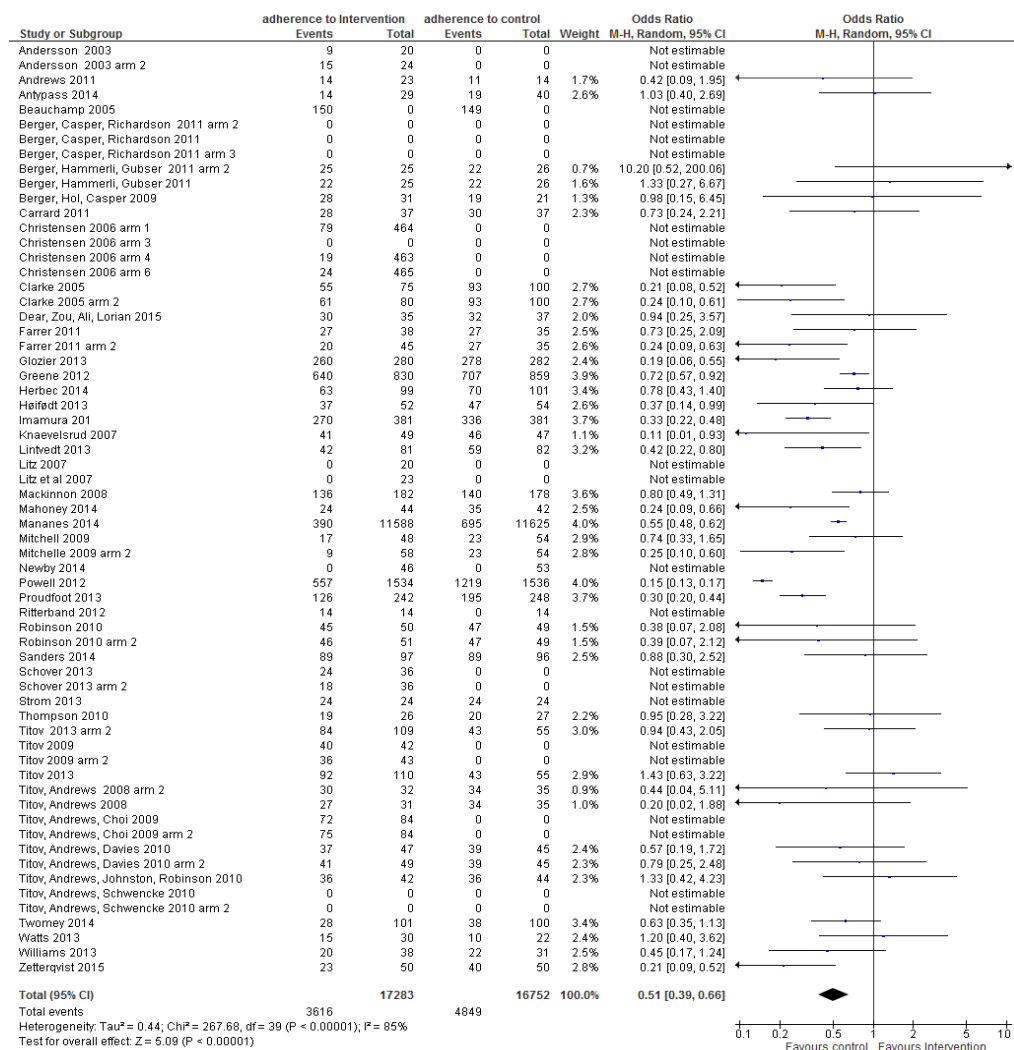
### 3.4.5.2 Gamification and adherence per total number of gamification features used

Adherence was compared across studies which employed one, two or three gamification features in an effort to draw a comparison, the results of each are presented in turn.

#### 3.4.5.2.1 One gamification feature

The mean adherence for interventions incorporating only one gamification features was M=71% (n=58, SD, 21.6) (Fig. 3.11).

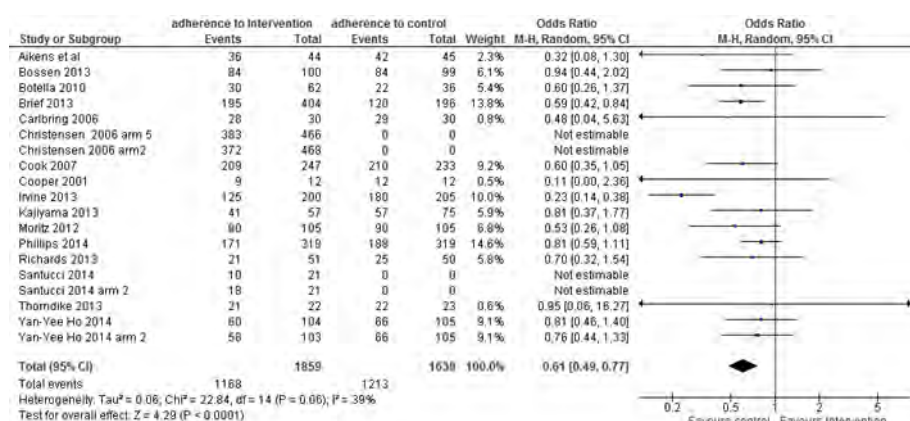
**Figure 3.11 Forest plot showing adherence to intervention compared to adherence to control in interventions employing one gamification feature (n=58)**



### 3.4.5.2.2 Two gamification feature

The mean adherence for interventions incorporating two gamification features was  $M=70\%$  ( $n=19$ ,  $SD$ , 17.9) (Fig. 3.12).

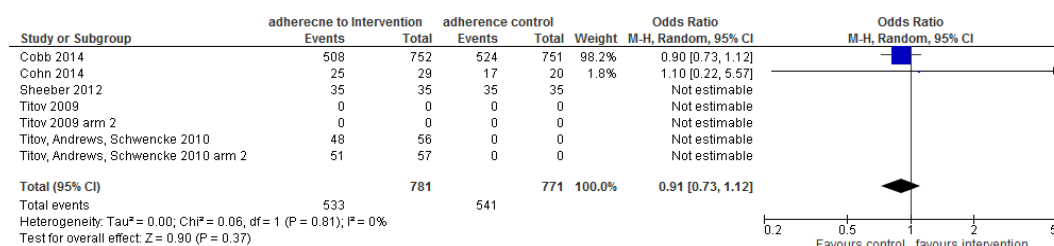
**Figure 3.12 Forest plot showing adherence to intervention compared to adherence to control in interventions employing two gamification features (n=19)**



### 3.4.5.2.2 Three gamification feature

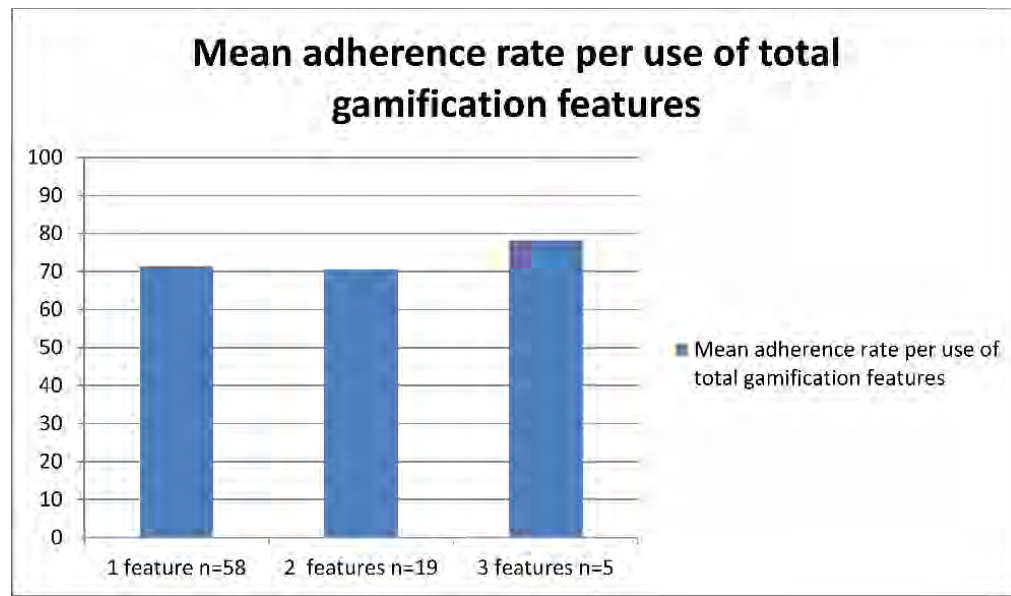
The mean adherence for interventions incorporating three gamification features was  $M=78\%$  ( $n=7$ ,  $SD$ , 12.3) (Fig. 3.13).

**Figure 3.13 Forest plot showing adherence to intervention compared to adherence to control in interventions employing two gamification features (n=7)**



A one-way ANOVA did not detect any statistically significant differences (n=82, p=0.749) between the mean scores of those using one, two or three gamification features (Fig. 3.14).

**Figure 3.14 Mean adherence per total number of gamification features used**



#### 3.4.5.3 Gamification and adherence per health condition

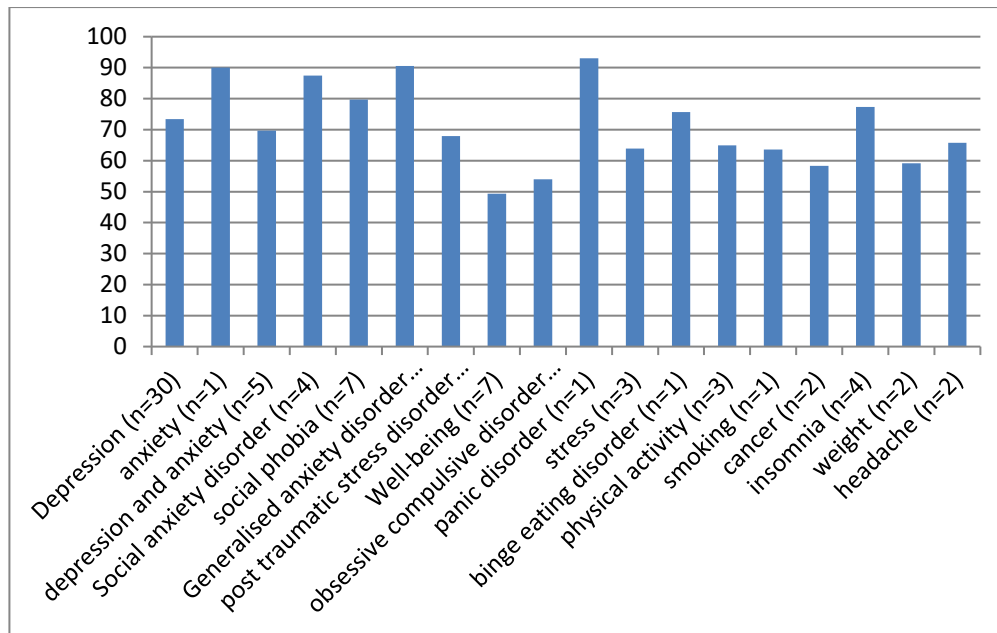
Interventions were designed to treat a range of health conditions and each intervention employed different gamification features (Table 3.2). The total number of gamification features identified is more than 82 (i.e., the number of interventions reviewed) as some interventions used two or more gamification features.

**Table 3.2 Use of gamification feature per health condition**

Condition	Goal setting	Points	Challenge	Progress	Feedback	Rewards	Story / theme
Depression	1		1	6	5	2	19
Anxiety							1
Depression and anxiety		1		2	2		2
Social anxiety disorder and Generalised Anxiety Disorder	1		2				8
Panic Disorder				1	1		
Social phobia				2	1		5
PTSD	1			3	1		
Well-being	1	1	1	2	1		1
OCD							1
Stress	3			1			1
BED	1				1		
Physical activity	3		1	1	1		
Smoking							1
Cancer					1		
Insomnia	1			1	2		
Weight	1			1			1
Headache				1			

The mean adherence to intervention per condition varied from 49% to 93% (Fig. 3.15). A one-way ANOVA did not detect a statistically significant difference (n=82, p=0.183).

**Figure 3.15 The bar chart displays the mean (%) adherence per condition (n= total number of interventions) the intervention was designed to treat**



### 3.4.6 Intervention characteristics and adherence

In addition to the examination of gamification features and their potential impact on adherence, other intervention features were then explored for any association with adherence. These intervention features are presented in turn.

Standard multiple regression indicated that the independent variables only explained 9.4% ( $p=1.83$ ) of the variance in adherence rate.

#### 3.4.6.1 Condition

Adherence varied per health condition each intervention was designed to treat, the mean adherence for interventions designed to treat depression was 74% ( $n=35$ , SD, 15.9) compared to interventions designed to treat other CMD 72% ( $n=39$ , SD, 21.9). This was not statistically significant ( $p=0.610$ , t-test).

#### 3.4.6.2 Automated / Guided

Interventions are classified as either ‘automated’ or ‘guided’. Automated interventions ( $n=50/82$ , 61%) had a mean adherence of 68% (SD, 21.8) compared to guided interventions ( $n=32/82$ , 39%) which had a mean adherence of 77% (SD, 16.23). This was not statistically significant ( $p=0.053$ , t-test).

#### 3.4.6.3 Therapeutic approach

Interventions based on CBT ( $n=58/82$ , 71%) were compared to those using all other therapeutic approaches ( $n=24/82$ , 29%). Mean adherence was 71% (SD,



21.9) and 73.2 (SD, 15.9) respectively. The difference was not statistically significant ( $p=0.655$ , t-test).

#### 3.4.6.4 Format of delivery

Two types of delivery format were compared, sequential delivery ( $n=63/82$ , 77%), and free navigation ( $n=16/82$ , 19%). The mean adherence for interventions reporting sequential delivery was 72% (SD, 21.5) while the mean adherence for interventions reporting free navigation was 71% (SD, 16.6). The difference was not statistically significant ( $p=0.874$ , t-test).

#### 3.4.6.5 Duration

Intervention duration were categorised into three groups to facilitate comparisons. The mean adherence for interventions which had an intended duration of up to six weeks, seven to nine weeks and ten plus weeks was 64% ( $n=27$ , SD, 24.5), 74% ( $n=36$ , SD, 17.4) and 77% (SD, 16.7) respectively. The difference was not statistically significant ( $p=0.104$ , ANOVA).

#### 3.4.6.6 Modules

Module included were categorised into three groups to facilitate comparisons. The mean adherence for interventions which included up to six modules, seven to nine modules and ten plus modules was 70% ( $n=51$ , SD, 22.0), 73% ( $n=18$ , SD, 17.7), 74% ( $n=13$ , SD, 17) respectively. The difference was not statistically significant ( $p=0.803$ , ANOVA).

#### 3.4.6.7 System features

System features were categorised into three groups to facilitate comparisons. The mean adherence for interventions which reported the inclusion of one to two, three to four, five to six, interactive system features was 67% ( $n=48$ , SD, 22.3), 77% ( $n=29$ , SD, 15.3) and 78% ( $n=5$ , SD, 19) respectively. The difference was not statistically significant ( $p=0.085$ , ANOVA).

### 3.5 Discussion

This review sought to identify RCT's which incorporated gaming features into the design of web-based health interventions to treat CMD's or well-being. Physical health interventions which included an outcome measure for CMD's,

or well-being were included when identified. This is the first review which has examined the use and role of gamification features on adherence in this context. Ten key gamification features were examined (Cugelman, 2013).

Sixty-one RCT's comprising 82 intervention arms were analysed and 47 separate interventions were identified. Interventions designed to treat depression, which were intended to be six or eight-weeks in duration, incorporating six modules, utilising CBT, were most common. This is shorter than the typical ten-week duration identified previously (Melville et al., 2010). The most common delivery format used was a weekly sequential release of modules. Interventions allowing free navigation were less common. Interventions were more likely to be automated rather than guided. Previous reviews report higher adherence to guided interventions compared to automated interventions (Primack et al., 2012). The current review supported this finding, (77% and 68% respectively) lending further support for the role of 'guides' in self-help treatments. However, this difference only neared statistical significance. Overall, the majority of RCT's included were found to have a high risk of bias which has implications for study conclusions.

One of the review objectives was to identify whether gamification features had been incorporated into the design of interventions developed to treat CMD and/or well-being. This review identified that gamification features have indeed been used in this context. Eight of ten gamification features reviewed were identified in use across the 82 included interventions. The majority (70%) of which incorporated only one gamification feature into the intervention, five different features were used in this way ('Goal setting', 'Progress', 'Feedback', 'Reward', and 'Story/theme'). Overall, the most common feature utilised was 'Story/theme'. Interventions using this did not commonly incorporate additional features, only six were found which did. 'Progress' and 'Feedback' were utilised together in six interventions. 'Points' and 'Challenge' were not frequently implemented and 'Levels' and 'Game leaders' were not incorporated.

No studies specifically compared the impact of different gamification features on programme adherence in the same RCT, however one trial compared six versions of the same intervention 'Moodgym'. Two of these trial arms were

found to incorporate two gamification features while the remaining four arms only included one (Christensen et al., 2006). However, the purpose of the trial was not to compare use of these features.

The main aim of this review was to explore whether the use of gamification features influenced adherence. Findings suggested that adherence was not positively influenced by the use of gamification features as mean adherence to intervention arm conditions was lower than mean adherence to control conditions where control was inactive i.e., WLC or TAU (respective means were 72% and 78%). Following this the use of different gamification features was compared across interventions using only one gamification feature. However, no statistical difference was observed which supported the use of one single feature over another, despite the mean adherence rates ranging from 53% to 76% for '*Progress*' and '*Feedback*' respectively. Nor was there any significant difference found between studies using different total amounts of gamification features (one, two or three features). However, the Forest plots did suggest that as additional gamification features were added, adherence moved closer to favouring the intervention over control.

An additional aim of this review was to determine whether adherence to interventions using gamification features differed across health conditions. Interventions designed to treat social phobia were found to have a higher mean adherence than those designed to treat well-being. However, no statistical difference was observed. Findings reported here are in line with established findings (Kelders et al., 2012).

Additional intervention features were also examined in an effort to shed light on active ingredients influencing adherence. Again, no statistically significant differences were observed and none of the variables were found to explain any significant proportion of the variance in adherence rate (total variance explained was only 9%). However, mean adherence increased as intended duration increased from six to eight to ten weeks.

### 3.5.1 Comparison to prior studies

Criticisms of gamification have been levied and discussed in the literature (Seaborn & Fels, 2015). For example, Gartner (Trends, 2012) stated

*“gamification is currently driven by novelty and hype”*, while Bogost (2013) considered it a quick fix adopted by businesses to increase and promote engagement. Underpinning these criticisms is the concern that implementation of individual features like points and leader boards in fact miss the real essence and power of games as motivational techniques, which have the potential to positively encourage behaviour change (Antin & Churchill, 2011) or positively encourage adherence to treatment programmes which reduce individual suffering through reductions in clinical symptoms. While many studies were found to have incorporated one game feature into their treatment programme, it is possible that such negative opinions may have reduced wider application in this health context due to concerns of appropriateness. However, Cugelman (2013) highlighted that, like other persuasive architectures, gamification has merit if implemented in the right way.

It is important to consider the way in which gamification features identified in use were incorporated into intervention designs. (Hamari, Koivisto, & Sarsa, 2014, p. 4) refer to the context of gamification as *“the core service or an activity being gamified”*. There were only three examples where the use of game mechanics was clearly acknowledged, and the intention of use identified as a means to address and increase user engagement and enhance enjoyment. Cobb and Poirier (2014) used in-game ‘*Rewards*’, ‘*Badges*’ and ‘*Challenges*’ to engage participants in a ‘Daily Challenge’ to improve well-being. In this example, adherence was high and usage data well reported. More than half the participants continued to engage with the programme at 60 days and 92% were reported to have completed one challenge. Authors reported a positive dose-response relationship for well-being where higher programme engagement predicted better well-being at post assessment and follow-up. Similarly, a guided physical activity intervention which assessed well-being outcomes applied motivational principles and game elements, including visualisation of progress and automated goal setting activities, specifically to enhance engagement and participation (Irvine et al., 2013). Imamura et al. (2014, p. 3) incorporated comic strip stories in an effort to *“foster learner’s interest in the program”*. However, the remaining interventions did not commonly acknowledge or describe their use of gamification features. For example, (Titov,

Andrews, Schwencke, et al., 2010) implemented ‘*story/theme*’, ‘*goal setting*’, and ‘*challenge*’ in the Shyness Programme, without acknowledgement that game mechanics were incorporated in the intervention. Indeed, incorporation of such features may not have been considered (by those who developed the intervention) to represent implementation of game mechanics. Further examples include (Sheeber et al., 2012) who incorporated three features without recognition of such, in a guided intervention to manage maternal depression. In this example intervention design and development was focused on principles which promoted self-regulated learning. Adherence and completion were high (97% and 63% respectively). In the main, intervention descriptions focused on the theoretical basis rather than the technological aspects of development. The intentional use of game design elements has been suggested as a defining feature of the operationalisation of ‘gamification’ (Seaborn & Fels, 2015) and as such this highlights the potential importance of intended use. Doherty et al. (2012) outlined, in a number of articles, the importance of encouraging engagement with, or adherence to, treatment rather than technology, and it is important to bear this in mind during discussion on use of gamification features in this context where the ultimate intention is to alleviate suffering and improve well-being.

### 3.5.2 Strengths and Limitations

This review was based on an extensive search of a large number of health and computer science databases. Hand searching was not conducted but the expertise of the multi-disciplinary team means that while publication bias cannot be excluded, this comprehensive review did identify a large number of relevant studies.

This review aimed to explore the potential role of gamification to increase programme adherence and engagement, adherence being an issue which has plagued web-based health interventions for some time (Christensen et al., 2009; Wangberg et al., 2008). In order to examine the role of gamification on adherence, adherence to study protocol was used. This was considered an objective, comparable measure calculated as a percentage of those (randomised) who completed post assessment outcome measures. While this is useful, it offers less insight than module completion rates would. However, limited reporting of

data such as log-on rates, module completion and average access time meant this was not possible. Only 34 studies reported a percentage for programme completion and only ten provided data for log-on rates, with one exception (Litz et al., 2007). These studies were all reported after 2009. A more comprehensive and standardised usage report across trials would assist and inform further analyses of adherence and programme engagement. This finding is in line with previous discussion on adherence reporting (Kelders et al., 2012; Morrison & Doherty, 2014; Whitton et al., 2015). Morrison and Doherty (2014) provided a useful analysis of log-data which could be replicated in future studies.

Interventions evaluated via RCT methodology was a specific inclusion criteria, as such it is possible that a body of literature pertaining to management of CMD or well-being which incorporate gamification features may have been excluded. However, RCT's follow robust methodological procedures and are considered to provide the highest quality evidence, and as such the approach adopted is of value (Akobeng, 2005).

Varied reporting complicated initial identification of studies for inclusion. Not all studies provided a detailed description of the intervention programmes. However, seven provided clear, detailed description of intervention features including screen shots and illustrations (Clarke et al., 2005; Cobb & Poirier, 2014; Høifødt et al., 2013; Imamura et al., 2014; Litz et al., 2007; Powell et al., 2013; Watts et al., 2013).

Interventions utilising gamification features in conditions other than depression were small in number, which limited opportunity to explore the influence of gamification features on adherence across health conditions.

Furthermore, the way in which specific gamified features were incorporated warrants discussion. In the present study 'Rewards' were commonly seen to be financial in nature while 'Progress' was often controlled progression through the system. 'Goal setting' and 'Feedback' are aligned with established strategies utilised in therapeutic treatment of CMD and their role is well defined in terms of supporting and encouraging behaviour change. In reviewing interventions designs it was not always possible to identify the intention behind each feature and they are also commonly used features in web-based

programmes. However, they were not employed in all interventions and so remain of interest in this context.

It is, of course, important to acknowledge that adherence also may be influenced by additional factors which could not be assessed in this review. This is highlighted in the small variance rate (9%). Furthermore, attrition to mental health treatments is also experienced in face-to-face delivery formats.

### 3.5.3 Implications for practice

Future research should look to examine whether application of specific gamification features influence adherence to protocol and completion rate. No RCT was identified which specifically considered the role of gamified features on promotion of adherence to mental health programmes. This could be achieved through comparisons of the same intervention (in the same clinical population) adjusted to include either different gamification features, different combinations of gamification features, increasing numbers of gamification features, or use of one specific gamification feature compared to none. Studies looking to explicitly make these comparisons may shed further light on the role of individual features extracted from game design on adherence to web-based health interventions. These effects should also be explored across different health and well-being contexts to identify whether inclusion of gamification features is more or less effective at increasing engagement and adherence across different patient populations and sub-groups, for example different levels of clinical symptomology.

It would also be beneficial to explore the use of gamification in interventions based on alternative therapies to that of CBT (which comprised the majority of those reviewed here). For example, whether they have a role to play in encouraging engagement to interventions based on ACT. In addition to this, future research might benefit from exploration of gamification in interventions, allowing free navigation as opposed to a linear, weekly format as identified here. This may shed further light on the potential role of game mechanics on programme engagement and adherence to treatment.

Assessment of participant's motivation to complete the full intervention upon entering the programme might also offer an alternative way to explore the role

of gamification. Use of extrinsic motivation features may influence some people more than others. Exploration of people's reasons for participating at the onset of a RCT might shed light on the role of gamification features. Gamification promotes motivation through external means, which means those who are internally motivated may not be influenced to the same extent.

Research findings have indicated that higher adherence is associated with increased treatment effectiveness (dose response relationship). Some have discussed a 'beneficial level' of engagement which facilitates a positive health outcome (Doherty et al., 2012) and this is certainly an area for future interest. This was not examined in the current review but could be further explored in relation to the inclusion of gamification features.

#### 3.5.4 Conclusion

Gaming features have explicitly been implemented into the design of interventions to treat CMD's and well-being. However, this was not common. This review did not find any evidence that use of specific gamification features were associated with higher adherence to the intervention program as measured by adherence to protocol. Furthermore, no evidence was found to suggest that interventions incorporating additional gamification features had any statistically significant influence on adherence. However, no studies explicitly examined the role of gamification on programme adherence or engagement.

What the review did show was that guided interventions and interventions intended to last ten weeks, as opposed to six or eight-weeks duration, and those incorporating three gamification features had a higher mean adherence. This may provide initial insight into the design of future interventions wishing to utilise gamification features to address adherence and contribute to the on-going discussions surrounding the use of game design elements in non-game contexts.



### **3.6 A systematic review and meta-analysis examining the effectiveness of web-delivered Acceptance and Commitment Therapy interventions for the management of mental health and positive well-being**

ACT has enjoyed a steady rise in interest as an alternative therapeutic intervention to CBT based interventions. ACT is considered a third wave CBT, philosophically rooted in functional contextualism (Hayes, 2004; Jiménez, 2012) and relational frame theory (RFT) (Barnes-Holmes & Roche, 2001). ACT differs from traditional CBT in a number of ways, most notably in that it does not consider thoughts and beliefs as correct or incorrect; and symptom reduction is not the goal of treatment but is a by-product of the process (Hayes, 2004). ACT is based on the principles of self-acceptance and a commitment to one's personal values and encourages the adoption of behaviours which are in agreements with those personal values. ACT aims to encourage individuals towards the acceptance of difficult and unwelcome thoughts or emotions and promotion and simultaneous adoption of actions and behaviours, into daily practice, which are in line with these individual core values and principal beliefs. Increased psychological flexibility facilitates a shift towards behaviours which are in line with personal values. ACT interventions commonly incorporate mindfulness and experiential exercises which promote contact with the present moment.

### **3.7 Aim**

The current review aimed to examine the published, peer reviewed evidence pertaining to the effectiveness of ACT in the treatment of common mental disorders and well-being in a web-based delivery format. With the secondary aim to examine adherence to ACT based interventions.

#### **3.7.1 Objectives**

The review objectives were

1. To identify RCTs of web-based interventions which have employed ACT as the main therapeutic approach, for the treatment of a CMD or improvement of well-being in any population.
2. To appraise and synthesise the evidence on effectiveness for depression, anxiety and QoL.
3. To report rates of adherence to the study protocol, calculated as a percentage of those randomised to the intervention and completed post assessment.

## 3.8 Method

### 3.8.1 Protocol

A protocol document was prepared (appendix 3) prior to undertaking the review.

### 3.8.2 Procedure

The primary researcher developed the search strategy and conducted the search. Identified studies were exported electronically into EndNote Web, duplicates were removed. When multiple reports were identified, which reported data from the same study, they were grouped together and considered to represent one 'study' (Higgins, 2008).

#### 3.8.2.1 Databases

Two electronic databases were searched Medline complete (EBSCO interface) and PsychINFO (EBSCO interface).

#### 3.8.2.2 Search strategy

A search strategy was developed for MEDLINE (appendix 4) and adapted for PsychINFO. The search date was database inception until 10.02.2016. Grey literature was also included, at the time the Association of Contextual Behavioural Science (ACBS) website reported a list of published computerised interventions (since 2013). This list was reviewed by the primary researcher and a list of all web-delivered ACT interventions was compiled. Reference lists of identified studies were examined to ensure all potential articles were identified.

#### 3.8.2.3 Search terms

A combination of search terms was used across three categories: 'web-based', 'intervention' and 'mental health/well-being' (Fig. 3.16). Standardised subject

terms were used in each electronic database, to identify all relevant studies meeting the specified inclusion criteria.

**Figure 3.16 Search terms (SR2)**

<b>Web-based</b>	<b>Intervention</b>	<b>Mental health / Well-being</b>
Internet	Acceptance and Commitment Therapy	Mental health
Web	ACT	Anxiety
Web-based	Therap*	Depression
Online	Treatmebnt*	Well-being
Web-delivered	Intervention	Burnout
Computer*	Mindfulness	Stress
	e-therap*	Ehealth
	etherap	e-health
	e-treatment*	e-mental health
	Cyber-therapy	Self help
	Cybertherapy	Mood disorders
	e-interventions	Generalised anxiety disorder
		GAD
		Obsessive-compulsive disorder
		Post-traumatic stress disorder
		PTSD

#### 3.8.2.4 Inclusion criteria

The following inclusion criteria were applied:

1. Articles must be published in a peer reviewed, English language journal.
2. The intervention must be based on ACT.
3. RCT design.
4. The study delivered the intervention via the web (internet).
5. The intervention was designed to be accessed on more than one occasion.
6. The intervention was designed to manage a CMD or improve well-being.
7. The study must report a measure of effectiveness of the intervention (i.e., pre and post outcome measure) to enable an effect size to be calculated.

#### 3.8.2.5 Exclusion criteria

Studies were excluded if:

1. Participants were under the age of 18.

2. The study reported the re-analysis of data from a subsample of a previously published RCT.

#### 3.8.2.6 Review process

The primary researcher extracted the identified articles and sent copies to two other researchers who had been contacted and asked to participate in the review and meta-analysis. Following agreement and communication of individual roles a two staged review process was facilitated by the primary researcher.

In stage one three reviewers (MB, AJ, AG) independently reviewed the title and abstract of all identified articles, against the specified inclusion and exclusion criteria. The primary researcher collated all responses and compiled a list of those where the decision was not unanimous. Articles were included for full text review where one reviewer indicated to include.

The primary researcher then retrieved a full text copy of all included articles via the host institutions journal access. When full text access was not available a copy was requested via an inter library loan. The primary researcher assessed all instances where more than one study by the same author was retrieved and checked that the data presented were from different populations. Copies were then disseminated and stage two commenced. The full text article was then assessed against the specified inclusion and exclusion criteria by the primary researcher and the second reviewer (AG). Studies were excluded when they did not meet a single criterion. The first instance where they did not meet eligibility was recorded as the reason for exclusion and the study was not assessed for other inclusion criteria in this instance. The primary researcher collated responses and identified those where the decision was not unanimous, for discussion with the third reviewer (AJ) until a consensus was reached.

#### 3.8.2.7 Data extraction

The primary researcher developed and piloted a data extraction sheet (appendix 5) and amendments were made where required.

### 3.8.3 Data Analysis

#### 3.8.3.1 Reviewer agreement

The Kapa statistic was calculated as described earlier.

#### 3.8.3.2 Included studies

The total number of included and excluded studies was reported numerically. Each RCT was first described in terms of its study design, i.e., number of trial arms, participant characteristics, condition designed to treat, outcome measures used. And secondly in terms of the intervention characteristics i.e., intervention name, automated or guided, therapeutic approach, format of delivery, duration, modules and system features. Frequencies, percentages, mean and Standard deviation (SD) were calculated using IBM® SPSS®.

#### 3.8.3.3 Adherence

Adherence to study protocol was calculated as described earlier. Completion data were reported using mean and SD. Completion was taken to mean completion of all modules in the specified intervention, as prescribed by the study authors. Where available other measures relating to adherence and engagement are reported using frequencies i.e., usage and satisfaction data.

#### 3.8.3.4 Quality Assessment

Quality assessment was undertaken by the primary researcher using the Risk of Bias tool described earlier. Assessment was made on the information provided in publication only. Authors were not contacted for additional information.

#### 3.8.3.5 Meta-Analysis

The meta-analysis was planned by the primary researcher and conducted by the second reviewer (AG). Data were entered into RevMan version 5.3.5 and Matlab R2015a, cleaned and checked for missing values and errors. Forest plots were produced in Matlab (AG).

Two categories of effect size were calculated, one comprising between-group effects measured at post-treatment and the other comprising within-group effects measured between pre- and post-treatment. In those studies which included more than one comparison condition, the active control was chosen as the comparison condition. For each of these two categories, summary effect

sizes were then calculated for three categories of outcome measures: depression, anxiety and QoL. All between-group effect sizes are signed so that a positive value is in favour of the web-based ACT condition and all within-group effect sizes are signed so that a positive value is in favour of the post-treatment time point of the pre-treatment time point.

Effect size was calculated using Hedges'  $g$  and means and standard deviations for each outcome measure were reported. The DerSimonian and Laird random-effects model (DerSimonian & Laird, 1986) was adopted in each case, based on the assumption that variation of true effects exists between studies. Using this model, the summary effect sizes outlined in the previous section were calculated. Corresponding tests for statistical significance were computed in the form of both two-tailed  $p$ -values and 95% confidence intervals. The heterogeneity of true effects was assessed by the  $I^2$ -statistic. Corresponding  $p$ -values were computed to assess the extent of uncertainty in  $Q$ , following the assumption that  $Q$  follows a  $\chi^2(k - 1)$ -distribution, with  $k - 1$  degrees of freedom.

Interpretation of effect sizes was based on Cohen's rule-of-thumb, that is, small effects were categorised as  $0.2 \leq g < 0.5$ , medium effects as  $0.5 \leq g < 0.8$  and large effects as  $g > 0.8$  (Strecher, 2008). The proportion of dispersion due to true effects was categorised by the well-established scale of Higgins et al. (Bricker, Wyszynski, Comstock & Heffner 2013), that is, the intervals  $25\% \leq I^2 < 50\%$ ;  $50\% \leq I^2 < 75\%$  and  $I^2 > 75\%$  indicate a low, medium and high proportion of dispersion due to true effects, respectively. Where the outcome measure was dichotomised, it was not possible to calculate Hedges'  $g$  directly. In this instance, data were transformed using the method detailed by Borenstein, Hedges, Higgins & Rothstein (Rosenblad, 2009) (Fig. 3.17).

**Figure 3.17 Data transformation method**

$$g = \left(1 - \frac{3}{4df - 1}\right) \frac{\sqrt{3}}{\pi} \ln \text{OR}$$

where OR is the odds ratio and  $df$  is the number of degrees of freedom associated with the problem.

### 3.9 Results

#### 3.9.1 Reviewer agreement

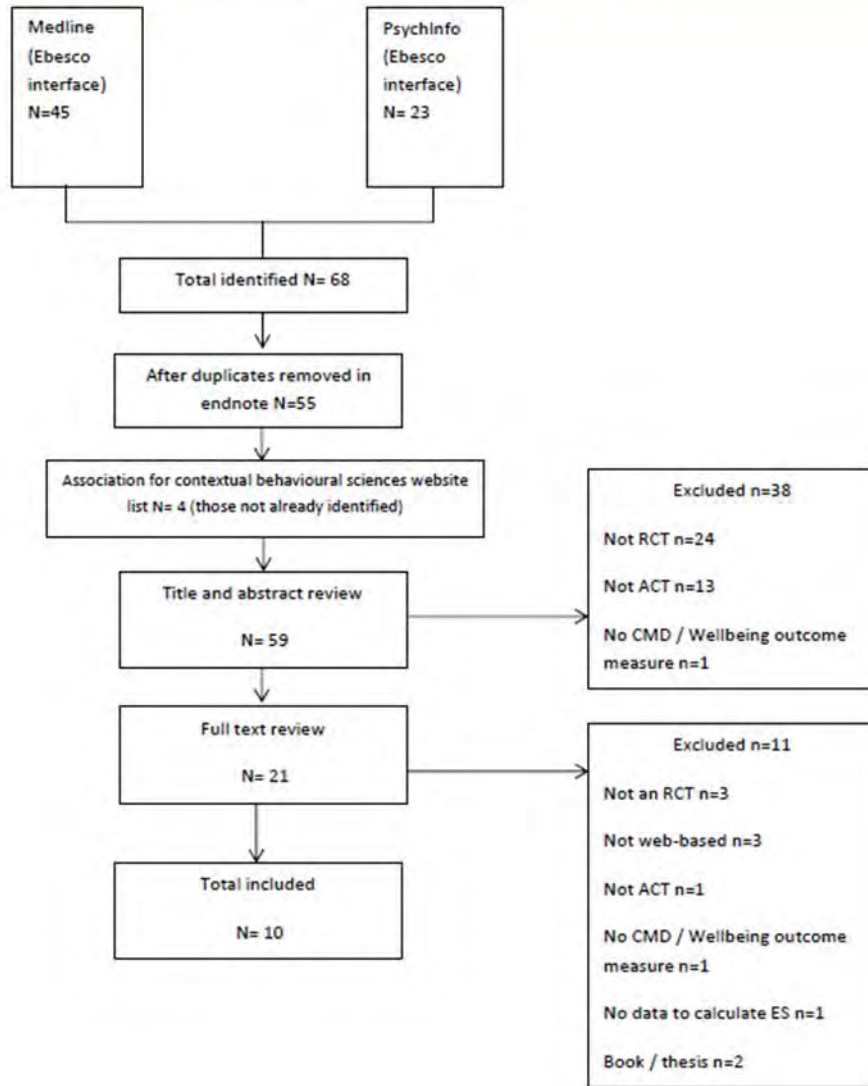
The F. Kappa statistic showed moderate agreement (.674) between reviewers at the title and abstract stage and substantial agreement at full text review (.886).

#### 3.9.2 Included studies

The database searches identified 55 articles, and the grey literature search identified an additional four articles. This led to a total of 59 articles included for stage one, title and abstract review (Fig. 3.18). A total of 38 articles were excluded which resulted in a total of 21 articles undergoing stage two, full text review. Eleven articles were excluded at this stage. Three were not RCT design, three were not web-based, one did not employ ACT as the therapeutic approach, one did not report pre to post outcome data for a CMD, one did not include data from which an effect size could be calculated and two were not peer reviewed articles. This meant that a total of ten RCTs met the specified inclusion criteria (Table 3.3) and were included in the meta-analysis.

#### **Figure 3.18 PRISMA flow chart (SR2)**

Flow diagram for systematic review of web-based ACT RCTs





**Table 3.3 Included studies (SR2) (n=10)**

Author / year	Condition	Trial arms	Comparator (s)	N total	Adherence to protocol/ACT group %	Adherence to protocol control group %	Completed ACT as prescribed	ACT: Core principles included	MP3 downloads / experiential exercises	# of therapists	Weeks	module	f-up months
Burhman et al., (2013)	Chronic pain	2	Moderated online discussion group	76	76.3	84.2	39.5	Acceptance; cognitive fusion; values; committed action	MP3 files: Metaphors and mindfulness exercises. Patient examples of overcoming chronic pain.	0	7	7	6
Carlbring et al., (2013)	Depression	2	WLC	80	100	95	27.50%	Acceptance; Cognitive fusion; Values;	Mindfulness Workbook Behavioural interventions	2	8	7	0
Hesser et al., (2012)	Tinnitus	3	CBT / Internet discussion forum	99	94.2	93.7	*	Acceptance; Cognitive fusion; Values;	MP3 files : Metaphors and defusion exercises. Mindfulness Behavioural interventions	7	8	8	12
Jones et al., (2015)	Depression in smokers	2	Attention control	9448 71	48	53.1	*	Acceptance; cognitive fusion; being present; self as context; values; committed action	Experiential exercises: metaphors and mindfulness exercise	0	8	8	3
Lappalainen et al., (2014)	Depression	2	Face to face ACT group	38	100	100	97.40	Acceptance; cognitive fusion; being present; self as context; values; committed action	MP3 files, video files and audio recordings: metaphors, mindfulness exercises Mindfulness	18	6	6	6/18
Lappalainen et al., (2015)	Depression	2	WLC				94.70	Acceptance; Cognitive fusion; Self as context; Values;	Mindfulness Video files and audio recordings: metaphors, mindfulness exercises	11	7	6	12

				39	100	100							
Levin et al., (2016)	Well-being	2	Mental health education website (MHE)	234	70	86	55%	Acceptance; Committed action; Values;	Mindfulness and breathing exercises, metaphors.	0	3	2	1 / 3
Levin et al., (2014)	Psychological distress	2	WLC	76	*	*	92%	Acceptance; Values;	Metaphors experiential exercises	0	3	2	3 week follow up
Pots et al., (2016)	Depression	3	Expressive writing / WLC	236	83.8	74.6 / 89.6	73%	Acceptance; cognitive fusion; being present; self as context; values; committed action	MP3 downloads: metaphors and mindfulness exercises Mindfulness	6	12	9	6 / 12
Trompeter et al., (2015)	Chronic pain	3	Internet based expressive writing group / WLC	238	71.9	64.5 / 80.5	not reported	Acceptance; cognitive fusion; being present; self as context; values; committed action	MP3 downloads: metaphors and mindfulness exercises	5	12	9	0

*\*Not reported*

Two instances were identified where RCTs reported data from the same author. In each instance the two reports were assessed and identified to include different participants. (Lappalainen et al., 2014; Lappalainen et al., 2015) specified different data collection points, 2011 and 2012 respectively while (Levin et al., 2016; Levin et al., 2014) indicated that participants received different compensation/rewards for taking part (\$60 plus research credits; \$10), which suggested different participants were also included. For these reasons all articles remained.

### 3.9.2.1 Trial arms

Of the ten RCTs, seven (n=7/10, 70%) included two trial arms, three of which included a WLC, four of which had active controls as the comparator arm. The remaining three (n=3/10, 30%) RCTs included three armed trials, of which two used an active control plus a WLC and one used two active interventions as control (Table 3.4). Three (n=3/10, 30%) trials were undertaken in Sweden; three (n=3/10, 30%) in the USA; two (n=2/10, 20%) in Finland and two (n=2/10, 20%) in the Netherlands.

**Table 3.4 Comparator characteristics for each included study**

Author	Population	trial arms	Comparator 1	Comparator 2
Burhman et al., (2013)	Chronic pain	2	Moderated online discussion group	
Carlbring et al., (2013)	Depression	2	WLC	
Jones et al., (2015)	Depressive symptoms in smokers	2	smokefree.gov	
Lappalainen et al., (2014)	Depression	2	Face to face ACT group	
Lappalainen et al., (2015)	Depression	2	WLC	
Levin et al., (2016)	Well-being in university students	2	Mental health education website (MHE)	
Levin et al., (2014)	Psychological distress in university students	2	WLC	
Hesser et al., (2012)	Tinnitus	3	CBT	Internet discussion forum
Pots et al., (2016)	Depression	3	Expressive writing	WLC
Trompetter et al., (2015)	Chronic pain	3	Internet based expressive writing group	WLC

### 3.9.2.2 Participant characteristics

Participants in all ten studies self-selected to take part. Two (n=2/10, 20%) of the studies reported that they recruited participants from a clinical population (i.e., pain clinics) (Levin et al., 2014; Trompetter et al., 2015) two (n=2/10, 20%) from an undergraduate student population (Levin et al., 2016; Levin et al., 2014) while the remainder (n=6/10, 60%) recruited from the general population.

Trials ranged in size from 38 to 238 participants. Three RCTs included >100 participants.

### 3.9.2.3 Condition

Half of the interventions were primarily designed to manage and reduce depression and depressive symptoms (Carlbring et al., 2013; Jones et al., 2015; Lappalainen et al., 2014; Lappalainen et al., 2015; Pots et al., 2016) one of which specifically focused on depression in smokers (Jones et al., 2015) one targeted psychological distress (Lappalainen et al., 2014); one well-being (Lappalainen et al., 2015); two chronic pain (Buhrman et al., 2013; Trompetter et al., 2015) and one tinnitus (Hesser et al., 2012). All included a pre and post outcome measures for a CMD, specifically anxiety or depression.

Methods to confirm a diagnosis of primary conditions included the following: medical examination and telephone screening (Buhrman et al., 2013), computerised screening interview combined with a structured telephone interview (Carlbring et al., 2013; Pots et al., 2016; Trompetter et al., 2015), computerised screening followed by telephone interview and face-to-face meeting plus a medical confirmation of tinnitus (Hesser et al., 2012), self-assessment questionnaires (Jones et al., 2015), structured clinical telephone interview (Lappalainen et al., 2014; Lappalainen et al., 2015) and none (Levin (Levin et al., 2016; Levin et al., 2014).

### 3.9.2.4 Outcome measures

Six different outcomes measures were used across the ten included studies: Hospital and Depression Scales (HADS); Beck Depression Inventory (BDI); Beck Anxiety Inventory (BAI); Anxiety and Depression Detector; DASS; and Centre for Epidemiologic Studies Depression Scale (CES-D).

Four different secondary measures were used for quality of life and psychological distress: Quality of Life Inventory (QOLI); GHQ-12; Symptom Checklist 90 items (SCL-90); and the MHC-SF.

Six different ACT specific outcomes measures were used in seven studies: Avoidance and Inflexibility Scale (AIS); Acceptance and Action Scale (AAQ-II); Five Facet Mindfulness Questionnaire (FFMQ); Psychological Inflexibility Scale (PIPS); Engaged Living Scale (ELS); plus an ACT knowledge questionnaire (Table 3.5).

**Table 3.5 Outcome measures**

Author / year	Condition	Anxiety	Depression	QoL	ACT measures
Burhman et al., (2013)	Chronic pain	HADS	HADS	QOLI	
Carlbring et al., (2013)	Depression	BAI	BDI / MADRS-S	QOLI	
Jones et al., (2015)	Depressive symptoms in smokers	Anxiety and depression detector	Anxiety and depression detector		AIS
Lappalainen et al., (2014)	Depression		BDI	GHQ-12; SCL-90	AAQ-II
Lappalainen et al., (2015)	Depression		BDI	SCL-90	AAQ-II; FFMQ
Levin et al., (2016)	Well-being	DASS	DASS	MHC-SF	FFMQ; ACT knowledge
Levin et al., (2014)	Psychological distress	DASS	DASS		AAQ-II; ACT knowledge
Hesser et al., (2012)	Tinnitus	HADS	HADS	QOLI	
Pots et al., (2016)	Depression	HADS	CES-D	MHC-SF	AAQ-II
Trompetter et al., (2015)	Chronic pain	HADS	HADS	MHC-SF	FFMQ-SF; PIPS; ELS

### 3.9.2.5 Intervention characterises

All interventions were web-based and available via personal computers, laptops and internet enabled devices. A total of eight different interventions were identified: Depressionshjälpen; webQuit.org; ACT; Living to the Full; Living with pain; The Good Life Compass; ACT-CL and one un-named). Two of the interventions were used in two different studies (The Good Life Compass and

ACT-CL). One of which (ACT-CL) was a progression of the first and included additional ACT components.

#### 3.9.2.5.1 Automated or Guided

Three (n=3/10, 30%) interventions were automated (Jones et al., 2015; Levin et al., 2016; Levin et al., 2014), seven (n=7/10, 70%) were guided. Of the seven guided interventions, the 'guide' was a combination of trained psychologists and psychology graduate students (n=2/7, 28%) or graduate psychology students (n=5/7, 71%). Two of the interventions provided additional support alongside these clinical guides. One included an administrator and the other a computer technician, both could be contacted if required by the participants for support. The clinical guides communicated and provided clinical support in a variety of ways; written secure messages and feedback via the system (n=5/7, 71%); written feedback via email (n=2/7, 28%) and verbal communication over the telephone (n=3/7, 43%) one of which delivered support and guidance and two acted as reminders to complete the next module in the programme. All contact was asynchronous. The majority (m=6/7, 86%) of guided interventions reported the number of therapists included, this ranged from two to eighteen therapists.

#### 3.9.2.5.2 Therapeutic approach

The majority (n=9/10, 90%) of interventions used ACT as the sole therapeutic approach, one (Carlbring et al., 2013) used behavioural activation in combination with ACT.

Four specifically stated that they included content which attended to all six core principles of the ACT theoretical model (Jones et al., 2015; Lappalainen et al., 2014; Pots et al., 2016; Trompetter et al., 2015). Two included content on only four of the six core principles (Buhrman et al., 2013; Lappalainen et al., 2015), three included content on three core principles (Carlbring et al., 2013; Hesser et al., 2012; Levin et al., 2016) and one included content on two core principles (Lappalainen et al., 2014). Two of the included studies (Levin et al., 2014; Levin et al., 2016) which reported findings on the ACT-CL intervention were prototypes focused on establishing feasibility and acceptance. All interventions included mindfulness, experiential exercises or metaphors. Four interventions included a maintenance plan for participants to be used at the end of the programme (Table 3.6)

**Table 3.6 ACT core processes per included study**

Author	Acceptance	Cognitive fusion	Being present	Self as context	Values	Committed action	ES Anxiety	ES Depression	ES QoL
Burhman et al., (2013)	Y	Y	N	N	Y	Y	0.18	0.44	*
Carlbring et al., (2013)	Y	Y	N	N	Y	N	0.45	0.98	0.02
Hesser et al., (2012)	Y	Y	N	N	Y	N	0.59	0.69	0.67
Jones et al., (2015)	Y	Y	Y	Y	Y	Y	N/A	0.24	N/A
Lappalainen et al., (2014)	Y	Y	Y	Y	Y	Y	N/A	0.15	0.16
Lappalainen et al., (2015)	Y	Y	N	Y	Y	N	N/A	0.83	0.60
Levin et al., (2016)	Y	N	N	N	Y	Y	*	*	N/A
Levin et al., (2014)	Y	N	N	N	Y	N	*	*	N/A
Pots et al., (2016)	Y	Y	Y	Y	Y	Y	0.41	0.36	0.35
Trompetter et al., (2015)	Y	Y	Y	Y	Y	Y	*	*	*

\* Not reported

#### 3.9.2.5.3 Delivery format

Eight interventions were designed to be accessed in a sequential manner, in which modules were to be completed in a pre-determined order. One (Lappalainen et al., 2015) allowed participants free navigation of the system, meaning participants could access and complete modules in any order they decided however, the recommendation was to work through the modules following the pre-determined order suggested. One did not report format (Jones et al., 2015).

#### 3.9.2.5.4 Duration

Intended intervention duration varied between three to 12-weeks ( $M=7.4$ ,  $SD$ , 3.06)

#### 3.9.2.5.5 Modules

Interventions included a mean of 6.4 modules (range 2-9 modules,  $SD$ , 2.5).

#### 3.9.2.5.6 System features

In a web-based context the features incorporated into the design of the intervention and computerised system are of interest as they have the potential to influence engagement and adherence (Kelders et al., 2012). Email reminders were included in four interventions (Lappalainen et al., 2015; Levin et al., 2016; Levin et al., 2014; Pots et al., 2016)); SMS reminders (Buhrman et al., 2013; Lappalainen et al., 2014; Levin et al., 2014; Pots et al., 2016); and homework tasks were incorporated into six (Buhrman et al., 2013; Carlbring et al., 2013; Hesser et al., 2012; Levin et al., 2014; Trompetter et al., 2015). Progression through the programme was controlled either by the system or the guide, dependent on successful completion of prior modules in seven interventions; telephone reminders were used in three guided interventions to prompt use and encourage continued engagement with the programme (Buhrman et al., 2013; Lappalainen et al., 2015; Levin et al., 2016). Personalised feedback to participants on receipt of a homework assignment was provided in half of the interventions (Lappalainen et al., 2014; Lappalainen et al., 2015; Levin et al., 2014; Levin et al., 2016; Pots et al., 2016;). The option to personalise the home



page was available in one (Pots et al., 2016) while none included social networking or indeed any type of networking features.

Of the three automated interventions two stated that they provided automated feedback. One intervention provided an additional workbook and a CD, one included a face-to-face meeting at the start and end of the treatment; and one reported one face-to-face meeting prior to commencement of intervention.

### 3.9.3 Adherence

Nine studies reported adherence data, adherence to intervention ranged from 48% to 100% (M=83%, SD=17.8) and adherence to active control treatments (i.e., not WLC) ranged from 53% to 100% (M=83%, SD=16.4%).

Seven studies reported completion rate. Completion ranged from 27% to 97% (M=68%, SD=28.2) of intended intervention modules.

Seven also reported usage data, however, data reported varied considerably. For example, one study (Pots et al., 2016) reported the mean number of modules completed. Another (Carlbring et al., 2013) reported the number of participants who did not complete any modules (this was 16% in the CBT condition and 6% in the ACT condition). A third study (Jones et al., 2015) reported website usage, usage in the ACT condition was significantly higher compared to the control condition (21.7 minutes per login vs 9.4 minutes). Lappalainen et al. (2015) reported average time spent per week using the system (50% of participants spent less than one hour a week, 38.9% spent 1-2 hours and 11.1% spent 2> Hours). Levin et al. (2016) reported the percentage of participants completing each module (85% completed lesson 1 and 55% completed lesson 2). Trompetter et al. (2016) reported module completion (72% completed six modules and 66.2% completed all nine modules). While Levin et al. (2014) reported a summary of programme usage across both intervention and control conditions (92% completed both modules and spent on average 81.98 minutes using the programme). The remaining three studies did not report any usage data.

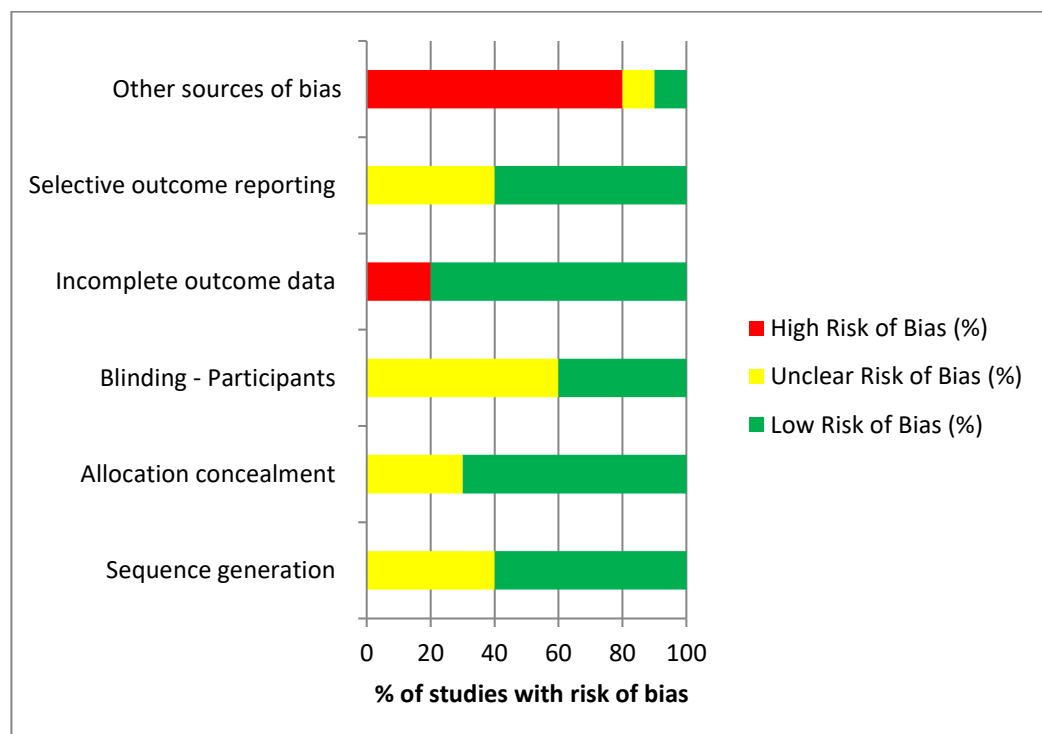
Satisfaction with treatment is also of importance for adherence and engagement with a web-based intervention. Six studies reported a measure of participant

satisfaction with the intervention programme, two of which focused on usability with the system interface (Jones et al., 2015; Lappalainen et al., 2014; Lappalainen et al., 2015; Levin et al., 2014; Levin et al., 2016; Trompetter et al., 2015).

### 3.9.4 Quality Assessment

Less than half (n=4/10, 40%) of the included studies were considered to have a low risk of bias (Hesser et al., 2012; Lappalainen et al., 2015; Levin et al., 2014; Pots et al., 2016) and one had a high risk of bias (Jones et al., 2015) while the remainder were assigned an unclear risk of bias. The risk of bias per sub-domain for each individual included study is reported (Fig. 3.19).

**Figure 3.19 Risk of Bias summary**



### 3.9.5 Meta-analysis

The number of studies included in the between-group meta-analyses were k = 10, k = 7 and k = 8 for the depression, anxiety and quality of life outcome measures, respectively. For the within-group meta-analyses, these were k = 10, k = 7 and k = 8.

Studies generally presented the mean and standard deviation of participants' scores in each outcome measure. The one exception to this was Jones et al. (2015), whose data on the depression outcome measure was dichotomised, meaning it was not possible to calculate Hedges'  $g$  directly. Thus Jones et al. (2015) was included in the between-group summary effect size calculation but could not be included in that of the within-group category, as the odds ratio is undefined for this category.

With regard to the between-group summary effect sizes, the effect size for the depression outcome was small and in favour of ACT with  $g = 0.24$ . This was also shown to be statistically significant with  $p < 0.05$  as was the proportion of heterogeneity attributed to true effects,  $I^2 = 55\%$ . The effect size for anxiety was statistically significant. However, it fell short of the lower limit for small effect size with  $g = 0.18$ . Heterogeneity for this outcome measure did not reach statistical significance, with the same being true for both the effect size and heterogeneity for the QoL outcome measure. Summary effect sizes belonging to the between-group category are reported (Table 3.7).

However, the within-group category demonstrated that participants' scores improved greatly between time points over all outcomes (Table 3.8). Effect sizes for both the depression and anxiety outcomes were medium in magnitude with  $g = 0.73$  and  $0.51$ , and the QoL outcome attained a small effect size of  $g = 0.44$ , all of which were statistically significant with  $p < 0.001$ . The depression and anxiety outcomes also indicated high proportions of heterogeneity between studies with  $I^2 \geq 75\%$  whereas the QoL outcome showed a medium proportion of heterogeneity, all of which were also statistically significant with  $p < 0.05$ . The depression summary effect size for ACT interventions versus comparison groups are reported (Fig 3.20).

It was not possible to calculate any summary effect sizes at follow-up due to a lack of published data.

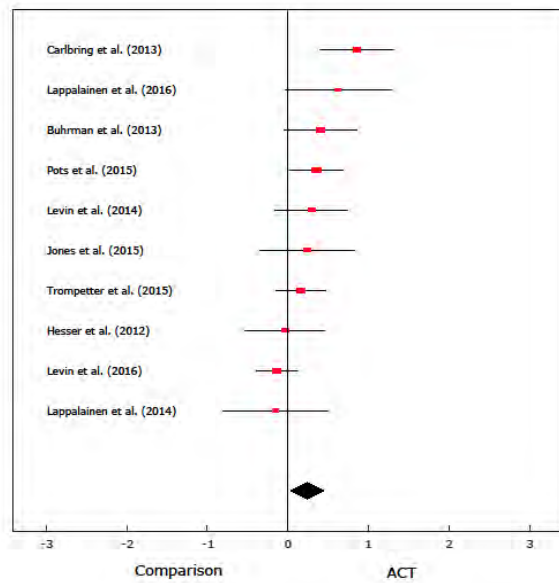
**Table 3.7** Key statistics relating to the summary between-group effect sizes by outcome measure. From left to right these are: *k* number of studies; *g* summary effect size with confidence interval (CI); *Z*-test statistic; *p*-value relating to *g*; *Q*-statistic for total dispersion between studies; *I*<sup>2</sup>-statistic for proportion of dispersion due to true effects; and *p*-value relating to *I*<sup>2</sup>.

	<i>k</i>	<i>g</i> (95% CI)	<i>Z</i>	<i>p<sub>g</sub></i>	<i>Q</i>	<i>I</i> <sup>2</sup>	<i>p<sub>Q</sub></i>
<b>Depression</b>	10	0.24 (0.04; 0.45)	2.35	0.02	20.05	55	0.02
<b>Anxiety</b>	7	0.18 (0.02; 0.34)	2.24	0.03	7.91	24	0.25
<b>Quality of life</b>	8	0.06 (0.11; 0.23)	0.69	0.49	9.93	29	0.19

**Table 3.8** The key statistics relating to the summary within-group effect sizes by outcome measure.

	<i>k</i>	<i>g</i> (95% CI)	<i>Z</i>	<i>p<sub>g</sub></i>	<i>Q</i>	<i>I</i> <sup>2</sup>	<i>p<sub>Q</sub></i>
<b>Depression</b>	9	0.73 (0.29; 1.16)	3.27	0.001	77.13	90	0.00001
<b>Anxiety</b>	7	0.51 (0.22; 0.79)	3.47	0.0005	24.36	75	0.0004
<b>Quality of life</b>	8	0.44 (0.22; 0.66)	3.86	0.0001	16.53	58	0.02

**Figure 3.20** Forest plot showing the depression outcome measure in the between-group meta-analysis. The x-axis' units are in Hedges' *g*.



### 3.10 Discussion

The aim of the current review and meta-analysis was to examine the published, peer reviewed literature pertaining to the effectiveness of web-delivered ACT interventions for the management of CMD and well-being.

As interest and research into the application of ACT grows, so too must the evaluation of its evidence base. Reviews and meta-analyses have examined the effectiveness of ACT across a range of disorders. (Öst, 2014, p. 105) concluded that “*ACT is not yet well established for any disorder*” but showed promise in the treatment of chronic pain and tinnitus with additional possible efficacy for: depression, psychotic symptoms, drug abuse and stress at work. Prior to this face-to-face delivery of ACT compared to CBT was evaluated, a significant mean effect size in support of ACT, for depression and QoL but not anxiety was observed (Jiménez, 2012). While, (Sharp, 2012) suggested ACT was effective for a range of anxiety disorders, despite a small research base. (Powers et al., 2009) reported an overall advantage of ACT compared to control conditions but found no evidence to suggest it was more effective than established treatments. Others have also reported ACT to be effective across a range of conditions

including: psychiatric disorders (Bach & Hayes, 2002), chronic pain (Alonso-Fernández et al., 2016; Nasiri & Kazemi-Zahrani, 2015; Wicksell et al., 2013), tinnitus (Hesser et al., 2012), multiple sclerosis (Nordin & Rorsman, 2012), anxiety disorders (Eilenberg et al., 2016; Smout et al., 2012), stress (Flaxman & Bond, 2010; McConachie et al., 2014) and health behaviour change including: smoking (Bricker, Bush, et al., 2014; Gifford et al., 2004; Jones et al., 2015); and weight optimisation (Juarascio et al., 2013). Thus, whilst there is some uncertainty of the effectiveness of ACT, this appears to relate more to establishing the evidence base rather than it being an ineffective intervention.

Indeed, the recent surge in interest in web-based interventions warranted further review of ACT in the context of an online delivery format to manage CMDs. No previous review had focused exclusively on ACT as implemented in web format. Although it is important to note that Öst (2014) included three web-based ACT interventions. The ACBS website listed nine computerised versions of ACT following the (2014) review. Thus, a review focusing solely on this application of ACT was warranted.

### 3.10.1 Principal results

Ten RCT studies met the specified inclusion criteria. Five studies focused on depression, one on psychological distress, one on well-being, two on chronic pain, and one on tinnitus. All included pre and post outcome measures for anxiety, depression or QoL. The majority compared against an active comparator or active comparator plus wait list control.

Findings supported the use of web-delivered ACT interventions for the management of depression. Review of those RCTs focused on depression as the primary outcome revealed that ACT was more effective than control, where control was either WLC or an active control. For example, Carlbring et al. (2013) reported a large effect size and 25% of participants experienced clinical recovery post treatment. Low dropout and good engagement were reported. On average participants completed five out of the seven modules. Lappalainen et al. (2014); (Lappalainen et al., 2015) reported web-delivered ACT was effective over and above face-to-face delivery and WLC with differential outcomes identified in favour of the web-delivered intervention. Furthermore, treatment

effects were maintained at follow-up although they did level out in-line with the WLC. Potts et al. (2016) reported significant effect of ACT compared to both WLC and an expressive writing condition that were maintained at follow-up. Finally, Jones et al. (2015) while not finding a statistically significant difference, reported positive benefit of ACT over attention control conditions coupled with good user satisfaction for the intervention in a depressed, smoking population. This non statistical finding was likely limited by the use of only one depression screening question. All of these studies identified a need for further research, and each were limited by small sample sizes.

Current findings are in line with those of prior reviews of ACT, Öst (2014) reported that ACT was ‘possibly efficacious for depression’. Five studies primarily targeting depression were reviewed, none of which were web-based, three of which were compared to TAU. Comparing the current effect size for depression overall effect size for active comparators (across all sub-samples) the current findings are in-line ( $g=0.24$ ), however, this compares less favourably for overall WLC comparison ( $g=0.63$ ) but are in-line with those reported by Jiménez (2012) ( $g=0.27$ ).

Regarding the use of web-delivered ACT interventions for the treatment of anxiety, the effect size was statistically significant, suggesting interventions were effective, however it only neared the threshold for a small effect size ( $g=0.18$ ). There are several reasons which might contribute an explanation of this lower observed effect size. None of the included interventions were primarily designed to treat anxiety, in each case the secondary outcome measure was included. Furthermore, only seven of the RCTs included an outcome measure which could be included in the effect size calculation (for anxiety). However, Potts et al. (2016) reported that ACT had positive outcomes for anxiety as well as depression. In prior review findings when ACT was compared to CBT, effect sizes for anxiety did not meet statistical significance Jiménez (2012). Sharp (2012) reviewed ACT specifically for use with anxiety disorders and concluded data provided preliminary support.

Web-delivered ACT interventions were not found to be effective in delivering improvements in quality of life. However as with anxiety none of the

interventions specifically targeted quality of life and two did not include an outcome measure which could be included in the meta-analysis calculation (Jones et al., 2015; Levin et al., 2016). Both of the RCTs reported by Levin et al. were focused on feasibility of ACT in an undergraduate population and contained the fewest number of ACT components of all interventions reviewed (the intervention was detailed to be under development and acknowledged it contained fewer elements). The most recent of these reported equivalence in outcomes for ACT to the Attention Control website and lower programme usage. However, their analysis of usage patterns suggested that those who engaged more with ACT experienced more positive outcomes and increased psychological flexibility. This was in comparison to their earlier findings which suggested strong acceptability and feasibility. The limited focus on quality of life or well-being is in-line with findings identified by Öst (2014), where no included studies were reported to them as the primary outcome measure. However, in the review by Jiménez (2012) an effect size of ( $g=0.25$ ) was reported which is higher than that found in the current data. This could be attributable to a few things, arguably while quality of life and well-being can be compared, they are not necessarily the best fit.

Variation in study context, i.e., population and incentives used and intervention characteristics, i.e., delivery format (automated or guided), duration, and modules warrants discussion. For example, the two studies included fewer modules which were available for a shorter period of time, did not conduct pre-assessment screening and participants received a financial reward for their participation (Levin et al., 2014; Levin et al., 2016). Equally Jones et al. (2015) automated intervention included only one pre-assessment depression screening question. Thus, opportunities for improvement, detection of disorders and effect sizes may be underestimated, due to use of unvalidated screening questionnaires at baseline. In contrast Lappalaine et al. (2014) and Lappalaine et al. (2015) utilised multiple therapists to guide participants. Guided interventions, using CBT, are associated with higher effect sizes and higher adherences (Kelders et al., 2012).



The primary goal of ACT is to improve psychological flexibility. Psychological flexibility in the context of ACT has been referred to a “*number of dynamic processes that unfold over time: (1) adapts to fluctuating situational demands, (2) reconfigures mental resources, (3) shifts perspective, and (4) balances competing desires, needs, and life domains*” (Kashdan & Rottenberg, 2010, p. 866). Examination of ACT specific outcome measures identified improvements in psychological flexibility. Jones et al. (2015) reported significant improvements in willingness to experience physical triggers and a trend towards willingness to experience emotional triggers (AIS); Lappalainen et al. (2014) and Lappalainen et al. (2015) reported significant effect in mindfulness skills and psychological flexibility in both face to face and web-based delivery of ACT (using AAQ-II) as did Pots et al. (2016) with the exception of improvements on the mindfulness facet. However, the two studies by Levin et al. did not find any significant effect on FFMQ measure or Acceptance and Action Questionnaire version two (AAQ-II) but did report improvements in ACT knowledge. Trompetter et al., (2015) reported significant improvements at three and six months follow up (FFMQ-SF) and six months (PIPS). Although mixed, these findings suggest support for ACT in improving psychological flexibility.

The secondary aim of this review was to report rates of adherence to web-based interventions employing ACT as the therapeutic approach. Poor adherence to web-based mental health interventions is of widespread concern and is well-documented in the literature (Christensen et al., 2009; Hilvert-Bruce et al., 2012; Kelders et al., 2012). With the potential to limit effectiveness (Donkin et al., 2011) and reduce cost effectiveness (Andrews et al., 2010) which is a key benefit of this delivery format. The mean rate of adherence to protocol (83%) was higher than published means for CBT based interventions where dropout rates have ranged from 2% to 83% (Oinas-Kukkonen & Harjumaa, 2009) and was comparable to the rates of adherence for the control groups (83.4%). Adherence was calculated as a percentage of those randomised to the intervention and completed post assessment. However reported rates of completion remained lower (68.4%). Four interventions specified that they included stakeholders in design and development of their intervention to address adherence or specifically employed persuasive design features in a bid to encourage

adherence and increase engagement. For example, Pots et al. (2016) incorporated persuasive technology (but did not specify which) in the design of their intervention, adherence and engagement was reported to be high (73% of participants completed all nine modules). While Levin et al. (2016) utilised a ‘tunnelled’ format. Initiatives like these may help to promote and increase adherence. (Couper et al., 2010) report that higher engagement with the intervention programme and online materials is associated with increased likelihood of adherence to study protocols, follow-up data collection points and importantly changes in health behaviour (fruit and vegetable intake). (Strecher, 2008) reported similar findings in a study looking to support smoking cessation where quit rates increased for each additional web page opened. Although these studies did not employ ACT it is feasible that the same association could be important across all therapeutic interventions delivered via a web-based format. Trompeter et al. (2015) addressed this point and noted the increasing need to address this issue in a web-based context.

It is important to consider web-based delivery format in its own right, this is in light of the recent expansion of interest into this field, evidenced by the multitude of protocol and feasibility studies identified in this review and also on the website for ACBS which lists 484 randomised ACT studies many of which are web or app based. The recent updated meta-analysis by Öst (2014), included 60 ACT RCTs across a variety of conditions. Only three of these explored web-delivered ACT. One did not include CMD or well-being outcome and so was not included in this review (Lappalainen et al., 2013) and another (Spek et al., 2007) combined ACT with CBT thus the effect of the ACT components could not be separated from CBT and so was excluded on this basis. The third was included (Hesser et al., 2012).

### 3.10.2 Study Limitations

There are several limitations to note: the variety of outcome measures used in each RCTs may limit the usefulness of the findings, for example on the QoL effect size measure, two studies did not report any outcome measures and a further two used SCL-90 which is considered a measure of well-being as opposed to QoL. Furthermore, a higher score on the SCL-90 represents lower well-being as opposed to QOLI and MHC-SF where a higher score represents

higher QoL. However, this difference in scoring was adjusted for in the statistical analysis.

Due to lack of published data for follow up measures, a follow up effect size could not be calculated. Due to the small number of included RCTs, meta-analysis by design (e.g., WLC / active comparator) was not possible. Of the ten RCTs reviewed three included WLC; the remainder used either an attention control website; alternative intervention (CBT, moderated discussion forum and expressive writing); or face-to-face delivery format. In the instance where more than one comparator group data was available, we compared against the active treatment. This decision was taken for a number of reasons. Firstly, the majority of included RCTs used active comparators so this was in keeping with the other comparisons drawn. Secondly, active comparators represent the most realistic real-world alternative. For example, CBT as a web-based therapeutic treatment has a strong and well-established evidence base (Mohr et al., 2013) and interventions using this approach are freely available (e.g., Moodgym) for the treatment of depression and other CMD as are psychoeducation websites and online discussion groups. It is important to acknowledge that the diversity of comparators may limit the generalisability of current findings. However, this was a practical and useful approach to adopt in the current review.

One study was based on Behavioural Activation and ACT and as such the effects of the treatment intervention cannot exclusively be attributed to ACT. Finally, publication bias and the trend to report positive results over negative or neutral results must be taken into consideration when reviewing the results of the current meta-analysis. It is possible that our results are over estimated as a result.

Usage data were not reported in all RCT's, in the future standardised reporting is recommended including agreement on completion rate. For example, (Karyotaki et al., 2015) advocate intervention completion be defined as completion of 75% or more of the total modules.

The interpretation of effect size magnitude (both between- and within-group) used in this paper adheres to Cohen's rule-of-thumb. However, with regards to the interpretation of within-group effect sizes, some authors prefer to opt for an alternative classification Öst (2014). Here small effects are classified as  $0.5 \leq$

$g < 0.8$ , medium effects as  $0.8 \leq g < 1.1$  and large effects as  $g \geq 1.1$ . When this classification is applied to the three within-group meta-analyses conducted in this paper then the effect sizes for the depression and anxiety outcomes of  $g = 0.73$  and  $0.51$  are re-categorised as small, while the effect size for the QoL outcome of  $g = 0.44$  does not reach the threshold for small effect size. Statistical significance remains unaffected however with  $p < 0.001$  in all three cases.

Finally, publication bias and the trend to report positive results over negative or neutral results must be taken into consideration when reviewing the results of the current meta-analysis. It is possible that the results are overestimated as a result. However, all relevant ACT RCTs listed on the ACBS website were reviewed to identify additional studies.

### 3.10.3 Implications for practice

Web-based delivery of interventions has undergone a recent expansion in a range of health contexts; physical health, mental health and lifestyle behaviour change. This brings with it new considerations for the effective delivery of therapeutic interventions. Increased interest in this delivery format stems from the explosion in access to affordable personal mobile devices which offer easy access to the internet from all locations with 3G or WIFI coverage. Such easy and convenient accessibility is thus one of the key advantages of this new delivery format, coupled with the cost effectiveness associated with its ability to facilitate widespread reach access across the population.

This review of ACT in a web-based context has highlighted that ACT for depression remains effective delivered through the internet but is not yet well established for management of anxiety or improvements in QoL. This review adds strength to this evidence base, across delivery formats.

Further research into the use of ACT via web-delivery, for all range of CMDs is required to continue to explore its effectiveness and to understand the most effective components for this delivery context. Specifically, those targeting anxiety and well-being would be of benefit as positive well-being continues to grow as an area of public interest and means to promote and prevent poor mental health. Studies should focus on recruiting larger populations to avoid concerns with lack of statistical power and to ensure wider generalizability of findings.

Also, studies should seek to examine the longer-term effect of ACT through inclusion of follow up periods in future RCTs. Nine protocol documents and five feasibility studies were identified in this systematic search, suggesting that evidence will expand in coming years. Thus, this review provided a first review of the evidence. In addition, analysis of ACT specific outcome measures is a potential area for further exploration.

Risk of bias assessment concluded that the majority of studies had a low or unclear risk of bias and thus there is potential for future studies to ensure that they continue to report in line with Cochrane recommendations to ensure the best quality evidence is available.

It is worth noting that the intervention used in Carlbring et al. (2013) has since been utilised in a subsequent RCT (Kivi et al., 2014) but here it is described predominately as iCBT. Thus, this study would not have been identified in the current search strategy and, if it had been identified through other sources, would have been excluded at title abstract stage due to variations in reporting of the intervention components and it's stated theoretical perspective/basis. Thus, future research into web-delivered interventions, using all types of therapy should consider the way in which they report and describe the intervention and treatment. Consistent reporting of interventions across RCTs would allow effective assessment of each. CBT and ACT are clearly distinguished in the field of psychology in terms of their mechanisms of action. This would also facilitate the systematic review process as research in this area develops.

#### 3.10.4 Conclusion

Web-delivered ACT interventions is effective for the management of depression (small effect size) and anxiety (neared the threshold for a small effect size). Web-based ACT interventions were not found to be effective for improving QoL. Due to lack of published data no effect size was calculated for follow-up effects. Further research is required across all mental health and emotional well-being domains to continue to develop and review the evidence base in this delivery format.

## Chapter 4: Participatory Design

---

This chapter first presents a brief justification for the use of PD in this context, before outlining the study, which was undertaken. The chapter concludes with a discussion of the study findings and implications for practice.

Throughout the chapter the term ‘end-user’ and ‘user’ is used to describe any persons which are anticipated to use the computer-based system and/or product under development i.e. individual workers and/or study participants, this definition is in line with accepted use (Christensson, 2006).

### 4.1 Development of a Web-Based Intervention to Support Lifestyle Behaviour Change and Well-being in Health Care Staff using Participatory Design

#### 4.2 Justification for use of PD

Findings from the PD literature (chapter 2) have highlighted that end-user input can be incredibly useful approach for the development of diverse computer-based products where adherence and engagement are of concern. Appropriately designed technologies can help individuals improve their health outcomes (Doherty et al., 2012). Specifically, the involvement of anticipated end-users, not unlike the ‘expert patient’ role in the psychological literature, can highlight, early on, key information regarding user need, deeper understanding of knowledge and values that can support the development of effective resources (Caixeta et al., 2013). Additionally, active user involvement across healthcare research has been widely promoted in patient settings and continues to be of critical importance. For example, the Patient and Public Participation policy (NHS, 2017) set out NHS England’s commitment to strengthening user involvement in service design and delivery, and NICE (NICE, 2012) has published similar sentiments.

PD offers a collaborative design process which actively encompasses anticipated end-users (Sanders, 2002), utilises diverse research methods including qualitative enquiry e.g. interviews and focus groups, known for their suitability in approaching sensitive topics (Kitzinger, 1995), and has the

potential to offer critical insight and understanding of users motivation and engagement through consideration of human factors, context appreciation and insight into usability and design (Orlowski et al., 2015).

### 4.3 Aim

To develop a web-based emotional well-being intervention, for use by healthcare staff in Wales, using PD.

#### 4.3.1 Objectives

The study objectives were

1. Explore the workplace context of anticipated end-users including access to, and availability of, existing well-being resources.
2. Explore anticipated end-users understanding and conceptualisation of well-being in a workplace context.
3. Determine the therapeutic approach for the emotional well-being intervention.
4. Explore and select potential website designs including style, logo and layout.
5. Explore and select intervention features including structure, duration, gamification elements, audio/visual components, and interactive elements.
6. Explore the above in relation to adherence and engagement.
7. Identify additional criteria relevant to participants

### 4.4 Method

#### 4.4.1 Ethics

Ethical approval was provided by Swansea University College of Human and Health sciences and College of Medicine Research ethics committee (07.07.2015 #180715). Abertawe Bro Morgannwg University Health Board (ABMU HB) approved the project as ‘service development’ (08.06.2015) as did PHW (19.06.2015).

Due to the unanticipated, extended project duration (the primary researcher took an extended period of maternity leave) the project was re-reviewed, and

approval re-confirmed by Swansea University College of Human and Health sciences Research ethics committee (19.06.2019 #180715) and ABMU HB confirmed their continued support (8.06.2019).

#### 4.4.2 Participants

Participants were staff from ABMU HB, which at the time of study, had approximately 1600 staff, 70% of which provided direct patient care and served a population of approximately 500,000.

#### 4.4.3 Inclusion criteria

1. Member of staff at the selected HB
2. Age 18 plus
3. Ability to provide informed consent

#### 4.4.4 Recruitment

A range of recruitment activities were undertaken to ensure inclusive reach across the organisation. Four key hospital sites were identified, Singleton Hospital, Morriston hospital, the Princess of Wales (POW) Hospital, and Neath Port Talbot (NPT) Hospital.

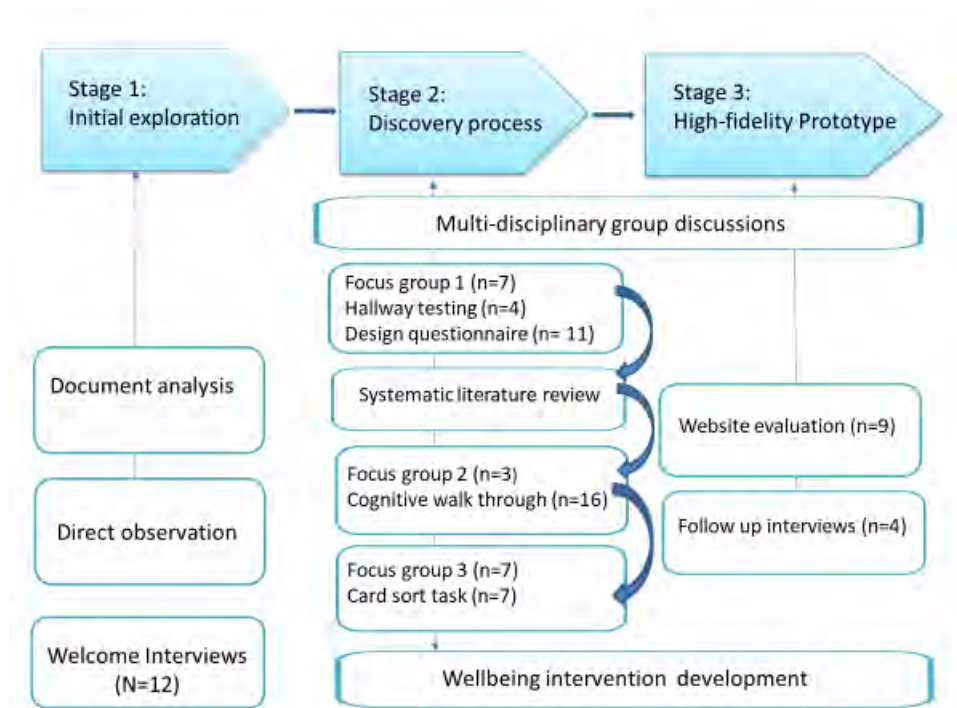
Recruitment included: Electronic invitation on ABMU staff intranet (05.08.2015), email invitation to 'Champions for Health' (Phase I) participants via PHW, the study advertisement was displayed on digital and physical notice boards across the HB following verbal permission from the general office at the respective sites, email invitation to the nursing education lead and postgraduate education and library staff (14.09.2015). In addition to these general recruitment activities two oral presentations were made to clinical staff at Singleton hospital (07.09.2015) and the POW (23.09.2015) hospital. Following each presentation interested staff provided their email address (to the primary researcher). Employee well-being were also contacted, and following an initial presentation (18.09.2015), a long-term working relationship was established. Later, participants who took part in a welcome interview were also asked to display a printed copy of the study advertisement in their workplace to continue to widen advertisement and recruitment efforts.



#### 4.4.5 Procedure

The PD procedure followed three distinct stages (Fig. 4.1). Initial exploration of work, discovery process and prototyping (Spinuzzi, 2005) specifically combined to elicit a progressive design process (Sanders et al., 2010) in line with standards of Human Computer Design (ISO-13407, 1999). The stages facilitated an iterative design process which placed significant importance on the inclusion of multiple end-user views and perspectives.

**Figure 4.1 Study diagram**



##### 4.4.5.1 Stage 1-initial exploration of work

To facilitate study objective one a document review was undertaken, the data sources and an overview of data collected are presented (Table 4.1). This stage typically did not involve much user interaction (Spinuzzi, 2005). The four key hospital sites were visited. The purpose of the visits was to observe the physical space, the variety of working environments and explore the organisation of and access to, available technology. Following this the welcome interviews were conducted, organised via email. Members of staff who had identified their interest were thanked for their interest in the study; and a mutually convenient

date was arranged. Interviews were held at multiple locations across the HB based on staff location.

All participants provided informed, written consent and the welcome interview was audio recorded. The primary researcher welcomed participants and outlined the aims of the project before moving on to clarify understanding and requirements of participation, explore motivation for participation, awareness of 'Champions for Health' (Phase I) and similar web-based interventions, and to discuss and identify any participant led criteria.

**Table 4.1 Data sources**

<b>Data sources</b>	<b>Description</b>	<b>Data collected</b>
Document analysis	<p>ABMU public website Published publicly available reports from ABMU HB</p> <p>Publications (Phase I and II) Champions for Health PHW evaluation documents, Champions for Health</p>	<p>Major and local hospital sites in the health board Staff roles within the health board Employment and sickness absence statistics Identification of current well-being resources available via the service</p> <p>Champions programme development Evaluation of past campaign results (phase I): engagement, retention and adherence Profile of typical staff member who took part Health improvement rate</p>
Direct observation	Visit to main hospital sites	Observations of physical space, technologies available
Welcome interviews	Staff from a variety of roles and locations within the HB	<p>Description of the design process Discussion of participation and role in the design process Clarify understanding and requirements of participation Explore motivation for participation Explore prior experience of PD approach Explore initial thoughts on well-being Questionnaire Clarify ability to attend focus group discussions and travel needs</p>

#### 4.3.5.2 Stage 2-discovery process

This stage focused on clarification of participants values, well-being needs and tactic knowledge via continuous and cooperative interaction with multiple stakeholders (Spinuzzi, 2005). A series of focus group discussions and rapid prototyping tasks were undertaken. This stage was also informed by the two systematic literature reviews (chapter 3).

##### 4.3.5.2.1 Focus groups

To promote and strengthen the relationship between researcher and participants, focus groups were held at a variety of hospital locations (Doherty et al., 2010). All participants provided informed, written consent and the discussion was audio recorded.

##### 4.3.5.2.2 FG1

The initial focus group discussion (FG1) included the primary researcher and participants. The group explored participants goals and values to generate a shared project plan which specified well-being needs that could/should be met by the intended well-being resource. Participants understanding of well-being, in the context of their workplace was explored in-depth. Participants were asked the following: ‘What does well-being mean to you?’, ‘What would you like included in a web-based well-being resource?’, and ‘What should the resource look like?’ Following this, discussion centred on the evaluation of existing websites (e.g. Moodgym and Colour your life) and Champions for Health (Phase I). Images used were displayed via power point presentation and printed pages (Fig. 4.2 - Fig. 4.3). This generated initial design ideas and identified likes, dislikes, key website features, intervention content (Maguire, 2001) and therapeutic approach. Ideas from the welcome interviews were presented in the form of a word cloud to generate further discussion and to explore unmet well-being need in the workplace.

Figure 4.2 Images shown to participants



Figure 4.3 Images shown to participants



4.3.5.2.3 FG2

New members (i.e. staff / anticipated end-users) were included in subsequent focus group discussions, in line with accepted recommendations (Sanders et al., 2010) and two computer scientists. A computer science student (JM) and a freelance computer science expert involved in Champions for Health (phase I). Their insight supported discussion on interactive features, design guidelines and ensured a variety of perspectives were incorporated (Maguire, 2001).

FG2 recapped the project plan to remind participants of the shared goal and began with a data validation exercise based on the thematic themes identified in FG1. This gave new members the opportunity to shape discussions and share their perspective. FG2 discussed and explored options for the therapeutic approach. Examples were outlined, participants shared their personal and professional experiences with different therapies and through collaborative discussion reached a consensus decision. Participants also discussed their views on initial designs and explored potential intervention feature requirements including, structure, duration, gamification elements, audio/visual features, and interactive elements.

#### 4.3.5.2.4 FG3

The third focus group ran as outlined above, before exploring design elements and intervention content.

#### 4.3.5.2.5 Rapid prototyping

Rapid prototyping was conducted simultaneously (Kinzie et al., 2002). The principle focus of rapid prototyping was to shape the design of the intended output in line with workspace considerations. As such prototyping was conducted in a range of organisational work settings and iterative phases were completed in line with accepted traditions (Spinuzzi, 2005). Results were communicated and discussed by the multi-disciplinary team following each task to ensure decisions being made were based on fully informed views and opinions of users in line with the early traditions of empowerment that the method is based on (Spinuzzi, 2005). Consultation with computer science experts also ensured that the developing designs met accepted usability conventions (Maguire, 2001). The multi-disciplinary team meetings were held at regular intervals to review prototype data. The iterative process ensured designs developed and changed after each successive task. The low-fidelity digital designs (JM) were developed from pencil sketches (principle researcher) and were informed directly from the data collected and analysed (FG1). Design features and style preferences were discussed as they emerged. Adobe Creative Suite, and Adobe Illustrator were used to develop initial website designs which were saved and exported in a web applicable format (PNG or JPEG).

Low-fidelity prototypes were produced to attend to cost and time considerations. They are considered excellent resources to stimulate early design discussions

(Preece et al., 2002). Three tasks were undertaken with participants following initial hallway testing: A card sorting task, design questionnaire task and a low fidelity cognitive walk through task. Prototype images and diagrams (designs and proposed page layouts) were also displayed on the walls during the tasks to support and facilitate communication of designs as they developed and to provide opportunity for comment and clarification of requirements (Beyer & Holtzblatt, 1997). Three different tasks were used to support engagement and encourage ownership of the website as it developed.

Key usability design conventions were incorporated. For example, key features relating to user friendly design were attended to including usefulness; consistency; simplicity; communication; error prevention; efficiency; workload reduction; and usability judgement. This ensured a comprehensive design interface was developed which provided adequate information to assist users to undertake a desired task (Shitkova et al., 2015).

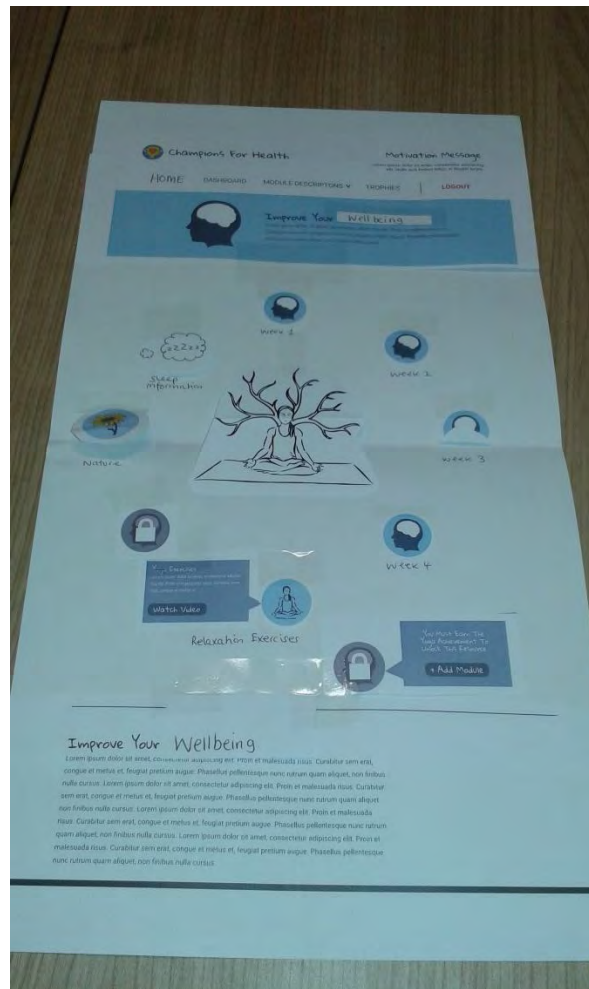
#### 4.3.2.6. Multi-disciplinary team

This group comprised the primary researcher and two computer science students (JM, DM).

#### 4.3.5.2.7 Hallway testing (U0)

Hallway testing, employed during the initial design and development phase, is widely used (Nielsen & Landauer, 1993). Individuals in an office setting were randomly approached and asked to participate. The office setting was selected due to its environmental similarity to the anticipated end-user context. Context is considered a key factor in the development of web and mobile applications (Kjeldskov & Graham, 2003). The purpose of the task was carefully explained to each participant prior to initiating the task i.e. to explore usability of initial layout ideas. Key objectives of the task were identified to avoid confusion and misunderstanding i.e. the task is designed to identify any immediate and obvious errors and difficulties associated with use. Debrief was undertaken after the task was completed. The participant was given an opportunity to ask questions. An example task is shown (Fig. 5.4).

Figure 4.4 Yoga girl home page layout used in the hallway testing phase



#### 4.3.5.2.7 Design task

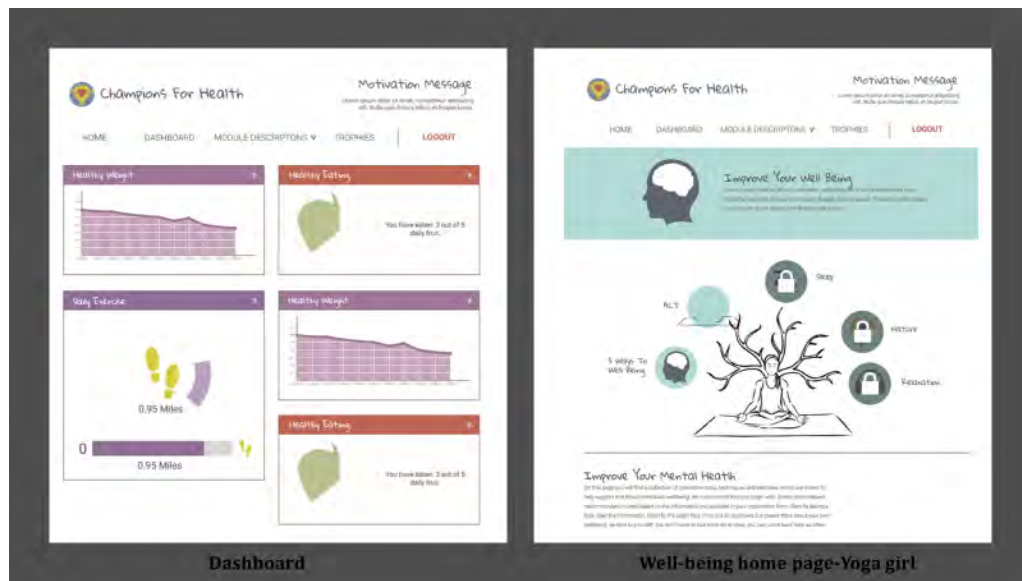
Visual, aesthetic appeal is of critical importance in web design (Fogg et al., 2003; Lindgaard & Dudek, 2002; Phillips & Chaparro, 2009; Sillence et al., 2004). For example, one study reported that the positive aesthetic appearance of a website outweighed difficulties experienced in terms of use and usability. Respondents judged the site to be pleasing despite being unable to successfully complete specified tasks (Lindgaard & Dudek, 2002). Similarly, (Fogg et al., 2003) reported that 46% of (n=2684) participants most frequently mentioned visual appeal in a study which assessed the credibility of two health websites. Following this information structure and focus were noted. Such findings have led researchers to suggest that visual appeal and aesthetic appearance is detected prior to other elements and as a result impacts on subsequent judgements including experience and enjoyment (Campbell & Pisterman, 1996; Jennings,



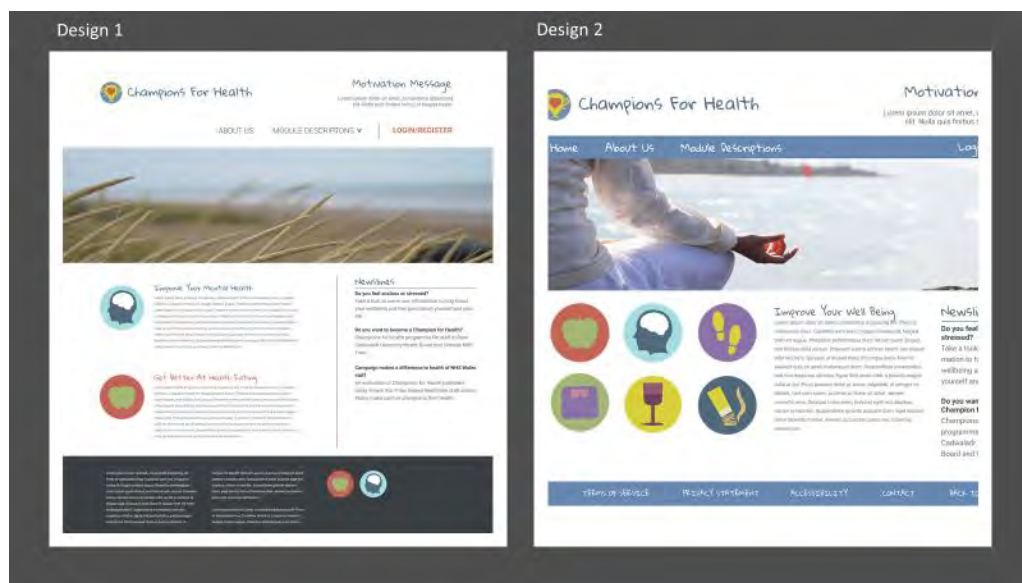
2000; Tractinsky et al., 2000). Lindgaard et al. (2006) reported empirical findings that suggest individuals reach a decision regarding visual appeal within 50 milie seconds of viewing a website. Thus, there is a critically short period of time to impress and engage potential users.

The design task was conducted in a group setting, in a large room with a large white board at the front of the room, in clear view of all participants. Participants were given a concise verbal explanation of what the task involved prior to initiating the task. Once questions had been answered participants were provided with a paper questionnaire (appendix 6). The questionnaire included clear headings which identified each web page design by name. Each design was displayed on the white board, for seven seconds. Participants were immediately asked to rate the design, using a five-point Likert scale which ranged from 'very good' to 'very poor', on four or five design aspects (the number of aspects rated varied per web page design web page) for example, dashboard design and well-being page (Fig. 4.5). This procedure was repeated for each design. Following this, participants were shown two home page designs (Fig. 4.6) and two logo designs (Fig. 4.7) and asked to indicate their preference by ticking a box on the questionnaire. A free text box was included to allow for written feedback. Once completed, questionnaires were collected, and the group were asked to discuss the designs.

**Figure 4.5 Dashboard and well-being home page**



**Figure 4.6 Home page designs**



**Figure 4.7 Logos**



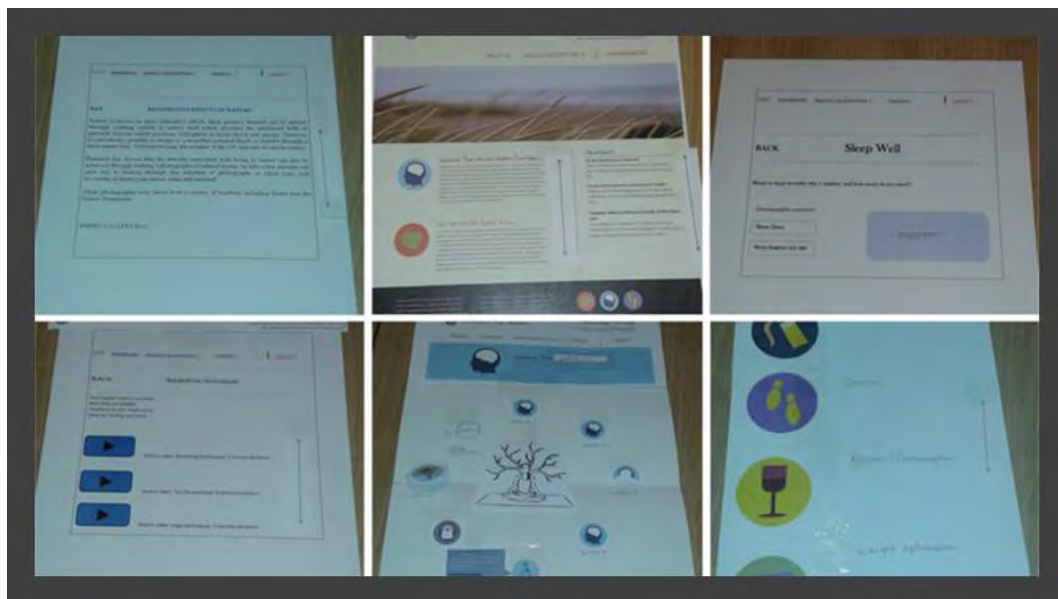
#### 4.3.5.2.8 Cognitive walk through

The cognitive walk through (Jaspers, 2009) was selected for its ability to examine typical user responses using a structured task specific approach (Blackmon et al., 2002). Testing the initial website designs in this way ensured that development remained focused on user experience and interaction responses whilst remaining cost effective (Blackmon et al., 2002). However, exploration and evaluation is limited to the use of simple designs and was not assumed to be indicative of response times (Wharton et al., 1992).

Initial website designs were pre-prepared for the task and designs were printed out in full colour or displayed on a laptop (Fig 4.8). Participant's verbal responses and interactions were video recorded. A video camera was set up on a tripod behind the participant to capture hand movements and hand actions whilst navigating the prototype. The task asked participants to view the paper designs of individual web pages. Participants were asked to 'imagine themselves in their usual work environment, with some time available to explore on-line, their interest in their own health and well-being'. The primary researcher asked a series of realistic questions (for example, imagine you are in your workplace and searching for health and well-being advice or inspiration and you came across champions for health home page. Where would you look/click first?) and a second (JM) acted as the 'computer/system' and responded according to user

behaviour. For example, the home page design was presented first, and the participant was asked to select a well-being resource they would like to explore. Users showed their selection by ‘pretending’ to click on the website buttons and tabs available. Depending on their selection the ‘computer/system’ then presented the next screen (i.e. if they selected ‘improve your well-being’ this led to the ‘yoga girl’ home page. Alternatively, if they selected the ‘module description’ tab at the top of the home page, a drop-down menu appeared etc). A third (DM) acted as an observer and made notes. After all screens had been viewed participants were de-briefed (de-brief included an explanation of what we were hoping to identify from their completion of the task) and thanked for their involvement.

**Figure 4.8 Printed designs**



#### 4.3.5.2.9 Card sort task

An open card sorting task was selected to inform the information architecture of the well-being intervention in the initial design phase (Spencer & Warfel, 2004). Information architecture encompasses website navigation, content categorisation, labelling and content management (Lash, 2002). An open rather than closed card sort was selected due to its use in the early design phase (Faiks & Hyland, 2000). The task enabled users to consider their needs holistically and

use has been associated with increased acceptance by end-users (Hahsler & Simon, 2000). Card sorting exercises are considered an effective way to discover the optimal organisation of content from the users' perspective (Wood & Wood, 2008). Results are intended to guide the design process as opposed to dictate organisation (Spencer & Warfel, 2004). The task has been widely used across a range of settings. For example, (Robbins et al., 2007) applied the card sort to the redesign of a library's website.

A group card sort was undertaken, participants were asked to work collaboratively to categorise, group and label items. The group approach, as opposed to an individual sorting exercise, was selected due to practical and time constraints. Participants were briefed on the task as follows 'we are looking for your help and input into how best to organise and categorise the content, resources and information within the emotional well-being module, we are particularly interested in exploring names and labels for the categories of information we wish to include. It is important to us to incorporate your views and ideas as we wish the module to easily understood by everyone and to make sense to people on the first visit to the site', please group these items as you would expect to find them on a health and well-being website (Wood & Wood, 2008), and de-briefed at the end (how did you find the task, any questions or comments?). Discussion was audio recorded. The number of cards was informed by the resources which would potentially be included in the emotional well-being intervention and limited to less than 30-40 (Tullis & Wood, 2005). Field notes were taken to supplement the audio recording and facilitate identification of key discussion points raised during the task.

Participants were provided with a set of (n=25) cards with the following category labels: Acceptance and commitment therapy (ACT), mindfulness, acceptance, cognitive fusion, being present, self as context, committed action, values, relaxation exercises, benefits of relaxation, sleep hygiene, sleep and well-being, sleep diary, photo gallery, map, restorative effects of nature, symptoms of stress, symptoms of anxiety, symptoms of depression, what is stress, what is anxiety, what is depression, ACT exercises, who to contact, and homework. Participants were asked to categorise the cards as they saw fit. No limit was placed on the number of categories available. Once all the cards were

sorted into categories, participants were asked to discuss between them possible labels for each of the categories they had identified. Options were written down on blank cards and discussed to reach consensus.

#### 4.3.5.3 Stage 3 High fidelity prototyping

A pilot evaluation was conducted using a high-fidelity prototype to explore engagement, user satisfaction and to gather additional feedback to support the iterative design process. High-fidelity prototypes support evaluation of the anticipated product, from the user perspective (Pernice, 2016). Offering a close resemblance to the final design i.e. design and visual appeal, user flow, content and functionality (Walker et al., 2002) without the associated cost and time implications. Product testing is a critical component of usability and product design (van Kuijk et al., 2015).

Participants in earlier design stages were invited via email to access a private wordpress.com website for a period of six-weeks. Participants provided consent by actively visiting the website and requesting permission to view the content. The website included the prototype module structured into ‘weekly’ sections (Fig 4.8-4.12). A blog update was posted to the website once a week, which served as a reminder to access the website. Structured feedback was requested on completion of each ‘week’ via an anonymous embedded survey. SurveyMonkey was selected due to its user-friendly format, data security provisions and user anonymity. Alternative feedback routes included website blog and direct email. After six-weeks a de-brief message was posted to the website and the site was closed. All users were invited to participate in an interview to discuss their experience further. Users completed two self-report measure of well-being at two time points, pre and post-intervention. The World health organisation five well-being index (WHO-5) and the AAQ-II (Bond et al., 2011), an assessment of psychological flexibility.

Figure 4.9 screen shot of the home page

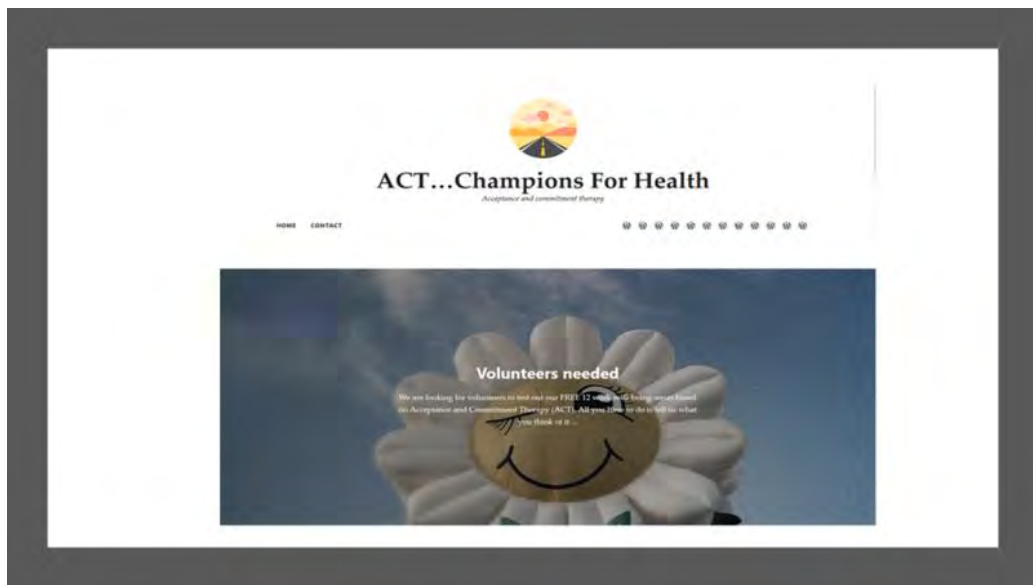


Figure 4.10 screen shot of week one



Figure 4.11 screen shot of a try at home activity

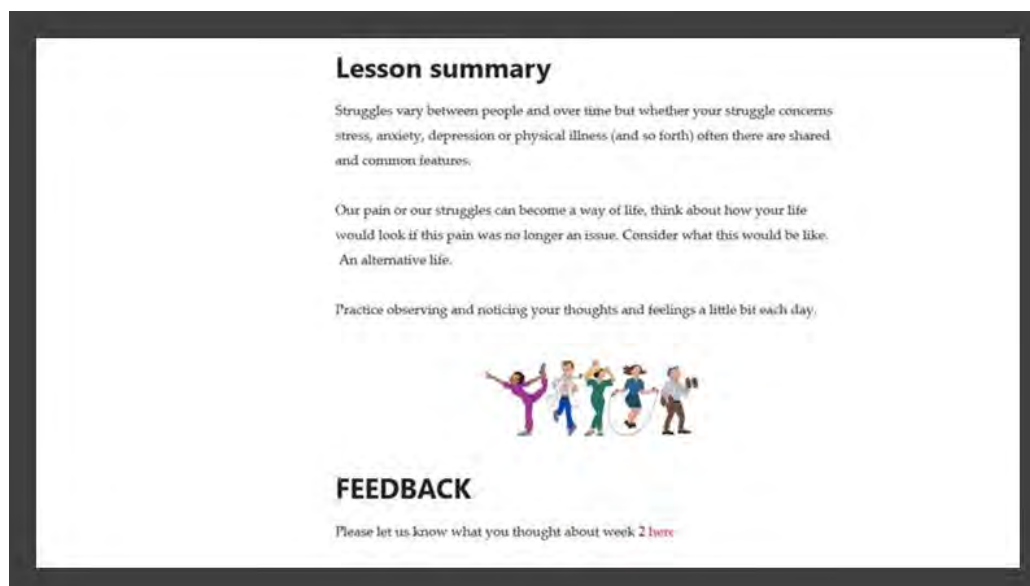


## Try at home

 Keep a diary or journal

- Notice what you found difficult?
- Notice your thoughts and feelings in response to difficult situations
- Practice observing the thought and watching it pass by
- Notice what worked?
- Practice this again.
- Notice the time you were able to spend on yourself each week.
- Set a goal for next week...

Figure 4.12 screen shot of a lesson summary




## Lesson summary

Struggles vary between people and over time but whether your struggle concerns stress, anxiety, depression or physical illness (and so forth) often there are shared and common features.

Our pain or our struggles can become a way of life, think about how your life would look if this pain was no longer an issue. Consider what this would be like. An alternative life.

Practice observing and noticing your thoughts and feelings a little bit each day.

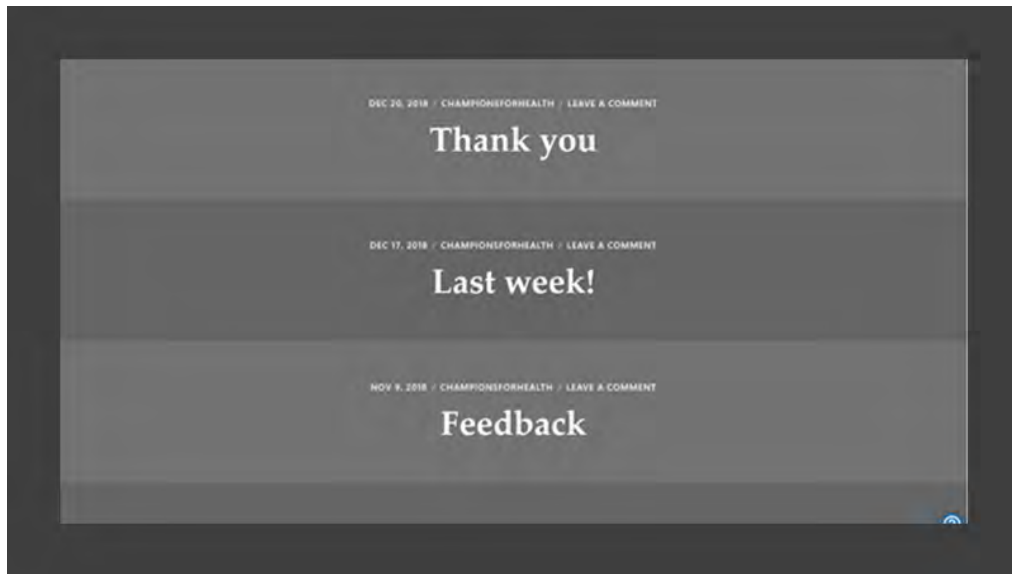


## FEEDBACK

Please let us know what you thought about week 2 [here](#)



**Figure 4.13** screen shot of website blog



#### 4.4.6 Website programming

Development of the study website was complicated and undertaken in three phases. The original website used by PHW was not suitable for use outside of the NHS and therefore a new website was required.

##### 4.3.6.1 Phase 1

A previously commissioned, alternative web platform was made available via PHW. This second platform was built using CakePHP 2.x an open source framework. Cake PHP is a PHP 7 framework that provides a model view controller structure. This alternative platform provided a skeleton framework for the intended website, it included a user dashboard and five modules (no content). The framework provided scope to build additional modules into its structure. However, before this could be developed the framework required updating to the newest release of CakePHP (version 3.2.) to incorporate additional functionality and improve performance.

A computer science student (DM) undertook initial development work. The software used included the following, but was not limited to, Sublime Text (with SFTP & Git Plugins), MySQL Workbench, Filezilla, iTerm 2 (with Tmux integration). Adobe Creative Suite, and Adobe Illustrator were used to develop initial website designs which were saved and exported in a web applicable format (PNG or JPEG). Exported images were then uploaded to the server and

linked into the content where needed. The remote server was hosted on Amazon Web Services (AWS) which provided cloud computing service: EC2 (Elastic Cloud Compute) and S3 (Simple Storage Service). EC2 is a service that allows the rental of virtual servers, running on Amazon's custom Hyper-V servers. The backend database was written in MySQL. Standard procedures for programming were followed to ensure no security flaws. For example, hashing the password field in the database. Unit and penetration testing were conducted.

The computer science students (JM, DM) were recruited through the computer science department, via an educational stream. Undergraduate computer science students are required to undertake a group project in their final year of study to develop and offer students work experience in multi-disciplinary, commercial or academic environments. The primary researcher compiled a project brief and delivered a face-to-face presentation (20.10.2015) following which students expressed their interest. A series of meetings were facilitated by the primary researcher to ensure both parties understood the project scope.

Despite efforts to develop a working prototype, the scope of the update and the skill set required was beyond the expertise available. Thus, the primary researcher undertook two website development courses, JOOMLA 1 (06.03.2015 to 12.05.2015) and JOOMLA 2 (18.05.2015 to 21.08.2015) at Swansea University, and built a website using wordpress.com as an alternative.

#### 4.3.6.2 Phase 2

Phase 2 was undertaken by a second group of undergraduate computer science students (KN, GE, LC). These students were recruited as described above (11.10.2016). The aim in this instance was to continue the work and to implement a fully functional study website to be used in the feasibility study. The CakePHP platform was updated (to version 3.4). However significant flaws in the programming of the earlier versions became evident and the team made the decision to develop the website using a platform called Docker with a cakePHP install, versions were managed in GitHub. Significant improvements to functionality, security and database development were made by this group of students. However due to the amount of time required and the demands of their

own studies, the platform was not completed in time for the anticipated feasibility study. To complicate matters further the primary researcher went on unexpectedly early maternity leave and the project paused.

A year and a half later (2018) following discussions with staff in the department of computer science a PhD student (DS) successfully completed the website following discussions, meetings and requirement session planning. This site was used to conduct the feasibility study (chapter 5).

#### 4.3.6.3 Phase 3

Feedback from the feasibility study indicated several programming errors and areas for improvement. As such a local commercial company were commissioned to build a new website. This website, used in the RCT (chapter 6), was built in WordPress and hosted on secure Swansea university servers. The external company were asked to reproduce the existing website, attending to the technical issues identified, for example lack of password reset, incomplete registration form (backend error was identified). A series of face-to-face meetings were held with the primary researcher and the programmer to establish requirements, separate discussions were held with a designer to discuss design requirements in line with PD findings. The final website design also considered available budget and time restrictions. The inter-disciplinary and cross organisational working involved in the website development is considered later (chapter 7).

#### 4.3.7 Intervention development

Once the therapeutic direction was selected (ACT) a relevant expert practitioner was identified (NH) to support the development of the intervention. The expert practitioner discussed, reviewed and provided detailed feedback on the intervention developed by the primary researcher. This ensured content developed in line with the therapeutic principles of ACT and that included scenarios and examples used explained key concepts, clearly and accurately.

The principle researcher while familiar with the principles of mental health and CBT but was not practiced in ACT. As such the principle researcher undertook research and training including a weekend workshop delivered by Professor Kelly Wilson (30.01.2016), and a one day experiential workshop in London

(25.07.2019); joined ACBS, engaged with the online ACT community, spoke to colleagues/friends familiar with the approach and explored the scientific literature pertaining to the use of ACT. This ensured a basic understanding of the therapeutic principles on which ACT is grounded.

A second mental health experts (AJ) also reviewed the content, to ensure suitability, safety and appropriateness. This approach was in line with those adopted by others (Monshat et al., 2012; Ospina-Pinillos et al., 2019; Sparud-Lundin et al., 2013; Wadley et al., 2013).

## 4.4 Data Analysis

### 4.4.1 Qualitative data

Interviews and focus groups were audio recorded and transcribed verbatim. Inductive Thematic Analyses was performed (Braun & Clarke, 2006).

This approach was selected due to its flexibility and suitability across all epistemology and theoretical viewpoints. The output is a thematic categorisation of data, with links and patterns in the data mapped and identified for exploration. Data was analysed without the application of pre-determined theoretical framework (Patton, 1990). This grounded approach to analysis is in keeping with the iterative design and development procedures of the PD approach.

A structured, six phased approach (Braun & Clarke, 2006), was followed where emergent themes are considered, grounded in the data. Stage one involved reading and re-read of the transcripts for familiarisation. Initial codes were generated during stage two, using line by line coding which involved annotation of transcripts in the left margin. Initial codes were one word or short sentences which summarised and represented the data. Once the whole transcript was annotated, all codes were extracted and entered into a code structure document where links and patterns across codes were initially outlined and considered (stage 3). A thematic map was developed from the code structure to support the identification of emergent themes (stage 4). Initially codes were grouped together to form wider themes and example quotes and extracts which

represented and related to each code were recorded in the code structure document.

A theme was considered to develop where it captured something of interest and importance in the data set, it was then developed and refined to include a detailed description of what was represented by participants and was illustrated with verbatim quotes and extracts (stage 5). The interpretation of the themes was conducted from a realist perspective in which the motivations, experiences and meaning attributed to those experiences is interpreted at an individual level. Participants were asked to consider their understanding of well-being and their well-being needs within the context of their workplace and as such this context was considered during the data analysis phase.

After this stage themes were revised and revisited and the transcript read and re-read several times to ensure that all codes and all examples were identified and considered in relation to the theme they were thought to represent. This stage (6) involved reformulating themes and collapsing codes to form sub-themes or moving codes into new or different themes. This process of reading and re-reading the transcript and interpretation of themes was iterative and was considered complete when all examples of themes were reviewed. Themes were then named.

The thematic analysis conducted, searched across the whole data set and extracted and identified key themes whilst retaining links in the data. The emergent themes were a mixture of new and expected themes derived from the qualitative questioning and semi-structured focus group schedule developed prior to data collection. This outcome was anticipated and is common when following this method of analysis.

Data validation, also known as member checking and respondent validation (Birt et al., 2016; Torrance, 2012) was undertaken to inform and 'check' the interpretation of interview and focus group discussions whilst also expanding the opportunities for previous participants to discuss their views of health and well-being and affording new participants the opportunity to explore meaning. Interpretation via thematic data analysis were presented back to participants at

several time points namely FG2 and FG3. Where new data were generated from the validation process it was included in the final thematic analysis.

#### 4.4.2 Prototype and usability data

The purpose of the prototype and usability analysis was three-fold:

1. To assess usability of the early designs
2. To identify problems or errors in the design
3. To assess the extent to which usability objectives have been met

The analysis method is described per task:

##### 4.4.2.1 Design task

A questionnaire was used to evaluate opinion on all aspects of the website design from the user perspective including style; colour; font; layout and appropriateness for health and well-being context. Questionnaire responses graded on a five-point Likert scale (1 = very good to 5 = very poor) were entered into Excel and IBM® SPSS® v22. Free text comments were extracted and reported in a word document, reviewed in the multi-disciplinary team meetings in conjunction with field notes. Descriptive statistics were used to report frequencies of responses and percentages calculated to identify preference for home page designs and logos.

##### 4.4.2.2 Cognitive walk through

Data were analysed in a structured manor (Jaspers, 2009), first the video recorded data were watched and question responses transcribed verbatim to capture verbal and physical responses. Second the data were scrutinised for error frequency and type (Maguire, 2001). The error detection spread sheet was structured by 'page/screen' in the task and per question asked of the participants. A correct response was indicated by a 0 score and an incorrect response by a 1 score and a full description. This was undertaken for each task question. A response was considered correct if it met the expected user action for that question. For example, when asked 'What would you do if you were interested in finding out about emotional well-being?' the expected responses would include 'click on the well-being icon' or 'navigate to the drop down menu,

explore modules and click on emotional well-being option'. All potential navigation routes were identified. An incorrect response would be any other answer, for example 'click on the five a day icon or option in the drop-down menu'. Finally, incorrect responses were assessed and assigned a risk score.

A summary document was produced which categorised all incorrect responses and risk assignment and highlighted critical incidents.

#### 4.4.2.3 Card sort task

The video recording was transcribed, and a report was produced which summarised the following: number of categories created, content organisation across categories, and category labels created and used.

#### 4.4.2.4 High fidelity prototype

Survey and feedback data generated in SurveyMonkey were extracted into Excel. Engagement was measured by completion of the weekly survey and provision of feedback. Data were descriptively evaluated, and user satisfaction was explored via interview. Interview data was handled as described above.

## 4.5 Results

### 4.5.1 Participant summary

Thirty-eight different staff contributed to the PD process over a one-year period. A variety of professional backgrounds were represented: Administration, education and managerial staff and clinical staff including nurses, foundation doctors, specialist grade doctors, consultants, physiotherapists, occupational therapists, CBT practitioners, speech therapists, and pharmacists. Participation was dependant on staff availability. Some staff took part in consecutive PD stages others only took part in one stage. Stakeholders included computer scientists (n=4) and mental health experts (n=2). In stage one, following 25 expressions of interest, 12 welcome interviews were conducted across a variety of locations: Cimla hospital, Brackla, ABMU Head Quarters Baglan, Morriston, Singleton and POW hospitals and Llanharran PHW offices. In stage two, three focus groups were conducted with 18 participants. In stage three, nine

participants reviewed the website. Four of which took part in an interview (Table 4.2).

**Table 4.2 Participant summary**

Task	Date	Location	Duration (mins)	No	Female (%)	Age bracket
Welcome interviews	11.8.15 - 23.9.15	Various	30 – 60	12	10 (83)	21-30, 31-40, 51-60 60+
FG1	28.9.15	POW Hospital	120	7	5 (71)	31-40, 60+
FG2	8.12.15	POW Hospital	60	4	1 (25)	21-30, 31-40, 51-60 60+
FG3	21.3.16	NPT Hospital	60	7	4 (57)	31-40, 41-50, 51-60 60+
Hallway task	5.10.15	Swansea University	<sup>a</sup>	4	<sup>a</sup>	<sup>a</sup>
Design task	12.10.15	Singleton Hospital	<sup>a</sup>	11	<sup>a</sup>	<sup>a</sup>
Cognitive walk through	26.2.16	Singleton hospital	<sup>a</sup>	7	<sup>a</sup>	<sup>a</sup>
	21.3.16	NPT Hospital	<sup>a</sup>	6	<sup>a</sup>	<sup>a</sup>
	08.12.15	POW Hospital	<sup>a</sup>	4	<sup>a</sup>	<sup>a</sup>
Card sort	21.3.16	NPT Hospital	<sup>a</sup>	7	<sup>a</sup>	<sup>a</sup>
High-fidelity website	8.11.18-20.12.18	Online	n/a	9	<sup>a</sup>	<sup>a</sup>
One-to-one interviews				4	3 (75%)	31-40
	3.12.18	NPT	12:09			
	10.12.18	Morrison	29:56			
	14.12.18	POW	29:39			
	9.1.19	Singleton	26:52			

<sup>a</sup> not recorded

<sup>n/a</sup> not applicable



## 4.5.2 Stage 1: Initial exploration of work

### 4.5.2.1 Document review ABMU

Findings from the document review identified that ABMU HB was created in 2009. At the time the HB served a population of approximately 6000,000 with an annual budget of £1.3 billion. Staff roles were diverse with approximately 16,000 staff employed (ABMU, 2010). The HB consisted of four acute hospitals, ten community hospitals and 77 General practices. Eight directorates were identified. The HB also worked in partnership with Swansea University.

In 2016 Wales had the highest labour market sickness rates across Great Britain (1.9%), highest in those aged 65 and over, workers in public sectors, caring occupations and part time workers (ONS, 2016). In 2014 sickness absence in NHS Wales was 5.6%, higher than in NHS England (4.25%) (WGLA, 2014). Of which ABMU HB had one of the highest sickness rates (2015-16). Those staff working in Nursing and Midwifery sickness absence was 6%, the highest of all groups, and 0.7% higher than the Welsh average (WOD, 2017). Equally sickness absence overall has risen in ABMU year on year; 5.91% 2017/18, 5.9% in 2013/14 and 5.3% in 2010/11 (WAG, 2019).

Within NHS Wales and ABMU specifically anxiety, stress, depression and other unspecified psychiatric illnesses affected 7,945 staff members (ABMU HB) in 2015-16 and accounted for 23% of sickness absences in 2015. Second only to musculoskeletal (25%) conditions. However, by 2017/18 this had reversed and anxiety, stress and depression including other psychiatric illnesses had risen to 31.8% and musculoskeletal had fallen to 11.2% (WAG, 2019). Singleton hospital reported the highest long-term sickness absence 2017/18 (4.9%) and primary care settings the highest short-term sickness absence (1.8%) (ABMU, 2010).

Existing well-being services identified within the health board were, 'Employee well-being' later rebranded 'staff health and well-being'. Employee well-being was the headline label under which all initiatives fell. For example, Well-being through work, Well-being champions and the annual staff well-being week.

Alongside these formal schemes, many locally led well-being initiatives were also in place.

The Well-being through Work service, initiated in October 2011, is a clinically led service; Occupational therapists, physiotherapists and assistant psychologists provide short term, early interventions aimed at supporting staff with, or at risk of developing, a work limiting health condition or disability to remain in employment. Treatment is provided via telephone assessment, face-to-face or group intervention and signposting. Following self-referral or manager led referral, a telephone assessment is undertaken. The face-to-face or group interventions offered were self-management courses for stress and anxiety including, ‘Managing your Well-being’, ‘Mindful and meaningful Living’ and ‘Lighten UP’. Priority appointments for staff counselling was also introduced in October 2018.

Additional courses were made available for managers including ‘Better Behaviours made Easy’ and ‘Being Absence Minded’ courses designed to support managers to support their staff return to work after a period of sickness absence or remain in the workplace whilst managing a stress and anxiety. In addition to this a work related stress risk assessment tool for managers was implemented (2018), designed to promote awareness of work-related stress, highlight possible signs of stress and, promote ways to make positive collaborate improvements with staff alongside an ‘Understanding Mental Health for managers training’ course to raise awareness of mental health concerns in the workplace.

The service went on to initiate a Well-being champions network (2016). The voluntary role involved attendance at a one-day training workshop. The main purpose of the role was to help support the Staff Health and Well-being agenda, to support colleagues and to promote and increase awareness of staff health and well-being services, promotion of public health campaigns in the workplace and the wider well-being agenda e.g. encouraging walks at breaks, healthy eating (WOD, 2017). Finally, weekly well-being weeks were also introduced across the HB (2017). These weeks incorporated a diverse range of (>50) workshops, activities, guided mediations, yoga practice, menopause, positive psychology,

smoking cessation, nutrition and dietetics talks and lunch time concerts. The aim of which was to promote physical and mental health. In 2019 650 staff joined the well-being event and the HB resigned the time to talk pledge (initiated in 2016).

#### 4.5.2.2 Document review Champions for Health

A document review of the Champions programme development was also undertaken. Several documents were located and reviewed including, Project Initiation Document, Champions for Health website 2012. Champions for Health a review of the campaign's communication. A Website to Support the Campaign to Promote Healthy Lifestyles among NHS Staff, Scoping Paper, the evaluation of champions for health campaign 2013 and Champions for Health (phase II).

The champions project was initiated to encourage 1,000 NHS employees to improve their own health through self-driven changes. The project was based on data which reported high levels of unhealthy behaviours among the Welsh population. As such the project sought to encourage NHS staff to develop their own healthy lifestyle behaviours to support and encourage health improvements in the local population which they serve. At the time the Welsh Government's 'Together for Health' Strategy (WAG, 2012) focused on the promotion of health in the people of Wales in recognition of the importance of good health as a vital component for prosperity, success and sustainability. The strategy also included an objective for NHS Wales staff to improve their own health and the health of those they served. Thus, the strategy put NHS Wales employees at the centre of health improvement and prevention whilst recognising 'work' as a determinant of health. As such workplace health and well-being interventions were recognised for their potential to reduce the rising sickness absence observed at the time, 45% of the adult population in Wales drank above the daily guidelines, 70% did not take recommended levels of physical activity, 64% did not eat five portions of fruit and vegetables per day, 20% smoked and 58% were obese or overweight (Davies, 2013).

Phase I (2012) was available to all NHS Wales staff via NHS Wales intranet pages for six months (September 2012-March 2013). Overall, 1,708 staff signed

up to the campaign of which 355 ABMU staff registered to take part. The most popular challenges were Increasing physical activity, Healthy eating, and working towards a healthy BMI. Stop smoking was the least popular. Over half selected 'Increasing physical activity' challenge in combination with 'Working towards a healthy BMI' challenge. The second most popular combination of challenges was 'Increasing physical activity' and 'Healthy eating' (19%).

Profile analysis indicated that the majority of staff who took part were women (80%), aged between 36-45 and 46-55 years old (age bracket), from managerial, administrative and professional occupations (95%), were White (93%) and identified as straight/Heterosexual (92%). These gender proportions were in line with representation in the NHS Wales workforce, approximately 77% of NHS Wales staff are female (NHS-Wales, 2015).

Overall adherence to the programme was 21% for the lifestyle questionnaires and 17% for the final lifestyle assessment. Evaluation data also reported that 23% of those who signed up did not enrol or engage. While 450 staff actively engaged, of which 35% reported a general improvement in their health, 33% reported an improvement to mental health. Equally a positive impact on health outcomes was reported for alcohol consumption, BMI, healthy eating and physical activity.

Phase II was launched in 2014 with the addition of the five ways of well-being resource as an information component. This campaign period ran for one year and was available to two HBs in Wales Betsi Calwdr and Cwm Taff. Evaluation data was not made available.

#### 4.5.2.3 Direct observation

Four key hospital sites were visited. Administration and managerial staff based in office settings had individual access to PC's whilst those in the clinical environment had access to a shared PC for example nurses. At the time of exploration staff access to the internet via work PCs varied, for example, personal access time ranged from 45-60 minutes per member of staff whilst others were not restricted. Internet access to some non-clinical internet sites was restricted including google, again this varied by location and directorate. By 2019 access to staff intranet had been mobilised and many restrictions lifted.

The HB had rolled out a mobile responsive secure access site for staff. This meant that community-based staff and those without access to personal PCs were now able to access the internet via personal handheld devices from any location. WIFI capabilities across the HB had also been increased and were widely and freely available to staff (and patients) whereas previously it had been limited.

#### 4.5.2.4 Welcome interviews

Prior to the interview each participant was asked to complete a short questionnaire. The questionnaire data identified that of the 12 participants four were based in the community, four were office based, three were based within the clinical environment and one worked across locations. All had access to an internet enabled computer device during their working day and ten had access to WIFI. (WIFI was only available in the main hospital buildings at the time of the study). Access varied however and some reported restrictions of 30-45 minutes personal internet access during work time i.e. lunch breaks whilst others reported unlimited access although some nonclinical internet sites were not available. Overall, five (42%) participants considered themselves to have very good access to an internet or WIFI enabled computer device, one (8.4%) considered access to be good and four (34%) average. Two didn't respond to this question. When asked about their confidence in using the internet five (42%) participants considered themselves to be very confident, two (17%) confident and three (25%) average.

Questionnaire data suggested only ten were familiar with Champions for Health and of those, six had taken part previously. However, when asked about their awareness of Champions for Health during the interview all said they were familiar with it. The following reasons were provided for those who did not take part; "I was on leave at the commencement of the programme and then not allowed to join late", "Not aware of the programme" , "moved offices and not contacted" , "Did not know about it" and "Time limitations". Of the twelve interview participants four had used other commercial web-based products; FitBit, MyFitness Pal and an app to monitor diet and activity levels. The following websites were also identified Charter society for physiotherapy, Pain tool kits and Arthritis UK. Interview data identified four others Moodgym,

Mindfulness, Samsung health and weight watchers. Ten (84%) reported that they would like to use a web based programme to support their well-being (“Ease of access and support”, “To have options”, “Important to live a well-balanced life”, motivation”), one wasn’t sure (“I’m not sure web based approaches are most useful”) and one did not answer. When asked to rate the support from the organisation to access to web-based health promotion tools five (42%) reported that support was very good, three (25%) satisfactory, two (17%) not very good and one (8.4%) said poor. One did not answer.

Open questions and free text answers asked participants to suggest ways in which the organisation could improve access to web based health promotion tools during the working day and a variety of answers were given. Some were suggestions for additional resources for example “I would liked to have seen more facilities for staff in some of the future Health Board plans - new build in Morryston e.g. gym facilities / shower facilities even if on a commercial basis like the shops being put into the new main entrance”, others suggested promoting existing resources for example, “highlight what is available and allocate time” and others didn’t feel anything was required. When asked about barriers to access half selected ‘Limited time to access a suitable device’.

The interviews then explored participants initial thoughts regarding a web-based well-being resource including potential resources for inclusion and participant led criteria (Fig. 4.14) which was used to stimulate discussions in FG1. They concluded with the arrangement of focus group one (FG1) i.e. date and location.

**Figure 4.14 Participant generated word cloud**



Workforce issues referred to experience of stress and anxiety arising from changing internal structures of the organisation, increasing workload pressure due to staff sickness and limited staff. Devaluation of staff by the organisation as a result of lack of consideration for personal circumstances in workforce planning and pressures added to staff unequally. Community teams felt isolated from the main organisation.

*“I think there is a perception that people higher up aren’t valuing the way that people are having to work harder and are expected to deliver better outcomes with less resources and the stress that puts on your personal performance and the way that you manage it every day in work and we’ve all got high expectations of the service and we want to deliver and we want to do a good job and that’s led to a lot of personal tensions for a lot of people”* (Welcome Interview. Female)

*“we are quite isolated being in the community I think in a hospital hub the view is a bit different when your us and we do visit hospitals, but we are usually out and about its feeling engaged to the organisation”* (Welcome Interview. Female)

Following the welcome interviews, four female participants decided not to take part in subsequent stages of the project. One was unable to travel to attend a

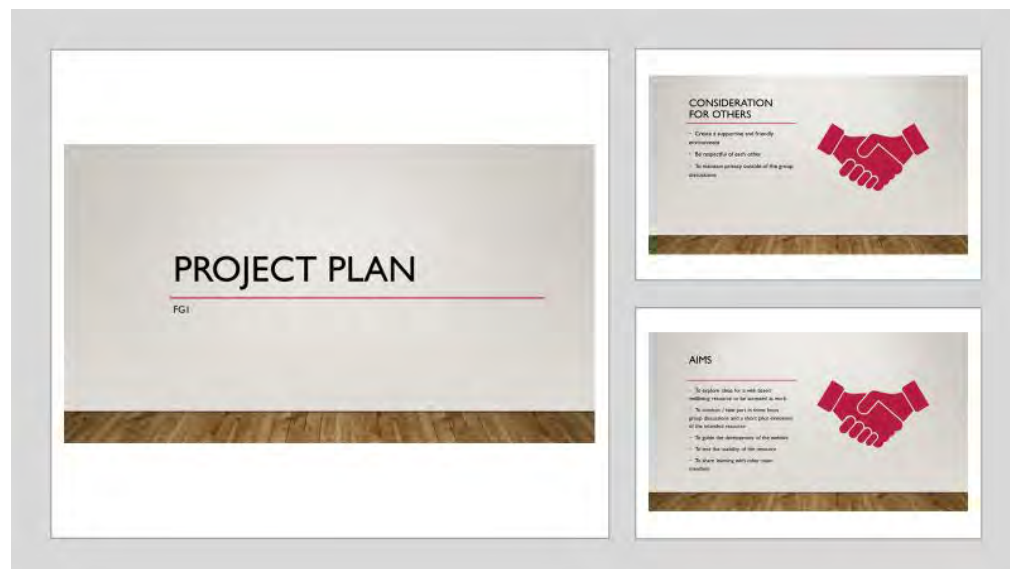
focus group discussion, another changed roles and was no longer eligible to participate and two others had limited availability to participate.

#### 4.5.3 Stage 2: Discovery process

##### 4.5.3.1 FG1

A shared project plan was created based on discussions of participants goals and values (Fig. 4.15).

**Figure 4.15 shared project plan**



During discussion of existing resources particulates considered and evaluated their views on resources presented and initial design ideas were discussed. For example, the use of a bright cheerful colour scheme was considered important as was a clear and consistent message.

Discussion of participants views and understanding of well-being led to the emergence of five *themes*; *Meaning of well-being*, *Causes of poor well-being*, *Well-being as taboo*, *Well-being needs and barriers*, and *Resources*. Each theme is outlined and illustrated with extracts from the data i.e. participant quotes.



## Theme 1: Meaning

This theme refers to participant's conceptual understanding of 'well-being'.

Well-being was described broadly as a sense of life balance and positive living across different life domains: Work / career, family, personal and social life and took into account aspects of enjoyment, responsibility, choice and ability to pursue activities in one domain without feeling restricted by responsibilities in other domains. For example, the ability to pursue hobbies, a sport or leisure pursuits and not feel exhausted or worn down by work roles.

Staff highlighted well-being as a broad concept incorporating physical and emotional self. Resilience and internal strength was thought to influence one's ability to achieve balance across life domains. Resilience being a requirement of positive well-being to support individual ability to engage with and embrace the multitude of events, experiences, and interactions that commonly crop up in daily life. Physical well-being was noted as important to overall well-being but not further discussed. Participant extracts are presented (Table 4.3).

**Table 4.3 Participant extracts (theme 1)**

*"I think balance, for me it's, having the right balance with everything, work, physical activity, emotionally"* FG1 female

*"I think it's about being able to do all the things you want to do whether they are those work demands or the things you want to do at home as well without them being compromised"* GH1 Male

*"I think it's about being able to be strong enough to deal with whatever is thrown at you as well ...something that is seemingly very small can suddenly become very difficult to deal with its that's functioning, just being able to do the things at that time that you need to do"* FG1 female

Theme 2: Causes of poor well-being:

Staff identified organisational and individual factors which actively reduced their sense of positive well-being through personal self-disclosures and sharing of sensitive experiences.

Theme 2: sub-theme 1. Organisational causes

The organisation in this context refers to the HB from which participants were drawn.

A perceived lack of organisational support for individuals was identified by some. Staff discussed situations which they considered had contributed to poor staff well-being. For example, institutional policies, written communications and daily practices were used to illustrate experiences and meaning attributed to personal events considered to have impacted negatively on individual's during periods of difficulty or illness. Specifically, the organisation wide sickness policy was identified as contributing to worsening staff health and increasing anxiety rather than acting to provide support for staff as they encounter an episode of sickness, be it mental or physical sickness. Participant extracts are presented (Table 4.4).

**Table 4.4 Participant extracts (theme 2 sub-theme 1)**

*“the sickness policy doesn't help, I don't know about anyone else, I could be feeling terrible but the thought of making that phone call is far worse, so you drag yourself in, even though you shouldn't go in, spreading germs, but you feel like you have to as you're going to be told off”* FG1 Female

*“it also encourages long term sickness I find, so then you've got people who are off for months on end sometimes, as then they think I might as well be off for one long period as I won't get punished for that, so rather than coming in and doing a day of work”* FG1 Female

Those working in satellite environments (community settings) or lone working situations perceived a lack of organisational systems of practice in place. This was perceived to exacerbate professional isolation and a perceived lack of support as individuals were required to act alone (in their daily roles) to implement organisational policies without support from others (i.e. those higher up in the organisation). Participants expressed a desire for collective responsibility at organisational level to create a culture of supportive working and acknowledgement of the importance of individual well-being. Participant extracts are presented (Table 4.5).

**Table 4.5 Participant extracts (theme 2 sub-theme 1)**

*“I work out in the community, I am a [removed], I’m often alone, not as in alone, there are often others, ... in the same clinical setting, but they are not my team.”* FG1 Female

*“one of my main stresses in my job is dealing with the teams sickness absence because of the very, very, direct pressure from above”* FG1 Female

*“I think it’s important that you know at all levels that it’s not just you as an individual as well, it’s the managers as well for the team they need to take a responsibility as well”* FG1 Male

Constant and chronic changes across the organisation further contributed to stress and anxiety in individuals and teams. Participants described a sense of constant uncertainty and the difficulty that not knowing what to expect next caused. For example, the recent and sustained, quick succession of policy changes, often without opportunity to implement them, led participants to question, how would the organisation be structured in the future? Where will their teams and departments fall? Who would manage them? This coupled with poor communication, critical staffing crisis and the increasing complexities of modern patient care and increased demand on the service, combined to increase

work demands and reduce opportunity to recover. Participant extracts are presented (Table 4.6).

**Table 4.6 Participant extracts (theme 2 sub-theme 1)**

*“We have no idea what it [the NHS] is going to look like. There is that underlying uncertainty and that feeds into the anxiety and stress level of the team”* FG1 Female

*“The complexity of the patients coming into hospital are perhaps more wide ranging, more complex and require different approaches and demands and I think that has a knock on effect on everyone”* FG1 Male

*“Stress is a sustained stress level now it feel like, whereas before it was peaks and troughs but there don’t seem to be any troughs and that’s difficult for the team”* FG1 Female

*Theme 2: sub-theme 2. Individual factors*

Individual factors which contributed to poor well-being were perceived to include: Poor coping mechanisms, unhealthy behaviours, and a lack of self-awareness. For example, individuals were considered to lack self-awareness if they were unable to observe and respond to small, sequential changes that occur at individual level and to understand how events and experiences can build up to become something serious and of consequence, i.e. look out for the small signs or markers along the journey to tipping or breaking point. This limited understanding of self-restricted ability to self-mange and self-support and was thought to have an active role in causing poor well-being.

Expectations placed on oneself, regarding management of one’s own role and control over ones working time was influenced by the organisational culture. Participants discussed self-imposed expectations and the way in which external pressure, to deliver services to expected high standards, were internalised and resulted in self-imposed restrictions on daily working practices. For example

some discussed colleagues who, having worked additional hours one week, then did not feel able to reclaim/adjust for those hours on subsequent days due to their perception that they would be judged by others for ‘sloping off early’ and letting the team down by not contributing fully to the excellent service delivery they aspired to provide. They expressed worry for criticism and judgement of from others around them. This further reduced opportunity to recover from periods of high pressure. Participant extracts are presented (Table 4.7).

**Table 4.7 Participant extracts (theme 2 sub-theme 2)**

<p><i>“Coping mechanisms may not be healthy and that’s when you have poor well-being”</i> FG1 Male</p> <p><i>“it’s having that self-awareness of what well-being is about those changes that can occur and a couple overflow and it’s all a bit too much and its being self-aware that we need to think about changes in ourselves”</i> FG1 Male</p> <p><i>“There is a lot more of wanting to do a good job and I don’t think the Andrews stuff didn’t help as people were so disheartened when they read a lot of that, that its almost over compensating as we want to be a good professional team that they then put so much pressure on themselves then it becomes difficult to manage... more anxious because of this perception you must be seen to be performing all the time”</i> FG1 Female</p>
--

### Theme 3: Well-being as taboo

Emotional health as a topic, was considered invisible at work, even within an organisation dedicated to health care. Physical health was acknowledged to be well understood. Those who were in a position to address their emotional well-being needs in the workplace described themselves as lucky. Well-being as ‘taboo’ in an employment context influenced a willingness to discuss well-being needs as they arose and was thought to contribute to slow recovery from periods of stress or anxiety.

Drawing the organisational and individual factors together, a spill over effect could be seen, in which negative well-being in one area of life, influenced another. The spill over effect restricted individuals' ability to maintain the sense of balance considered important for positive well-being.

#### Theme 4: Well-being need and barriers

Well-being need referred to the overarching needs of individuals in their endeavour to achieve or sustain positive well-being within a personal and organisational context. Barriers refer to elements which acted to limit ability to meet identified need.

##### *Increased visibility*

One need expressed was for the organisation to foster an environment in which self-awareness and self-management of well-being were encouraged and supported through increased visibility at organisational level. For example, action by the organisation to promote staff well-being e.g. positive screen saver messages "*have you looked after yourself today?*", training, highlight existing resources and identification of benefits to staff and the organisation (i.e reduced absenteeism, shorter pathway to well-being support reduced stigma). Effective staff supervision to avoid build-up of complex or daunting emotional issues related to work roles. Lack of organisational acknowledgment of the importance of well-being was considered a barrier which led to stigma further reducing opportunity. Participant extracts are presented (Table 4.8).

**Table 4.8 Participant extracts (Theme 4)**

<p><i>"It would be nice as part of your online training"</i> FG1 Female</p> <p><i>"pcs always have these screen savers that say how we should be helping all the patients, 'have you thought about your patient?' but I haven't seen one yet that says, 'how are you doing?' 'Have you had a drink?', 'Have you been to the toilet?'"</i> FG1 Male</p>
--

*“this can be a self-help thing, if you go and see well-being at work, which will take 50 mins anyway this actually might be a benefit to the managers as its shorter sharper and a benefit to the manager”* FG1 Male

*“It’s about feeling safe in your work environment”* FG1 Female

*“Stress is something you can’t see it’s not talked about”* FG1 Male

Increased visibility incorporated desire for organisational acknowledgement of problems occurring ‘on the ground’ and improved communication regarding safe and accepted working practices. Combined these efforts could build and foster a supportive context in which positive well-being could be established and maintained. Participant extracts are presented (Table 4.9).

**Table 4.9 Participant extracts (theme 4)**

*“if people further up the organisation can just acknowledged that people on the ground are really struggling to get there head around all these changes, we want to do it but actually [removed] is ridiculous, we won’t even have directors by then”* FG1 Female

*“stopping stories of people working 12 hours shifts, not having a break and not going to the toilet”* FG1 Male

*“I do think that even though we are a health board there is more focus on physical illness and how that’s accepted and how that’s fine to talk about its really hard to talk about mental health problems”* FG1 Female

#### *Potential Barriers to use of champions website*

Limited time to access the internet or personal WIFI enabled devices during working day to read information or enter health data including lack of opportunity to access well-being module in a safe/private space and lack of support (‘why are you on your phone?’). This was of particular relevance to staff

whose roles were not office based. Reduced cognitive functioning associated with episodes of high stress / anxiety may reduce ability to interact with the champions programme, coupled with preconceived ideas surrounding well-being, mindfulness and the ‘types’ of people who utilise them may reduce ability to ‘take on something new’ (Table 4.10).

**Table 4.10 Participant extracts (theme 4)**

*“When people are at their worse that’s probably the worst time to start digging through a phone to start looking at this ... If you’re stressed at home and stressed at work and then you said go and look at this it’s too much isn’t it” FG1 Male*

*“nurses can’t get on the pcs to look at it, that’s really hard then as they are probably a big chunk of people you want to get to but they haven’t got that access” FG1 Female*

*“wards are so busy its having the time” FG1 Female*

*“it would be looked at that you are looking at things on your phone, why are you looking at your phone” FG1 Male*

*“...if they are working as teams they are unlikely to be able to have any time to access anything, you will be expected to do it at home” FG1 Male*

#### Theme 5: Suggested content

Suggestions for effective online tools to support self-management of well-being in an employment context are presented (Table 4.11) These suggestions corresponded with design suggestions provided by Doherty, et al. (2010). For example, designing for client engagement (recommendation 3.1.1) suggests engaging with client interests and ideas, recommendation (3.5 and 3.6) highlights use of adaptable, sustainable and flexible systems which are in line with participant call for cross platform accessibility. Participant call for psych-educational materials is echoed in recommendation (3.7) - use of prints outs.



**Table 4.11 Participant suggestions (Theme 5)**

- Stress management
- Relaxation tools: Tai chi, mindfulness, breathing techniques, instructional videos, audio, techniques to go away and practice yourself, immediate application,
- Sleep tools/info
- Predictive: Signs to look out for yourself, list of things that might need to be addressed before they spiral further
- Reflective: Way to identify own issues, way to unpick what's happening, root cause, underlying meaning. Why am I finding this difficult- identification tool
- Shared stories: representative of organisation
- Communication techniques
- Coping with change module
- External resources
- Panic button
- Tools should be Quick to use and effective
- Visual and not too text based
- Representative of staff groups across the organisation- facilitate identification with resources
- messages should be simple and repeated
- the technology it is built on must be responsive and work across platforms i.e. is accessible via mobile phone.
- pro-active approach to self-management and highlight that the resources and tools included were to be accessed and utilised when individuals were feeling well
- long term approach to looking after one self was advocated.

Despite appreciation for the emotional well-being tool, participants expressed concern that the tool could not represent all staff groups and that the topic in itself was not well understood enough to address in an online context.

*“Mental health is such a vast array of emotions and feelings that it's going to be quite difficult to find an ideal module because it scales and questionnaires, you might not open up... The best form is sometimes being able to talk it through and breakdown what is going on. I don't know how we can break that down and apply it to an online tool” FG1 Male*

#### 4.5.3.2 FG2 and FG3

Data from FG2 and FG3 were combined. The data validation process undertaken in each focus group showed support for the analysis and earlier conceptualisation of well-being (in line with the five themes presented above). No new themes emerged. As with earlier discussions the element of self-care and self-awareness were reiterated. Time for self and the things that one chooses to accomplish or participate in was highlighted again as was the reference to balance between work and other life domains. A sense of knowing what one could control was also highlighted. Participants at one group extended this understanding to include spiritual and environmental elements. The following extracts (Table 4.12) highlight these key points and provide support for the summary of well-being from the welcome interviews and FG1.

**Table 4.12 Participant extracts FG2 and FG3 (well-being)**

*“I think it’s like a balance, a combination of physical and mental health combined to create one person that’s well”* FG2 Male

*“to be well emotionally as this is the key to overall good health”* FG3 Female

*“ a lot of well-being is an internal thing, dealing with the external pressures, and things that happen I guess so perhaps you can’t always control everything [laughs] that we are bombarded with on a day to day basis but how we react to those pressures, how we use the time we’ve got available and how we just stay on top of things and on top of life in general I guess that’s part of well-being and that’s the balance, so balance is perhaps the key word”* FG2 Male

*“feeling content, emotionally physically socially and spiritually”* FG3 Female

*“feeling generally good about life. Having time for the things that and making time for the things that ' really matter'”* FG3 Male

*“Stepping back and thinking can I really change it, don’t lose sleep over it if you can’t”* FG2 Female

*“the correct balance of work and social life, good relationships with work and hobbies” FG3 Female*

*“I think the guys who are actually working on the wards or in these areas where it’s really stressed out ... I think there is still a lot of stigma there” FG2 Male*

The validated themes informed the development of the intervention. For example, discussions surrounding the meaning of well-being and the prevalence of taboo topics in the workplace led to discussions on therapeutic approach. CBT and ACT were considered. Participants considered available resources and prior experiences, and discussions suggested a desire for a resource, in contrast to those already accessible. A resource that would provide well-being support, both during times of stability and difficulty. Specifically, the resource should aim to embed skills gradually to support individuals through more difficult times as they arise. A resource to fall back on. Participants identified that CBT was already available and widely used and that an alternative approach would be beneficial. Several participants had experience of ACT and CBT and had either received or delivered training for ACT within the HB and so felt it wasn’t too out of step with staff experiences despite being less well known. Equally discussions of appropriate resources for practical use in the workplace identified a desire for a mindfulness-based approach. Mindfulness is a key element of ACT. Participant extracts are presented (Table 4.13).

**Table 4.13 Participant extracts (mindfulness)**

*“Try to avoid the predictable routes, HPCs already know the tools and pathways”. WI Male*

*“bring in a little bit of mindfulness that maybe is something you might want to do at the end of every day or just doing a mindfulness exercise that just keeps that stuff in the work environment every day”. WI Female*

*“Little things you can download to your phone or pictures so you are mindfully listening to the person leading you through mindfulness. I think that’s really helpful for a stressed person... mindfulness is a big, big, word at the moment”.*

WI Male

*“little self-messages for the actual person whose reading it so you know remember to have a stretch remember, not to sit down in front of the desk for too long or because we all know it’s the right thing to do but if you have that reinforcement”* WI Male

*“it could be some simple interventions that you initially look at and then you wont even need the phone as if its just relaxation breathing technique”* FG1 Male

*“perhaps just plugin in a pair of head phones and walking off and listening to a pod cast, or recording or tai chi or whatever it is, out of your usual space and explore and then come back and settle down”* FG2 Male

*“...something that someone can use to try and get themselves back on path as it’s not going to be suitable for everyone and depending on what the issue is. If there is something that will help someone to unpick [it]”* FG1 Female

*“we have moved away from it [CBT] ... not because of how old it is but more a move away from the CBT approach to more of an ACT approach”.* FG1 Male

*Moodgym is very dry and it’s a bit boring ...something quick and easy and interactive. Imagery is a lot easier to deal with rather than a quiz about how crap I’m feeling.* FG1 Male

*“providing mindfulness, mediation on the phone”.* FG1 Male

*“A guided mindfulness where you just learn how to zone out for ten minutes at a time or a guided meditation”.* FG2 Male

The resources identified in the welcome interviews and FG1 was also re considered and discussed in FG2 and FG3 to ensure new members had the opportunity to raise ideas but also to ensure that ideas could be considered with computer scientists and considered in relation to functionality, usability and real world application. A summary of resources was presented to participants with the aim to identify a number of resources for use. For example, guided mindful meditations, Tai chi and breathing exercises and a focus on communication

remained important for stress management. Equally personal and shared stories and the need for clear signposting remained important to helping others understand their experiences and identify sources of help. Blogs and chat rooms were also raised for discussion again, their relative merits were considered in regard to feasibility of programming, privacy issues informed by the computer scientists.

Interactive features were discussed with enthusiasm. For example, experiential exercises (a key feature of the ACT model) should be included and supplemented with example scenarios tailored to healthcare staff needs, although not too specific so that different professional groups couldn't relate to them. Interactive exercises, homework activities (via PDF download), short well-being films, take-home messages and references to original ACT materials should also be included. Additional psycho-educational materials could be offered alongside the longer, structured intervention to attend to the needs of those looking for a 'quick fix' on the understanding that not all users would need or want a long-term approach or be able to dedicate adequate time. Audio and visual communication was preferred over long text sections.

Participants also felt it important to offer different resources to progress, in recognition and consideration of the different professional groups working across the HB. For example, the stress and strains experienced by different professions and equally the differing access, space and time considerations which may limit or inhibit users from engaging with available resources. A mobile responsive website was therefore a key requirement for those staff not based at a desk or without direct access to a PC. Differences at a person and personality level were also recognised and therefore the need for an overall approach was identified rather than specific tailored resources for each professional group. As highlighted in the participants extracts (Table 4.14).

**Table 4.14 Participant extracts FG2 and FG3 (resources)**

<p><i>“Tai chi isn't a bad one, there is a lot of evidence that tai chi is helpful with stress...A guided mindfulness where you just learn how to zone out for ten</i></p>
--

*minutes at a time or a guided meditation” FG2 Male*

*“Perhaps just plugin in a pair of headphones and walking off and listening to a pod cast, or recording or tai chi or whatever it is, out of your usual space” FG2 Male.*

*“I think particularly hearing other people’s experiences, people who have been through it” FG2 Male*

*“helping you towards a diagnosis or sign posting you to the right people” FG2 Male*

*“as you get stressed or upset your communication suffers as a result” FG2 Male*

*“A lot of choice but you don’t have to go down one route to progress, you have different available options to progress” FG2 Male*

*“the website itself should be responsive so you can use it on your phone without any hindrance” FG2 Male*

*“there are marked differences between professional groups, they are dealing with stress and strain some particular staff groups might be quite good at it” FG2 Male*

*“I do work with colleagues that do suffer with depression and anxiety, there are those colleagues who put themselves under a lot of pressure, they think they are not doing enough, and they always have to do more” FG2 Female*

Participants were asked to discuss their initial thoughts on a series of website images (those used in the design task) and to make decisions on style, design and layout. Discussion centred on personal preferences for style, choice of images and font and the different elements which stood out for different participants. For example, the beach scene generated an immediate response and was quickly disregarded however the importance and prominence of nature in relation to the topic of well-being was acknowledged.

The importance of clearly and quickly identify the range of content was noted. The designs which included the six modules were preferred and discussion included the provision of information via interactive boxes.

Participants were asked to consider the colour scheme, pastel shades and bright colours were presented. Responses were mixed across individuals and also in regard to the way they were presented i.e. on screen or on a printout. Some acknowledged the current style and trends seen across commercial websites i.e. pastel shades. Logo images were also discussed and there was confusion over the well-being logo presented in regards to both the colour and image used. Different ideas were offered including sunshine and scales which would represent balance. Font preferences also varied. Participant extracts are presented (Table 4.15).

**Table 4.15 Participant extracts FG2 and FG3 (images)**

*“I think the image itself is fine I just think it’s a bit non-descript really it could be any website” (FG2 Male)*

*“when you mentioned beach scene, I didn’t see it, I didn’t even know what you were talking about I was looking for titles and script... I was looking for headings, I was looking, to me that’s just a waste of space, why is it there, I didn’t see it, I was scanning to see where I could find information.” FG2 Female.*

*“as you said it is a bit of waste of space [beach scene home page]... it could be used as a sliding banner, that type thing that perhaps introduces different aspects of the site, things that lead to action...I preferred that one [v3] as you can see all the options at one time and presumably you can hover over them and the bit in the middle will change, or perhaps you will have it on a rotating thing because on that one you cant. I know that there is six modules, but looking at that it’s not immediately obvious the scope” FG2 Male*

*“Perhaps if you hover over the module, some clues or tips as to how you can help, healthy eating you know” FG2 Male*

*“so the colours in that one [v1] when you first showed them to us I didn’t like them I didn’t like I guess, pastel shades, but seeing it on the print outs and that I think it worked better*

*I think the pastel shades are on trend aren’t they? And that’s you know, from that perspective that’s where everyone seems to be going with the design it’s the same thing with the health board is producing”* FG2 Male

*“I think the pastel shades are on trend aren’t they?”* FG2 Male

*“I think if you just saw that logo you wouldn’t necessarily know what it meant”*  
[well-being logo] FG2 Male

*“we talked about well-being being a balance so maybe scales”* FG2 Female

Discussion of specific intervention features and potential user requirements were considered throughout the discussions but not in depth. For example, participants considered the best way in which to structure of the well-being resource, and initial consensus indicated a preference for weekly information. Use of this familiar format could guide users through the intervention content whilst supporting the development of new skills slowly over a sustained period of time, was one idea to emerge. However, each week should be designed as a stand-alone session, to encourage frequent, repeated use and skill consolidation. Navigation was briefly considered in that participants thought that but too many options and too much content, at times of high stress or emotional distress, is overwhelming and participants wanted to ensure this was not an issue. However, discussion on organisation of the content was limited. Participant extracts are presented (Table 4.16).

**Table 4.16 participant extracts FG2 and FG3 (structure)**

*“bite size pieces that you can dip into but that builds up a picture”*. WI Female

*“something you can do on your break, to get you into a positive state and then you leave it and can feel better about yourself”*. FG2 Female



*“A lot of choice but you don’t have to go down one route to progress, you have different available options to progress” FG2 Male*

#### 4.5.3.3 Rapid prototyping and usability summary

A total of (n=40) participants took part in either the rapid prototyping and usability tasks. A range of professions within the HB were represented: Administration, Education, and Clinical staff. Key design features including the home page were reviewed via the design questionnaire. Participants (n=18) data informed the look, structure and layout of the website used in the feasibility study (chapter 5). Results indicated a preference for bright, bold colours and simple layout to enhance readability and usability. Participants (n=13) in the cognitive walk through task identified two key website layout errors; difficulty exiting the ‘pop out’ pages (which displayed psycho-educational content) and navigation uncertainty on the well-being home page. Issues were addressed in the website used in the feasibility study. Participant (n=7) data in the card sort task informed; category and heading labels, content requirements and consistent integration of resources.

##### 4.5.3.3.1 Design task results

Data from the design questionnaire is presented (Table 4.17). When asked which home page design was preferred ten (56%) participants answered and of those the majority (n=6/10, 60%) preferred design two (Fig 4.9) equally the majority (n=12/16, 67%) preferred logo design two (i.e. saturated colour scheme, Fig 4.10). Seventeen (94%) participants indicated that the logo designs were appropriate (n=1 nonresponse).

**Table 4.17 Design questionnaire data summary**

Design	Very good	Good	Average	Poor	Very poor	No response
<b>Home page V1</b>	1 (6%)	9 (50%)	8 (45%)			
Appropriateness	1 (6%)	11 (61%)	4 (22%)	2 (11%)		
Layout	1 (6%)	7 (39%)	9 (50%)	1 (6%)		
Colour scheme	1 (6%)	5 (28%)	8 (45%)	3 (17%)		1
Likelihood of visiting again	1 (6%)	7 (39%)	6 (33%)	4 (22%)		
<b>Well-being home page</b>		9 (50%)	8 (45%)	1 (6%)		
Appropriateness		11 (61%)	4 (22%)	3 (17%)		
Layout		10 (56%)	3 (17%)	4 (22%)		1
Colour scheme		4 (22%)	5 (28%)	7 (39%)	1 (6%)	1
Likelihood of visiting again		12 (67%)	6 (33%)			
<b>Registration page</b>	8 (45%)	6 (33%)	2 (11%)	2 (11%)		
Appropriateness	8 (45%)	6 (33%)	2 (11%)	2 (11%)		
Layout	8 (45%)	7 (39%)	2 (11%)	1 (6%)		
Colour scheme	7 (39%)	8 (45%)	3 (17%)			
Does it put you off registering?	8 (45%)	4 (22%)	2 (11%)	2 (11%)	1 (6%)	
<b>Dashboard</b>	3 (17%)	11 (61%)	2 (11%)	2 (11%)		
Appropriateness	2 (11%)	14 (78%)	2 (11%)			
Layout	2 (11%)	11 (61%)	5 (28%)			
Colour scheme	1 (6%)	6 (33%)	6 (33%)	5 (28%)		
Do you understand each section?	2 (11%)	9 (50%)	4 (22%)	2 (11%)		
<b>Nature page</b>	4 (22%)	11 (61%)	3 (17%)			
Appropriateness	3 (17%)	9 (50%)	5 (28%)	1 (6%)		
Layout	3 (17%)	8 (45%)	4 (22%)	3 (17%)		
Would you visit again?	1 (6%)	8 (45%)	7 (39%)	2 (11%)		
<b>Sleep page like</b>	3 (17%)	6 (33%)	7 (39%)	2 (11%)		
Appropriateness		10 (56%)	4 (22%)	4 (22%)		
Layout		3 (17%)	3 (17%)	12 (67%)		
Would you visit again?		4 (22%)	6 (33%)	8 (45%)		
<b>Relaxation page</b>	3 (17%)	10 (56%)	4 (22%)	1 (6%)		
Appropriateness	2 (11%)	12 (67%)	3 (17%)	1 (6%)		
Layout	2 (11%)	11 (61%)	2 (11%)	2 (11%)	1 (6%)	
Would you visit again?	1 (6%)	9 (50%)	7 (39%)	1 (6%)		

Data from the free text comments and open discussions were categorised into the following three themes; ‘*Colour and style*’, ‘*imagery*’ and ‘*resource suggestions*’. Overall feedback highlighted a desire for a colour scheme with clear logos. Responses indicated a call for bright cheerful colours with strong

use of imagery and consideration of what each might represent. Comments were discussed and fed into the next design phase. Participant extracts are presented (Table 4.18).

**Table 4.18 Participant extracts (Design questionnaire)**

<p><b>Colour and style</b></p> <p><i>“brighter colours better”</i></p> <p><i>“may need to make sleep design more attractive”</i></p> <p><i>“relaxation page looks great”</i></p> <p><i>“Sleep design / picture needed 'too wordy”</i></p> <p><i>“Colours may benefit from being a little bolder”</i></p> <p><i>“I found a lot of the colour schemes rather cold and cheerless”</i></p> <p><i>“Not sure about beach part - photo on home page titles could have been stronger on home page, a little bland”</i></p> <p><i>“Not enough emphasis on main headings”</i></p> <p><b>Imagery</b></p> <p><i>“Well-being logo- did not make sense to me”</i></p> <p><i>“Mediatory figure on well-being page may put people off”</i></p> <p><i>“there were a few images of meditation and people with their legs crossed and hands crossed together not sure whether this may imply its more about meditation or prayer”</i></p> <p><i>“The reason I didn't like the registration page was because it struck me as childish /patronising”</i></p> <p><i>“The meditation pic is a good concept but have a sun rather than sparks going out of their head. Too much writing on some modules with no summary</i></p>
---

*headings / sub text (barely time to read half of these) nice happy relaxing pics great!” (Design questionnaire respondent)*

**Resource suggestions**

*“Confidence building, self-care, practical steps people can take to self-monitor”*

*“An explanation/ definition of well-being. A statement that a lot of people have emotional health issues, but there is a lot of support available”*

*“Signpost to local / national agencies or sources of help. Relaxation videos / audios. Mindfulness. Goal setting / monitoring page”*

*“Messages about work life balance and the importance of engaging in hobbies / interests”*

Free space was also given to describe understanding of well-being. Responses were in line with the focus group discussions/ Participant extracts are presented (Table 4.19).

**Table 4.19 Participant extracts (design questionnaire II)**

*“Everything that encompasses feeling, healthy and well more than psychological and physical include spiritual, environmental and relationships with others”*

*“To be well emotionally as this is the key to overall good health”*

*“All aspects of health, physical and emotional. Self-care. Taking time for yourself”*

**4.5.3.3.2 Cognitive walk through tasks**

The hallway testing data (n=4 participants) has been combined with the data from the low (n=10, paper designs) and high-fidelity cognitive walk through tasks (n=6, designs shown on a laptop). This is considered an adequate number of participants to detect key usability errors (Nielsen & Landauer, 1993). Error data is presented with a severity rating indicated (Table 4.20 - 4.23). Overall,

the key errors identified were user difficulty navigating away from the three ‘pop up’ pages (i.e. nature, sleep and relaxation), uncertainty on what to expect or how to use the resource, and confusion over what to expect when accessing the ‘nature page’.

**Table 4.20 Hallway task data (n=4)**

Screen	Task	Error	Alteration to be made	Error severity rating
Well-being home page	Which options are open to you?	One participant wrongly identified a 'locked' option as being open as available for use	Text label added to icon image. Locked message appeared after selection which explained how to unlock resource	LOW
Well-being home page	Can you point to any other interactive features to you on this page?	One participant selected the module description button and one selected the title text	Additional text and information was added to the page to explain how best to use the resources available on the page	MED
Well-being home page	If you wanted to find some resources and information on well-being which option would you select first ?	One participant selected the title text	Make it clearer which is interactive and which isn't	MED
Dashboard	What would you expect to find here?	Uncertainty	Option to have page explained was added in to assist users who were uncertain how to use the dashboard resources	HIGH
Dashboard	How would you remove a section?	All respondents selected to press X	Discussion on whether this permanently removed it or just hid it	MED

**Table 4.21 Usability errors detected in low fidelity cognitive task (n=3) at POW Hospital**

Screen	Task	Error	Alteration	Error severity rating
Well-being home page	Which options are open to you?	didn't identify relaxation techniques straight away. Was confused by locked option.	Include a tutorial or instructions to advise users	HIGH
Well-being home page	Can you point to any other interactive features to you on this page?	Two participants failed to identify all interactive features on page	Include a tutorial or instructions to advise users	HIGH
Well-being home page	If you wanted to find some resources and information on well-being which option would you select first?	Selected a dead end	Include a tutorial into dashboard to advise users on first use and make a personalised recommendation on where to begin.	HIGH
Dashboard	What would you expect to find here?	uncertainty on what to expect	Include a tutorial into dashboard to advise users on first use	HIGH
Dashboard	How would you remove a section?	Didn't know how to remove section	Include in tutorial instructions	LOW
Nature pop out page	What would you expect to find here?	uncertainty on what to expect	Change name of section	MED

**Table 4.22 Usability errors detected in the low-fidelity task (n=7) at Singleton Hospital**

Screen	Task	Error	Alteration	Error severity rating
Registration page	How would you quit registration	Pressed back button and it took them to well-being page.	Correct pathway	HIGH
Well-being home page	You want to navigate out how do you do it?	Clicked on relaxation then hit back and was taken to home page. Lost it. Sorry. Went back in to well-being module.	Correct the pathway and make the exit process much clearer	HIGH
Sleep pop out page	What looks interactive?	Tried to scroll using bar on page behind the pop up.	Correct the pathway and make the exit process much clearer	HIGH
Sleep pop out page	How would you navigate back to the well-being page?	All users had difficulty navigating back from the pop up pages. All tried to click outside the usable area	make the exit process much clearer	HIGH
Relaxation pop out page	How would you navigate back to the well-being page?	All users had difficulty navigating back from the pop up pages. All tried to click outside the usable area	make the exit process much clearer	HIGH
Nature pop out page	What would you expect to find here?	Three participants were uncertain on what to expect	Make the text and icon clearer to show why might be useful	HIGH
Nature pop out page	What would you access first?	One tried to access photos and a second tried to scroll down page outside pop up.	Make it clearer to show what is interactive / might be useful	MED



**Table 4.23 Usability errors detected in the high-fidelity task (n=6) at NPT Hospital**

Screen	Task	Error	Alteration	Error severity rating
Home page	Which option would you select if you were interested in finding out more about well-being?	Apple icon selected by one participant	Add label/text to picture icons on home screen	LOW
Home page	Any other options available to you to find out about well-being?	Four participants selected other modules including the healthy eating module	Add labels to direct users	MED
Well-being home page	What options are open to you? Which are not?	One participant wrongly identified a 'locked' option as being open and available for use	Text label added to icon image. Locked message appeared after selection which explained how to unlock resource	LOW
Well-being home page	What else might you expect to see here?	One participant was uncertain what ACT stood for	On-going discussion re labelling of resources with participants to identify best descriptor text	MED
Dashboard	How would you input your data?	Two participants were unsure how to do this	Include tutorial on how to use dashboard	HIGH
Dashboard	How would you add a new module to your dashboard?	Two participants were unsure how to do this	Include tutorial on how to use dashboard	HIGH
Sleep pop out page	What order would you rank resources?	One participant didn't identify the third resources as available	Alter the look of the resource and how they are displayed to ensure all are clearly identifiable	LOW
Nature pop out page	what would you expect to find here?	Don't know what it means	Rename to give more definition ad info to user in succinct way	MED

#### 4.5.3.3.3 Card sort task

The card sort task was undertaken by (n=7) staff. Eight categories and labels/headings and subcategories were identified (Table 4.24). Key outcomes were category labels, requirement for additional information on stress, depression and anxiety and integration of resources throughout the module.

**Table 4.24 card sort categories**

<p>Things that might help:</p> <ul style="list-style-type: none"><li>○ Benefits of relaxation mindfulness</li><li>○ Being present</li><li>○ Relaxation exercise</li><li>○ Restorative effects of nature</li><li>● Low mood and depression<ul style="list-style-type: none"><li>○ What is depression</li><li>○ How to recognise symptoms of depression</li></ul></li><li>● Anxiety<ul style="list-style-type: none"><li>○ What is anxiety</li><li>○ How to recognise symptoms of anxiety</li></ul></li><li>● Resources<ul style="list-style-type: none"><li>○ Who to contact</li><li>○ Map: interactive map with suggestions of local walks</li><li>○ Photo gallery</li><li>○ Sleep diary</li></ul></li><li>● Stress<ul style="list-style-type: none"><li>○ What is stress</li><li>○ Symptoms of stress</li></ul></li><li>● ACT<ul style="list-style-type: none"><li>○ Values</li><li>○ Cognitive fusion</li><li>○ Self as context</li><li>○ Acceptance</li><li>○ Committed action</li><li>○ ACT info</li><li>○ ACT exercises</li></ul></li><li>● Sleep<ul style="list-style-type: none"><li>○ Sleep hygiene (but don't use this term)</li><li>○ sleep and well-being</li></ul></li><li>● Homework tasks: these were thought to be integrated throughout all the resources and categories to encourage engagement. Alternative terms were</li></ul>
--

suggested for use to avoid users feeling like they were being told what to do.

#### 4.5. 4 stage 3: High fidelity website

Nine participants piloted the high-fidelity intervention for a period of six weeks, four of which consented to take part in a one-to-one interview. Participation was anonymous. Seven participants completed the WHO5 pre-intervention and eight completed the AAQ-II, however only one (11%) completed these measures post-intervention. Overall participants remained engaged with the resource until week five, although interview data indicated content across all six weeks was viewed.

The survey responses (Table 4.25) indicated that the content was useful, contained adequate information and that the majority of interactive content i.e. experiential exercises, YouTube clips and try now activities were explored and that the lesson summary was helpful. Open ended anonymous survey responses and free text comments received via; blog post (n=2), email (n=2) and handwritten feedback (n=1), were categorised thematically. A wide range of topics were identified; *visual display, interactive website features, quantity of content, wording and proof reading, and barriers to use.*

**Table 4.25 Summary of key survey results and free text feedback**

Week	N	Usefulness	Adequate information, n	Used the exercises, n	Used the clips, n	Free text comments
1	4	Useful (n=3) / somewhat useful (n=1)	4	4	4	<p><i>“Overall having tried to give them all a go in short period of time I found it quite a lot of content. Wondering if less is more? Could some of the exercises be offered in future weeks?” (survey respondent)</i></p> <p><i>“ACT model may need more of an intro/explanation or something like "the model will be revisited throughout the programme" or "the 6 techniques will be expanded upon throughout..." (Blog post)</i></p> <p><i>“Overall having tried to give them all a go in short period of time I found it quite a lot of content. Wondering if less is more? Could some of the exercises be offered in future weeks? (survey respondent)</i></p> <p><i>“An explanation at this point on what the scores mean would also be helpful (if there is a more detailed explanation rather than the lower the score the greater psychological flexibility)” (email respondent)</i></p>
2	3	Useful (3) / somewhat useful (1)	3	3	3	<p><i>“good - week two seems a lot easier to read through and doesn't feel as intense” (survey respondent)</i></p>

						<i>"I didn't find it obvious that the small 'w's at the top right of the page refer to the week numbers. I think it would be more explanatory if they were called 'week 1, week 2' etc" (email respondent)</i>
3	3	Very useful (1) / useful (1) / somewhat useful (1)	3	3	3	<i>"I think there were too many exercises this week" (survey respondent)</i>  <i>"The watch links need some text to contextualize why we are now moving to deep breathing etc as they feel a bit random at the mo" (Blog post)</i>
4	3	useful (n3)	3	2	3	<i>"Maybe somewhere it could advise on the amount of time needed" (survey respondent)</i>  <i>"The unwanted party guest YouTube example was excellent and in my opinion the most engaging" (survey respondent)</i>  <i>"Butterfly metaphor is great – perhaps there could be audio so we could actually close our eyes and listen? Least useful exercise was acceptance exercise" (survey respondent)</i>  <i>"I downloaded pdfs at the time, I will come back to the various values exercises over time" (survey respondent)</i>
5	1	useful (1)	1	1	1	<i>"It was quite a short week compared to the others, but I would not have wanted anymore on the particular topic, there was more than enough detail on it" (survey respondent)</i>  <i>"I liked the first video lots. The second link is not working. The third link is the Rowan Centre and it is the same as the first "read further" link - both that and</i>

						<p><i>anxiety site are good to have there for those who want to read further” (survey respondent)</i></p> <p><i>“I think there could have been one less exercise as they are all making the same point. I think this is a very important point and the week was helpful, but it probably did not need labouring so much” (survey respondent)</i></p>
--	--	--	--	--	--	--

Feedback categorised as ‘*interactive website features*’ included suggestions for different ways to display content, for example to expand descriptions and embed YouTube clips, to use audio files as an alternative to text, and to include ‘time to complete’ estimates for each experimental exercise and interactive element. ‘*Barriers to use*’ identified included lack of time to access the website, lack of access to the website via workplace PCs, no headphones, perceived lack of managerial support, and volume of text content within the website.

Interview data (n=4) was reviewed against thematic themes identified in earlier stages. No new themes emerged. Discussions centred around follow-up questions based on the survey data including usability queries, format and layout and organisation of therapeutic content and barriers to use for staff. Interview participants discussed the length of time they felt they had spent on each week and how this might be reduced or broken down into shorter segments.

**Table 4.26 Participant extracts (Interviews)**

**ACT**

*“Distinctions between values and goals was clear. I think that’s really good as some people get very goal oriented but we don’t always understand the values that underpin it....goals aren’t necessarily the thing making us happy. Its really good you’ve made that clear and the activities to help the, uncover the value”.*

Female 2

*“I’m into mindfulness, I like it”* Female 3

*“I think everybody should do this, thins kind of way of thinking the world would be a nicer place if everybody was a bit more chilled out”* Female 3

*“It was really good to just go back through things that maybe I’ve spoken about or heard others speak about”* Male 1

*“I think acceptance and commitment is really important ...a really good concept”*

Male 1

## **Format and structure**

*“I liked the structure, for some of them I would feel...this was longer or I felt I had lost my engagement with it a little bit. With the internet aspect of things, a staff member who had an hour lunch break, maybe the drip, drip effect is better but the format of the five layers was definitely good. If you asked me what I remembered the videos were great ” Male 1*

*“there were some things that were short and sharp with nice images that I thought id remember and really enjoy and then there were things with a lot of content and I thought gosh I’m switching off here” Male 1*

*“I like the way it’s the same layout each week, makes it easy to follow and links to listen to” Female 1*

*“Keep in manageable expandable sections” Female 1*

*“analogies, its good to see those” Female 1*

*“I think it was really good having the same format each week...repetition it gets it across that its about learning a skills” Female 1*

*“I like things you can do yourself [batteries exercise) Female 1*

*“Good idea doing it workbased” Female 1*

*I like the way its delivered over 12 weeks, in a healthcare setting everything is very much condensed down so the lecture based course at the health board is long and is four sessions it made it more bitesized and accessible...it fitted into life more” Female 2*

*“As its spread out over a number of weeks it allows it to be simpler” Female 2*

*“I think keeping the same structure is good its familiar and it helps people get use to it...in therapy that’s what we do”. Female 2*

*Homework and have a go at the experimental stuff at the end is nice” Female 2*

*“Enough to do on a break or in between patients so it’s a good time frame...I personally thought they were all about the right length.” Female 2*



*“Maybe a video, text, bit of text, the last thing you want is a massive chunk of text to read”* Female 3

*“The same thing comes up on the PDF. You think you’ve got to read it. could you say for a PDF version of this click here. When you read a magazine article there’s read these bits here, I want to read everything and I’m a bit OCD so I want to read everything so if you said for a PDF version click here”.* Female 3

### **Suggestions**

*“a more blended approach”* [therapeutic approach] Male 1

*“Personal element, contact details”* Male 1

*“Try to understand their reasons for doing it, how will they use it”.* Male 1

*A lot of the staff even don’t always understand the language [health literacy]...some of the things we send out to patients, some staff don’t understand. Something to reflect on”* Male 1

*“People can sometimes misconstrue the information and get lost. A lot of the successful things I’ve seen online have a personal element...somewhere along the line someone to check they’ve taken on the information correctly”* Male 1

*“Maybe a space for people to pause and think before going onto the next session”.* Female 2

*“You know you’ve got the weeks as the WordPress icons? I think week number would be better”.* Female 2

*“I’m thinking about now...a tab for notes would be helpful, write your own stuff at the bottom, reflections or something like that.”* Female 2

*“Have a really concise explanation of what ACT is on the first page. Having that definition there will help. Like the serenity prayer, it’s been changed with ACT to be a request not a prayer...so having something like that right at the beginning will help people see what they are doing”.* Female 2

*“What to expect page”* Female 2

*“At the end will you be able to print out a certificate...in PADR they ask about work life balance and personal life, that’s a standard question. You can print the certificate and put in your file”.* Female 3

*Would you take into occupational health to recommend it to them?* Female 3

[stress example] *“have you thought about difficult work colleagues, you’re stressed because your difficult work colleague expects things of you, some people are difficult. I went to a meeting this morning and I was very aware that I had to know what I wanted to say because of the personality of someone at the meeting...missing lunch break because you are busy...making mistakes, in pharmacy everything gets double checked and quite a lot of errors get made and that’s why they get checked, its stressful if you make an error...you are under a lot of pressure from the nurses and Drs and relatives and patients themselves to discharge. That’s quote stressful if you have all these patients wanting their medication right now. Balancing workload, competing priorities and you have a life outside work oh my god its Christmas jumper day at school...”* Female 3

**Barriers**

*“I can’t do it in work, its not part of my work I wouldn’t be allowed to but also I haven’t time, at the moment I’m working through my lunch break I but that’s probably why they are getting stressed isn’t it...but if I went to manager and said I was struggling it might be ok”* Female 3

*“It was in administrative time [access time] purely because in clinic even if I knew I had a slot free some people come in early or get their time wrong so its hard to relax in that time. Or I did it in the evening when I had free time”.* Male 1

*“Our technicians don’t have desks they are busy”.* Female 3

*“If I’m doing something I would want to the whole thing, but at the end you skim through things...the more that’s there...if there were three options you’d have to read them all to choose”* Female 3

*“on other websites I’ve seen it will say how long each exercise it will take, so having sections and saying how long each will take...if you know what you’re allowing yourself it might help”* Female 1

*“I just skim read the long text...not enough time at work”* Female 1

*“I’m adamant I get out for a run on my lunch break...but then we often recommend apps and screen time to patients we see”* Female 1

*“I haven’t been able to access the YouTube clips as we can’t access them from work devices...and equally I wouldn’t know how to work the sound on my computer”*. Female 1

*“I dipped in and out rather than doing it week by week”*. Female 1

*“Potentially difficult for staff in high pressured environment who don’t have access to a device however those staff and community based staff including me now have access thanks to ABMU mobilisation strategy we have ipads... that makes it a lot easier (health visitors, nurses, could keep up with this between patients if they are permitted to as part of their well-being, if they had a DNA you’re welcome to sit in your car to do it in between patients”*. Female 2

*“thinking about ward-based staff or community staff, maybe condensing it a little?”* Female 2

*“Why they [staff] are going to be doing it and them be allowed to do it...good for CPD as well as for you”* Female 2

*“Someone needs to be of quite high cognition to go away and reflect on it...if you’re in distress and seeking help you’re not thinking straight always”* Male 1

*“It needs to come from top down but also from other places like occupational health...Well-being champions can drip feed things in different ways, all the screens that are around. Layered effect to think preventatively”*. Male 1

### **Duration**

*“Does it have to be 12 weeks”?* Female 3

*“Can it be condensed”?* Female 2

*“Reflective pieces would have taken longer than the 15, 20 mins I spent”* Male 1

*“I spent maybe 30 mins”* Female 3

## 4.6 Discussion

The current study aimed to develop a web-based emotional well-being intervention, for use with public sector staff in a work-place context, using PD to identify participant led criteria and address issues surrounding poor adherence and engagement to web-delivered interventions.

### 4.6.1 Principal findings

The PD process led to the development of a well-being intervention developed following three collaborative and active research phases which maintained sustained and varied end-user involvement. An emotional well-being intervention based on ACT was developed, sequentially structured and designed for self-guided use over a 12-week period. The intervention included the six core processes of ACT and experiential ACT exercises, scenarios, interactive resources, psycho-educational materials and five well-being films. Each resource included was identified as a direct result of the PD process. The structure and range of the resources included were selected with the intention to support and encourage a gradual development of skills designed to boost well-being over time. Participants specifically highlighted the importance of developing a resource which could be used both in times of positive well-being and mental strain. Gamification features were incorporated to encourage sustained engagement, informed by the systematic reviews (chapter 3). Overall, the style and design features selected were bright, bold and simple for clarity and ease of use. For example, the home page design selected showcased all six modules.

### 4.6.2 Implication for practice

The collaborative and iterative design process was highly rewarding and insightful. A diverse range of staff engaged in a multitude of activities at different time points over a one-year period and participants from high and low

rate absenteeism's workforce groups were represented. For example, working time lost in the NHS varies by region and workforce. Ambulance staff, healthcare assistants and support staff have 6.3% and 6.2% sickness absence respectively while nursing, midwifery and health visitors are lower (1%) as are medical and dental staff (1%) (Black & Frost, 2011). Incorporation of qualitative methods of enquiry i.e. interviews and focus groups, facilitated open discussion of well-being which enabled a collective understanding to be generated and utilised throughout the design process. Open discussions between the principle researcher and participants created a supportive group environment which enabled topics to be revisited over time and contextual organisational and workplace issues to be considered and reflected upon.

Participants were asked to consider their understanding of well-being from a workplace context during FG1 and interpretation of participants views was then discussed further in FG2 and FG3 during the data validation exercises. Overall participant discussions highlighted that well-being was collectively understood to reflect a broad sense of balance within one's life across different life domains which were identified as: work/career, family, personal and social life. This understanding of balance across life domains took into account both hedonic elements of well-being i.e. enjoyment and pleasure and eudaimonic elements i.e. responsibility, choice and personal growth. But these were considered in terms of one's ability to pursue chosen activities without feeling restricted by the responsibilities and burdens of another life domain. This was a central feature of discussions, likely due to the context in which participants were asked to consider their well-being (workplace). Equally participants identified well-being as balance between the emotional and physical self. These findings are in line with those of (Attwood et al., 2020) in a study which explored the use of well-being questionnaires as part of this research authors explored healthcare staff and service users understanding of well-being within a healthcare context using focus group and qualitative enquiry. 'Well-being as balance and 'Well-being as an active process' were to key themes reported (the other themes reported by Attwood et al., 2020) were specific to the patient health care journey and thus not comparable). (Gauche et al., 2017) explored workers perceptions of well-being, while not in a healthcare context, participants were public sector

workers, results indicated organisational (e.g. management style, colleague support) and personal resources (e.g. resilience and coping techniques) were critical components. Elsewhere, Health and well-being in a workplace context has been described as “*a broad concept comprised of personal satisfaction; work-life satisfaction; and general health which is a combination of mental/psychological health and physical/physiological health*” (Pescud et al., 2015, p. 2). While the international labour organisation presents their understanding of workplace well-being as covering “*all aspects of working life, from the quality and safety of the physical environment, to how workers feel about their work, their working environment, the climate at work and work organization*” (ILO, 2019).

Early presentation of designs facilitated discussions on likes and dislikes, style, images, colour, layout, and highlighted requirements for inclusion in the website. Requirements identified were: cross-platform accessibility specifically a mobile responsive site, tools should be quick to use, visual display (not too text based), psycho-educational resources which could be downloaded and printed, a range of relaxation tools and techniques to support individual use and enable self-guided practice and learning with immediate application. Reflective i.e. the resource should provide a way to identify one’s own well-being concerns and provide a way to unpick what’s happening to understand the root cause. External resources which support a pro-active self-management approach over the long term. This approach has received support and is encouraged in early phases of development (Kip et al., 2019; Onken et al., 2014). Not all of the requirements identified were incorporated into the final prototype. This is not uncommon (Monshat et al., 2012). The communication module, coping with change module and panic button were not included. However, the concept underlying the two module suggestions were embedded throughout the ACT module. The panic button was not included as the intervention and overall website was not intended to be a therapist supported resource instead sources of help and external organisations were identified, and contact points listed within the ACT module.

The use of rapid prototyping enabled designs to be reviewed by multiple participants at multiple time points which supported the desired iterative design

cycle. Designs evolved over the course of the project and were shaped by successive participant views. Equally the usability tasks undertaken enabled quick and accurate identification of frequent user error, poor design features and areas within the site which required further explanation and clarification. Staff engaged easily with these tasks which were selected for their range of topic and ease of use. The final stage complimented the process as it brought together the different strands of the project into one space. For example, whilst the overall design features, key resources and therapeutic approach were developed within the PD framework the actual intervention content was developed alongside of these discussions due to the amount of time and specific expertise required i.e. expertise in mental health and ACT was necessary. However, the content development process mirrored the iterative PD design cycle and was informed by participant data throughout. Thus, the final stage (stage 3) brought these two stands together and enabled participants to review the intervention content within the framework of the website.

#### 4.6.3 Consideration of PD

The PD approach used was informed by the mental health design guidelines. For example, ‘Design for outcomes’ (Doherty et al., 2010) advocated the use of concise goals and a focus on intended outcomes. Adhering to this enabled effective management of expectations at each stage in the process and resulted in a shared project plan which attended to participant goals and values and in line with the aims of the PD process. This shared project plan was used in successive focus groups and enabled participants to reflect and focus on project requirements. Participants had limited time to take part due to work commitments and/or the need to secure management support to take part. The use of concise goals ensured an immediate array of design suggestions and resources were identified. Similarly, the inclusion of multi-disciplinary experts outlined in ‘design in collaboration with MHC professionals’ (Doherty et al., 2010) provided critical insight from a range of perspectives and ensured early on that ideas and suggestions raised were realistic and feasible, in terms of website programming i.e. available expertise and software functionality. For example, during FG2 the involvement of two computer scientists on equal terms meant that suggestions could be explored in terms of actual website feature

requirements as opposed to abstract concepts and general ideas. On a number of occasions anticipated end-users were asked to expand on their thoughts and to visualise what their ideas might look like within the framework of a website (e.g. 'how would you put that into a website?'). The inclusion of different professions ensured different perspectives were considered early on. Equally, the importance of identifying user need and being sensitive to mental health state when considering delivery and reminder options to participants (Lindsay, Jackson, et al., 2012; Wadley et al., 2013) was central to the well-being resource created. For example, participants discussed the need for the well-being resource to be accessed during periods of positive mental health with the idea that skills learned would then support them during more difficult periods or periods of poor well-being. These discussions were enabled as sensitivity and consideration was given to participants own mental health experiences and their personal knowledge of using different therapeutic approaches. For example, the exploration of participants emotional well-being needs in the context of anticipated use i.e. the workplace, enabled trust to be established throughout the design process. This was evidenced by staff discussions of taboo topics and personal needs.

Adherence and engagement are a critical concern in web-based delivery formats and of particular interest to the current programme. For example, the document review highlighted high dropout during Champions for Health (phase I). The participatory approach was selected specifically to address this issue. Participation in the design and development process is considered to increase likelihood of user ownership and alignment with the end product/system (Preece et al., 2002) while simultaneously affording the opportunity to explore anticipated end-user views in relation to promoting use and engagement with the resource (van Bruinessen et al., 2014). The continued interest of participants in the process over a sustained period of time indicated that this was successfully achieved. However, the final stage failed to retain adequate users compared to the earlier development stages. This could in part be explained by the substantial lag period between development and evaluation (this is considered further as a limitation).



Of particular relevance to the current project was the need for sensitivity in the development process, the intervention concerned individual's mental health and well-being and considered lifestyle behaviour alongside these important issues. For example, (Muller, 2007) identified that individual capabilities, diverse needs and roles of workers across varying workplace contexts and has a significant impact on the way in which PD is undertaken. Thus, it was critical to be aware of participants individual needs and to be sensitive to their on mental health status (as it is in any research conducted in this context). Specifically, it was assumed that participants interested in taking part in the development and design of a well-being resource may have experienced a range of mental health conditions either directly (themselves have a diagnosis) or indirectly (as carers of others with diagnosed conditions). As such participants and intended end-users may have cognitive impairments, a common feature of many mental health conditions or difficulty with abstract reasoning (Kip et al., 2019). In response it was understood that in some instances 'usual' methods may not be appropriate, or could be detrimental (Matthews et al., 2008) and they should be considered thoroughly prior to use. Both Kip et al. (2019) and Wadley et al. (2013) identified challenging aspects of the participatory design process in their work with mental health sufferers namely poor motivation of users, difficulties travelling to attend sessions and inability to keep appointments. While these challenges were not encountered specifically study participants did encounter difficulty travelling across the various HB locations to attend successive sessions, some require line manager approval to attend and others chose to attend in their spare time to negate this issue.

#### 4.6.3 Comparison with prior work

These findings are in line with those of Wadley et al. (2013) who reported successful utilisation of a two staged PD project to develop a web-based social therapy intervention for Australian adolescents with psychosis. Similar to the current approach they followed a co-design process where four initial design ideas were presented to six mental health service users to stimulate discussions. Followed by separate discussions with clinicians. The designs enabled participants to explore therapeutic delivery options and four designs were presented. Authors reported that the use of workshops enabled specific

circumstances of their user group to be identified, which then informed their prototype design. For example, the adolescents with psychosis were familiar with technology and mobile phones and reported frequently running out of credit, as such the service was delivered cost free. Their participants reported experiencing anxiety following previous CBT treatment and using Google to look up symptoms. As such authors concluded that their treatment should not be negatively focused. Equally unsolicited reminders to access the services were set as an 'opt in' service based on participant concerns that they might feel harassed via SMS. Authors used this information, in conjunction with a second workshop which included eight clinicians, to create a prototype design which was refined and evaluated for usability. This stage of their project was conducted over a three-year period and culminated in a six-week safety and feasibility trial which included 23 users. The processes undertaken were similar to the current study. For example, information gathered during the user led focus groups regarding participant experiences, preferences and workplace context directly informed the stakeholder discussions and subsequently shaped the designs presented for development and evaluation by the users in stage two.

Wadley et al. (2013) also reported use of usability testing in the development of their prototype. Usability experts were directed to explore the designs supplemented with end-user's evaluation. The current study also undertook usability testing with anticipated end-users in a bid to ensure easy navigation and ease of use. Likewise, both studies undertook a feasibility trial (chapter 6). Overall Wadley et al. (2013) reported positive engagement with 70% of users logging into the system once a week and 75% reporting satisfaction with the service, 60% accessed at least three modules and 90% would recommend it to others. Comparing the pilot evaluation conducted in stage three of the current study, participant engagement was lower, less than half (33-45%) of the nine participants completed the weekly surveys. Although the four participants who took part in the follow-up interview reported accessing all six-weeks of content. Participants identified that the information provided was useful, adequate and that the weekly summary was helpful.

In addition to this Wadley et al. (2013) highlighted how they maintained separation between therapeutic content and software development in part to

promote wider application of both elements. They reported structured, sequential therapeutic modules which included text, images, user to user asynchronous social media interaction points and interactive exercises, developed by a multidisciplinary team, and available based on initial assessment needs. Again, this is similar to the current study where the therapeutic content was not tied to the programming of the website, was delivered sequentially and included interaction points and optional content. Although the current intervention did not include a social interaction element, nor did it offer the option for user generated content. However, the reminder emails offered a two-way communication schedule and points in the website asked for users to share their personal well-being activity suggestions, natural scenery photographs or general commentary. The overall aim, again like the current study was to align the technological design with the needs of anticipated end-users in their case, adolescents with psychosis. Previous research has established the need to include end-users in the development of technology designed to deliver mental health treatment with a specific focus on the application of PD (Hagen et al., 2012).

Kelders, Pots, et al. (2013) reported the development of an intervention to prevent depression utilising 'Living life to the full' an ACT based intervention previously established as an effective treatment with minimal and extensive email support (Fledderus et al., 2012). Authors reported use of literature scan and user-based methods which included, 18 participant interviews, rapid prototyping and a requirement session and both expert and user led evaluation. While the authors did not identify their work as PD, instead they aligned their work with human centred design, persuasive design and business modelling in conjunction with the CeHRes roadmap for eHealth development. Despite this the methods used were similar and in line with their description of human centred design i.e. "*Human centred design advocates the systematic, continuous consultation of potential users during the whole design process*" (Kelders, Pots, et al., 2013, p. 2). For example, the current study included a staged development process which included contextual inquiry and value specification, as explored from a user perspective, which sought to identify user values using both interviews and focus groups. Twelve interviews were conducted, similar in

number to Kelders, Pots, et al. (2013) and Kinzie et al. (2002). Equally a range of stakeholders were included in the iterative and evaluative design process. Kelders, Pots, et al. (2013) reported a diverse range of professionals involved in the development process. However, the current study did not undertake an expert led evaluation in the same way. Instead computer science experts contributed to the iterative development process within the focus group and rapid prototyping sessions.

Like the current study Kelders, Pots, et al. (2013) concluded that their methods provided valuable insight beyond comments on colour and layout and extended to include contextual considerations, content and delivery. For example, authors identified that users expected expert support or guidance to be included, likewise needs included a feedback and progress mechanism, a flexible course with a fixed end point and the expectation that the system be easy to use. The current study identified user led criteria beyond design preferences for example, the selection of therapeutic approach, the inclusion of additional psychoeducational resources on sleep, nature and active relaxation. Equally the importance of user's workplace context added invaluable insight into how and when the programme might eventually be accessed and incorporated into daily schedules i.e. ability to engage with the resource and the need for management support and/or 'permission' to use the resource. Other barriers to use were also identified which facilitated the development of 'quick fire' experiential exercises that specified expected completion time to increase opportunity to participate at work.

Kelders, Pots, et al. (2013) concluded that their approach ensured the design of a holistic web-delivered intervention which took into account the system, content and service. One critical difference between the current study and this previous study though was that Kelders, Pots, et al. (2013) incorporated an intervention that had already been developed and effectiveness established whereas the current study sought to develop the intervention alongside the website which would deliver it.

Orlowski et al. (2015) included eight empirical research studies which either directly or indirectly (or applied the theoretical structure) used PD in a systematic review which explored the development of technology delivered youth mental health and well-being interventions. The studies were diverse, and the current findings are compared and considered against five of the studies. Firstly, (Monshat et al., 2012) utilised PD to develop a six-week web delivered mindfulness awareness training and education programme 'MATE'. The program was developed for young persons aged 14-25 years old in Australia. The intervention unlike the current resource was adapted from an existing programme available to medical students (Hassed, 2008) and a draft website was already available. Ten participants took part an interview to explore views on usefulness, enjoyment and evaluation. Like the current study participants were asked to explore their thoughts on structure, delivery mode, homework and site access. Thematic findings were similar, for example, Monshat et al. (2012) reported that style, design and layout were important. In line with Kelders, Pots, et al. (2013), commentary moved beyond colour preference and identified participants preference for short video communications, which increased in duration over successive weeks, with a maximum of four per week. Downloadable resources (e.g. PDFs), due to short attention spans, anticipated boredom and multi-tasking. Participants suggested gamification elements like progress bars to facilitate a sense of achievement. These findings are in line with the current study where participants were very keen to share their ideas and contribute to the development process. Similar to the card sort which indicated that use of the word 'homework' would put users off, Monshat et al. (2012) reported that a range of alternative terms were suggested including: mediation time, rest, or time out. Equally feedback for users was considered in both studies. Monshat et al. (2012) highlighted that participants had called for regular communication to encourage engagement. While this was not a direct finding of the current study, the weekly feedback surveys completed by evaluation users, indicated that this was important. As did the call for weekly interactive features and the desire for progress to be reflected back via virtual health points and progress charts. Equally rewards were noted in both studies. Participants in the Monshat et al. (2012) study requested a reward for their time and perseverance. Both holistic appreciation (for taking part) and a physical reward

(e.g. certificates, stickers, prize draw). While one participant in the current study called for a downloadable course completion certificate which could be shared with line managers or incorporated into a work portfolio to ensure value for time (commitments) were formally acknowledged in the workplace. Regarding evaluation and baseline data Monshat et al. (2012) specifically explored participant views to identify duration and format preferences. Which led to a call for personalisation and segmented questionnaires, to avoid fatigue. The current study did not specifically ask these questions; however participants did comment on the need for personalised feedback following completion of well-being questionnaires. The final theme identified by Monshat et al. (2012) indicated that engagement and adherence to the full six-week programme would be challenging due to privacy concerns and limited access to internet enabled devices. Equally these concerns were identified and explored in the current study and for specific professions this was acknowledged to be a potential barrier to use. As such a mobile responsive site was called for to ensure access via personal mobile devices and to alleviate the reliance on work located PCs despite the intended resource being designed for workplace use. Overall there were many similarities between the two studies however the incorporation of participants into the design process was limited in the Monshat et al. (2012) study to participant interviews unlike the current study which sought to integrate and incorporate collaborative design processes throughout all development phases.

Lahey (2014) used PD to develop an intervention (Project 99) aimed at promoting positive mental health and well-being for young persons in Glasgow and Clyde NHS. Five different youth groups were involved in a large-scale project to explore ways in which digital tools could add value to clinical care and how to best encourage engagement across this population. Like the current study participants were considered co-designers and a variety of events were facilitated with a commissioned co-design network. Participants co-created designs which were shared with funders and health and education ministers. The project reported several challenges which included difficulties working across a number of volunteer sectors and incorporating diverse views, lack of experience facilitating a PD project on this scale and disparity in pace between public and

private sector organisations including complicated legal responsibilities. The key challenge reported was the variation in life experiences to be explored and represented in the final tool. These challenges were not uncommon to the current study, which also encountered difficulties in ensuring adequate time for participants to contribute, at regular points, over a sustained period of time. Further complicated by limited programming resources and expertise to realise the variety of resources desired by enthusiastic participants. These challenges should not be underestimated, ethically there is a critical consideration to deliver or attend to participant led criteria to support their identified well-being needs.

Findings were also considered in line with a study conducted by Valaitis et al. (2007) which included young persons aged 14-24 years old living in rural Canada to develop a health promotion website to address problematic alcohol use. The authors conducted think tanks with five participant groups to explore design specifications and health promotion. Scenario based design activities were used to create fictional characters used to explore website scenarios use and to identify potential issues encountered and to resolve the issues identified. The method identified key information to be included in the website and advertising ideas for target audiences and highlighted specific concerns for young persons in rural and isolated areas. Participants provided drawings which meant that situation based features were explored in-depth whilst not aligning the experiences with the participants themselves i.e. affording the young participants anonymity to discuss and explore their thoughts in a safe way. The current study did not include this demographic and it was felt that adults participating in focus group discussions with an experienced facilitator, who was external to their employment setting would feel safe to share personal experiences, as indeed they did.

Elf et al. (2012) explored eight young carers' aged 17-24, views via PD to develop a web-based support system. Authors reported four thematic themes; Communicating the message, Ideational working principles, User interaction and User interface. Findings exposed key differences between the views of participants and those of the project team and concluded that early user involvement and critical reflection were key to successful implementation of web-based systems. Findings from the current study support the anticipated end-

user emphasis on early inclusion of users and also highlighted participants consideration of access, interface and interaction with the system.

Finally, Løventoft et al. (2012) discussed their implementation of PD to develop a smart phone App ‘Daybuilder’ to support people with depression. The approach was from a self-management perspective focused specifically on mood, appetite and sleep, rather than one geared to affect behavioural change. Six Danish participants recently diagnosed with depression took part in a focus group discussion which used story boards and a PD workshop which used mock-ups. The process culminated in a four-week field test evaluation which explored the prototype design. Four (66%) users completed a questionnaire and six interviews were conducted, which was a somewhat similar response rate to the high-fidelity prototype evaluation conducted using the wordpress.com site. Equally their approach was similar, they included mental health experts in the content development process. Authors reported that the focus group did not generate any user led suggestions or content instead designs presented were greeted with acceptance. However, the workshop generated participant discussion. Authors noted that they moved away from a PD led approach to a user centred approach as a direct result of limited engagement in the focus group. This was in contrast to the current study where participants were active participants, vocal and engaged. Authors also reported challenges with the approach namely it was time consuming and required additional effort to lead and supervise the group sessions than anticipated. Likewise, the current study involved much organisation and time to liaise with individual participants to find suitable and convenient times and locations and many interested individuals were unable to attend all focus groups (or any at all). This was further complicated due to the disperse geographical hospital locations within the HB. The four key hospital locations included were far apart and participants lived in different communities in south Wales.

#### 4.6.4 Limitations

The PD study had several important limitations which must be considered when reviewing the findings. As noted earlier a PD approach is not thought to cultivate radical change (Beyer & Holtzblatt, 1997) and indeed, the aim was not to generate a radical update to the programme but to incorporate additional



elements identified by users and in line with user need. However, the mere practicalities of undertaking the PD process meant that a restricted number of staff could feasibly be included. And as a result, not all professions within the workforce were represented. Notably no participants were recruited from the following roles: hospital porters or security staff. However, at each stage in the design process participants were asked to consider how others working within their organisation might access the resource, to discuss specific issues they might be aware of arising from different roles within the organisation. Participants were also encouraged to discuss the project and their involvement with it, with their team and line manager and to open a two-way feedback process. This two-way feedback process emerged as a result of some staff needing to obtain management support and time release to attend the focus groups and prototyping sessions. Further to this, multiple stakeholders, at multiple time points were included in the design process. Thus, while this remains a limitation which may reduce the generalisability of findings, earlier releases reported that users were mainly from office-based roles. Future work should widen recruitment approaches and offer more diverse routes for participation to avoid missing key staff groups within the organisation. For example, it could aim to hold role specific focus groups to avoid potential difficulties based on hierarchal organisational roles. Equally additional support from top level organisational representatives may provide increased access and visibility to under-represented staff groups.

This issue of under representation from specific job roles was further exacerbated by an over representation of female participants at each stage in the design process. Equally this may have limited consideration of design, content and features from a male perspective. It is possible that the final design was biased towards female friendly images, designs and content for example, the 'yoga girl' image used on the well-being home page was female and no male icon was included. Likewise, female dominated active relaxation pursuits were likely overrepresented within the psycho-educational 'pop out' relaxation resource. However, the gender split within the study was not dissimilar to the proportions of males and females working within the organisation. For example, the document review revealed that the majority of the HBs workforce were

women. In addition to this data collected in Champions for Health (phase I) also indicated that end-users were mainly females in office-based work environments. This issue has been reported and discussed by others. Kelders, Pots, et al. (2013) noted that their study included highly educated women between the ages of 40-49 years. Equally their earlier study (Kelders et al., 2011) reported similar demographics, as did a study by (Balmford et al., 2008). Thus, while it may be an issue to consider generally, the participants included in the current study represented the end-user population in appropriate proportions.

Potentially the most pertinent limitation of the selected PD approach concerned the highly labour intensive and time-consuming nature of the design process which required both continued organisational and individual commitment for a sustained period of time. Prior work has noted that PD approaches have been difficult to sustain within complex health care contexts where anticipated end-users and stakeholders are busy and cannot commit adequate time to the iterative process of designing (Hirschheim, 1983; Pilemalm & Timpka, 2008). Equally lost time and unmet deadlines are reported as workers take control and guide development (Spinuzzi, 2005). While a range of stakeholders from many professional streams worked well together and participated with active and ongoing interest, some were unable to attend successive focus groups and usability sessions due to busy work schedules, organisational commitments and varying geographical locations and some tasks suffered from small numbers which limited data analysis. The first focus group discussion was also limited to a maximum of two hours while FG2 and FG3 were only able to run for one hour each due to staff work commitments. While the time available was adequate, longer sessions might have facilitated further insight into design and feature requirements. For example, focus group discussions did not include reflections on the registration process and the elements within this important process including the questionnaires and the wording of the feedback displayed to users following questionnaire completion. In hindsight this would have been a useful requirement to consider. Participants input into this important website component may have provided important information and reflection which

could have had a positive impact on website use and engagement beyond initial interest and registration had the feedback been more personalised, directed or focused. Attwood et al. (2020) recently reported a qualitative study which explored healthcare staff and service users' views on well-being questionnaires and their findings indicated that questionnaires focused on a holistic result at an abstract level lacked personal information and failed to support an active and immediate response in user motivation. This was the very response which current participants indicated was desired (self-management and active resource). Equally, focused and specific discussion of how participants would access and use the intervention resources could have been introduced into the design process through the use of future based scenarios (Bødker & Iversen, 2002). Users need to experience the future in order to explore and realise their demands of it "*The practice of the users is the starting point of design*" (p. 12). If this is not achieved artefacts are developed that merely work around existing issues (Bødker & Iversen, 2002). Furthermore, the focus groups did not explore intervention features including structure, duration, gamification elements, audio/visual components, and interactive elements to the extent to which was anticipated at the outset. This was in part due to the restricted time available but also a result of limited experience of web-delivered interventions or gamified tools. Despite the inclusion of computer science experts in stage two, these components were not explored in adequate depth and decisions made were based mainly on the findings of the systematic literature reviews. Thus, available participant time should be considered thoroughly in future projects of this kind or alternatively management support should be secured prior to recruitment to ensure wider reach and longer session duration can be achieved.

In line with the above PD projects are often small scale due to their experimental approach, and it has been suggested that organisational engagement is limited as a result (Clement & Van den Besselaar, 1993). Indeed, this was the case for example, while the project successfully recruited 38 participants this is a small number when compared to the size of the organisation. The impact of this could be seen at various stages in the project development. the FG2 only included four participants, while this is adequate, it is at the small end of recommended

participants. Kitzinger (1995) recommended focus groups include between four and eight participants in order to facilitate group enquiry and communication between participants. The card sort task didn't include an optimum number of users for example, the number of recommended users varies from 15 up to 20-30 (Tullis & Wood, 2005). Equally the high fidelity prototype evaluation was limited by the small sample (nine) and less than desirable weekly survey response rate however the one-to-one interviews conducted afterwards went some way to address this as they provided additional insight into participant experience of the content.

The need for sensitivity within this mental health and well-being context meant that some traditional techniques were not considered for use. For example, role playing was not introduced in the discovery phase due to the potential for this to trigger psychological distress in participants. Role playing is considered a useful technique to explore users' experiences with technologies and similar systems in order to access tacit knowledge which could aid the production of the intervention (Simsarian, 2003; Svanaes & Seland, 2004). The omission of this technique while not critical may have limited the types of tacit knowledge identified and explored. However, focus group discussions, consideration of existing resources and early presentation of designs via rapid prototyping were used instead and these generated rich discussions which supported a co design process.

Another limitation that must be considered in a text-based delivery mode includes the omission of a full assessment of cognitive workload, due to time constraints this was not undertaken. This is desirable as web-based delivery methods often rely on text to convey complex messages. However, the readability of the main website was assessed and considered to be a grade level 9 meaning it should be easily understood by 13 to 15 year olds thus of appropriate reading age for users ages 18 plus (<http://www.readabilityformulas.com/freetests/six-readability-formulas.php>).

Finally, the intervention content was developed alongside the PD process. This limitation is noted by Tollmar (2001) who wrote that PD methods are largely neglected in later design stages. The primary researcher developed the

intervention content based on PD findings, which was then reviewed by two mental health experts as well as being evaluated by PD participants at multiple time points. This decision was made in light of participant time constraints and is not uncommon in the field of mental health where clinicians are consulted separately to ensure materials and content are safe and appropriate for use. For example, (Kelders, Pots, et al., 2013; Lappalainen et al., 2014; Lappalainen et al., 2015; Levin et al., 2016; Levin et al., 2014; Pots et al., 2016) reported implementation of ACT based therapeutic interventions developed by clinicians and relevant experts.

On a broader level critical reviews of PD have been made by anthropologists (e.g. Diana Forsythe). Criticisms have focused on the shallow and superficial use of ethnographic methods of, observation, shadowing and interviewing, to elicit understanding of user's perspectives without qualified, insightful analysis. This means that the use of ethnographic research methods in the context of PD (stage 1) brings with it concerns relating to accurate use of methods and meaningful understanding and interpretation of data collected. However, this concern was addressed through the iterative design process which incorporated repeated data validation efforts and continued efforts to afford reflection on earlier viewpoints and decisions and prior experience (of the primary researcher) using qualitative research methods in a range of healthcare contexts. As such potential limitations arising from the use of these methods may be mitigated.

Equally, PD has been described as challenging (Hirschheim, 1983; Pilemalm & Timpka, 2008). Effective management is critical to realise user requirements and avoid costly delay (Caixeta et al., 2013) and to manage participants ability to work together and share decision making without encountering power and hierarchal issues (Rothmann et al., 2016). In NHS projects patients have had insufficient decision-making power (Bowen et al., 2013) despite an emphasis on patient and public involvement in service design and delivery (NICE, 2012). This lack of decision making power, and inadequate power is reported elsewhere. For example, for residents engaged in urban planning project in Finland, 'OurCity' failed to realise any democratic benefits (Salgado & Galanakis, 2014). Authors concluded that the failure resulted in part from the relative invisibility of PD. The picture is complicated further by increased

complexities associated with the inclusion of multiple stakeholder involvement, often with complex health needs (Doherty et al., 2010). Pilemalm and Timpka (2008) reported high turnover of users, time consuming group procedures which resulted in time available being wasted, and significant administration tasks which limited time for designing during a large scale, two-year health informatics project. While (Rothmann et al., 2016) reported difficulties arising from unshared language and terminology use across different professional contexts. The application of PD in dementia care settings has also identified several challenges; limited focus of participants in long workshops, difficulty articulating requirements, unattended requirements and designing for nonspecific tasks (traditionally tasks are based in workflows and organisational settings rather than general day to day context) which must be considered (Lindsay, Brittain, et al., 2012). However the involvement of healthcare professionals and patients, early in the design process, has highlighted key user information, identified healthcare values and facilitated an understanding of service delivery including the way in which healthcare is accessed, utilised and navigated from a range of user perspectives i.e. patients, workers, organisations (Lindgaard & Dudek, 2002) and has shown that user requirements can be well considered (Bowen et al., 2013; Orłowski et al., 2015; Steen et al., 2011). Thus, in summary although a variety of limitations are acknowledged PD ultimately aims to empower individuals through design. This guiding principle and the values behind the approach were critical to the current study and were embedded throughout the design process.

#### 4.6.5 Conclusion

This study brings together strands of public health, psychology and medicine with computer science to develop an emotional well-being intervention using PD.

It makes two key contributions. Firstly, it offers insights for future practice through the presentation of empirical data reported from a range of stakeholders. The focus on user led features thought to enhance and promote use and engagement with the well-being intervention and health behaviour change programme overall is of particular interest. Secondly it contributes to the

developing body of knowledge regarding the utility of this approach within the context of health and well-being.

Overall, the study objectives were met. The design process successfully facilitated exploration of anticipated end user's workplace context, access and availability of existing resources, and existing workflows, it generated an in-depth understanding of well-being within the workplace and identified potential barriers to access. Participants were able to select the therapeutic choice through collaborative discussion and consideration of shared knowledge, understanding and need. Rapid prototyping and a range of PD tools led to an iterative design cycle which specified style, logo and layout requirements and identified intervention features, including structure, duration and interactive components. The three staged process also ensured participants had the opportunity to explore and articulate criteria relevant to their roles over time and to reflect on decisions made at each stage.

## Chapter 5: Feasibility study

---

This chapter explores the term feasibility study and provides a brief justification for use in this context, following this the cluster randomised control feasibility study which was undertaken in 2019 is outlined including a description of the study website and well-being intervention developed. The chapter concludes with a discussion of the study findings.

### 5.1 Randomised Feasibility Studies

*“Feasibility Studies are pieces of research done before a main study. They are used to estimate important parameters that are needed to design the main study”*

(Arain et al., 2010, p. 4)

Feasibility studies are valuable (Arain et al., 2010). They can increase the likelihood of success of the (anticipated) full-scale trial. Through a thorough examination of critical elements of the trial design i.e. recruitment, including the willingness of clinicians or relevant others to recruit participants and the number of eligible participants; the randomisation procedure, including the willingness of participants to be randomised and an indication of engagement and adherence. It is important to note that feasibility studies do not always culminate in a full-scale trial and as a result are considered high risk (Arain et al., 2010). Interestingly feasibility studies for RCTs do not necessarily need to employ a randomisation procedure (Arain et al., 2010). Nor do they seek to evaluate the outcome measure of interest, in light of the smaller sample sizes employed (Arain et al., 2010).

Lancaster et al. (2004) provided seven evidence-based recommendations and good practice guidelines pertaining to randomised controlled feasibility trials. Their recommendations were (1) to test the integrity of the study protocol for the future trial, (2) to gain initial estimates for sample size calculation, (3) to test data collection forms or questionnaires, (4) to test the randomisation



procedure, (5) to estimate rates of recruitment and consent, (6) to determine the acceptability of the intervention, (7) to select the most appropriate primary outcome measure(s).

In 2010 Arain et al., updated the review by Lancaster et al. (2004) identifying 54 studies of which almost half (52%) were feasibility studies (the remainder were pilot studies); the majority randomised participants (62%); and included a control arm (69%). Only eight lead to a full-scale trial. Their review of current practice and editorial policy pertaining to feasibility and pilot studies suggested that feasibility and pilot studies have been poorly reported in the literature and that confusion between the two often interchangeable terms had arisen. Equally guidance published by the Medical Research Council (MRC) states that pilot and feasibility studies include interchangeable concepts (Craig et al., 2008; Lancaster, 2015). While Thabane et al. (2010) identified that many feasibility and pilot studies included hypothesis testing which was not supported by the use of small sample sizes and therefore should not feature in this trial design.

Pilot studies are generally smaller versions of a full-scale study while feasibility studies aim to evaluate components of the design and approach being used (Tickle-Degnen, 2013). Thus, to avoid confusion the current study followed the Consolidated Standards of Reporting Trials (CONSORT) statement, extension guidance for randomised pilot and feasibility studies including cluster trial designs (Eldridge et al., 2016). This document does not distinguish between the term ‘pilot’ or ‘feasibility’. Although the terms are explained with subtle differences. For example, “*a feasibility study for a future definitive RCT asks whether the future trial can be done, should be done, and, if so, how*” (Eldridge et al., 2016, p. 2) while a pilot study is considered a sub-set of a feasibility study which operates the intended RCT on a smaller scale without or without randomisation. However, despite these subtle differences, the intention of both remains the assessment of feasibility “*...primarily aim to assess feasibility*” (Eldridge et al., 2016, p. 3).

The original CONSORT statement (published 1996, updated 2001; 2010) aimed to provide guidance which improved the transparency and quality of

reporting of RCTs. Equally the extension guidance aimed to improve the reporting of pilot trials through the application of a 26-item check list, separate abstract checklist, and a CONSORT flow diagram template (Eldridge et al., 2016). These documents were used to report the current feasibility study.

## **5.2 Champions for Health: A Randomised Cluster Feasibility Study**

### **5.2.1 Aim**

This feasibility study aimed to explore acceptance and feasibility of including an emotional well-being intervention, based on ACT, within a web-delivered, workplace, lifestyle behaviour change programme, in a population of Welsh public sector staff.

### **5.2.2 Objectives**

The study objectives were:

1. To determine whether the randomisation procedure was feasible. (i.e. is the system capable of randomising participants to either control or intervention groups based on self-reported location?)
2. To determine whether the recruitment strategy was feasible (i.e. will adequate numbers of staff register to use the study website?)
3. To determine whether the inclusion of an emotional well-being intervention, based on ACT, within a web-based lifestyle behaviour change programme, was acceptable (i.e. will participants consent and register to use the study website knowing that an emotional well-being intervention was included? Will participants, with access, enrol onto the intervention?)
4. To explore whether the well-being intervention had the potential to encourage a positive impact on adherence and engagement to the wider programme (i.e. do intervention group participants engage with Champions for Health programme more than control group participants?)
5. To explore the usefulness of two additional intervention components (i.e. do the additional intervention features influence adherence and engagement to the intervention module?)

## 5.3 Methods

### 5.3.1 Study protocol

The study protocol was registered with the International Standard Randomised Controlled Trial Number (ISRCTN) registry (01.02.2017). Trial registration: ISRCTN50074817.

### 5.3.2 Ethical approval

The study received ethical approval from the College of the Human and Health Sciences Research Ethics Committee (11.01.2017) and Research & Development approval from ABMU HB Joint Study Review Committee (JSRC) 2017 as a service evaluation.

Research & Development approval from ABMU HB Joint Study Review Committee (JSRC) was re-confirmed (20.11.2018). Further to this, following a change to the trial design from a two-armed, to four-armed trial, an amendment was granted from Swansea University Medical School, Research Ethics Committee (21.02.2019 #09012017).

### 5.3.3 Trial design

A four-armed, cluster, randomised, controlled feasibility trial with email reminder.

### 5.3.4 Trial arms

Four trial arms were included, each with different interventions components available (Table 5.1).

**Table 5.1 Trial arms and modules available to participants per trial arm**

<b>Trial arm</b>	<b>Name</b>	<b>Champions for Health programme modules</b>	<b>Core Intervention components</b>	<b>Additional Intervention components</b>
<b>Control</b>	Champions for Health	Quit smoking, Alcohol reduction, Weight optimisation, Regular exercise, Eat healthily		
<b>Intervention 1</b>	Champions plus ACT	Quit smoking, Alcohol reduction, Weight	ACT, Sleep,	

		optimisation, Regular exercise, Eat healthily	Relaxation, Green Space	
<b>Intervention 2</b>	Champions plus ACT & PocketMed ic	Quit smoking, Alcohol reduction, Weight optimisation, Regular exercise, Eat healthily	ACT, Sleep, Relaxation, Green Space	PocketMedic well-being films (Fig 5.3)
<b>Intervention 3</b>	Champions plus ACT & social norm message	Quit smoking, Alcohol reduction, Weight optimisation, Regular exercise, Eat healthily	ACT, Sleep, Relaxation, Green Space	Static social norm message (Table 5.2 & Fig 5.4)

### 5.3.5 Participants

Any staff employed by ABMU HB.

### 5.3.6 Eligibility

Inclusion criteria were:

1. A member of staff at the selected health board, at the time of the study
2. Aged 18 plus
3. Access to an internet enabled device
4. Ability to read English
5. Ability to provide informed consent

### 5.3.7 Clusters

Four clusters were created based on key hospital and community sites within ABMU HB (chapter 4). Three clusters were randomised to an intervention arm. Use of this trial design is common in health care contexts where cluster trials are an important methodology used to compare different ways of encouraging health behaviour change (Eldridge et al., 2009; Osrin et al., 2009).

This design was selected for pragmatic reasons. The reasons were three-fold: (1) Focus group discussions identified that participants who had taken part in earlier releases of the website had discussed its content with colleagues. As such it became evident that should allocation occur at individual level,

participants may discuss and share the content of the intervention with those not allocated to that trial arm. This approach is reported elsewhere (Peri et al., 2008). (2) The clusters are natural groups of people, determined by their place of employment. Outcomes within naturally occurring clusters may tend to be more correlated than those across clusters; this is because individuals within a health board may have similar practices, arising from organisational culture and shared environment or demographic features which might influence the outcome (Osrin et al., 2009). (3) Allocation by site location may support recruitment. Undertaking randomisation post consent and baseline would introduce significant delay which might have a negative effect on enrolment and engagement. This design was discussed with a statistician (OB).

#### 5.3.8 Randomisation

A computer program was written in Python by the programmer (DS). The code randomly allocated the four clusters to a trial arm using a built-in randomisation function which was designed to select a cluster and condition at random, print them out as a pair and then remove them both from the list to ensure that four unique sets were created, without repetition. The results of this were imported into the website. For example, if the code determined cluster 1 (site A) was to receive the control condition the programmer organised the website to display the control condition when the user identified their location as site A. This was repeated for each condition i.e. site B was pre-programmed to display intervention 1, site C intervention 2 and site D intervention 3.

Code:

```
hospital = ['Singleton', 'Morrison', 'Princess of Wales', 'Neath Port Talbot']  
condition = ['Control', 'Well-being ', 'Well-being + Videos', 'Well-being +  
Social']  
while len(hospital)>0 and len(condition)>0:  
    h = random.choice(hospital)  
    c = random.choice(condition)  
    print h + "=" + c  
    hospital.remove(h)
```

condition.remove(c)

### 5.3.9 Allocation concealment

Only the programmer had access to participant allocation. The primary researcher remained blinded to cluster allocation throughout the trial phase. Allocation was only revealed after post intervention outcome measures were extracted from the website. This ensured that recruitment across the different hospital sites remained unbiased and was undertaken in equal measure.

Participants were blinded to trial arm allocation during the consent and registration process to the study website. Following completion of this step, participants were able to navigate to their personal user dashboard where, they were able to identify whether they had been randomised to the control or an intervention arm. This information was displayed via access to the enrol function i.e. those randomised to an intervention arm were able to see the well-being intervention on their home page and they were able to enrol onto the module. Thus, participants were not blinded to trial arm allocation after this point.

### 5.3.10 Recruitment

Recruitment was undertaken between 01.28.2019 and 07.02.2019, during which the four key hospital sites were each visited twice for a minimum of three hours per visit. At each site the participant information sheet and advertisement were handed out to staff who approached the recruitment table. The recruitment table offered free portions of fruit, chocolate, a variety of health promotion flyers and distress balls (Fig. 5.1). A Swansea University banner was displayed, and the primary researcher wore a Swansea University ID badge. During these face-to-face recruitment sessions, ABMU staff were free to ask questions and to take a study flyer for further information. Staff were also encouraged to display the study flyer in their own offices or workspace to increase visibility.

## Figure 5.1 Recruitment



During recruitment the following activities were undertaken; Electronic invitation (appendix 7) and study flyer (appendix 8) were displayed on the HB intranet (28.01.2019), electronic and physical notice boards across each of the four key sites and in several community GP practices located in Swansea. An interactive oral presentation was made at four site locations during a voluntary induction training session to the health boards ‘Well-being Champions’ scheme. The presentations were organised via ‘Employee well-being’ ABMU HB. Staff who took part in the PD phase were also emailed a personal invitation to take part. Previous ‘Champions for Health’ participants were also emailed an electronic invitation and study flyer (via PHW).

#### 5.3.11 Procedure

Interested staff were required to visit the study website (Fig. 5.2) to consent to take part. Consent (Fig. 5.3) was provided electronically using a tick box process prior to completing the online registration form (appendix 9) which asked for; username, password, gender, age, location, self-rated health, self-rated work performance, sickness leave in past six months, quantity of one week absences in the past thirty days and completion of the two self-assessed primary outcome measures. During registration participants could ‘opt-in’ to receive a weekly email reminder, which included the website link, motivational suggestion, stated the challenge week and included contact details in the electronic sign off.

Figure 5.2 Study website (home page)

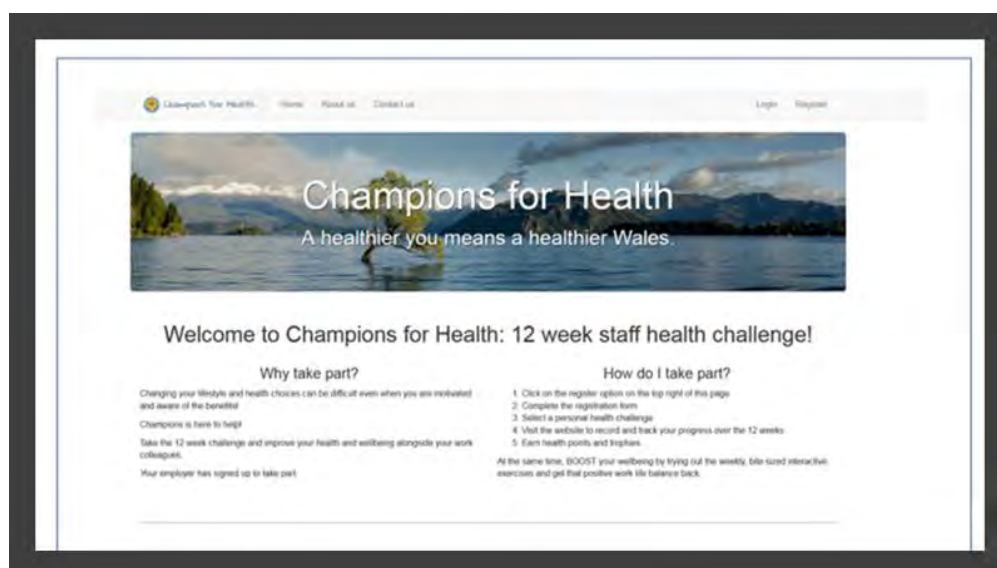
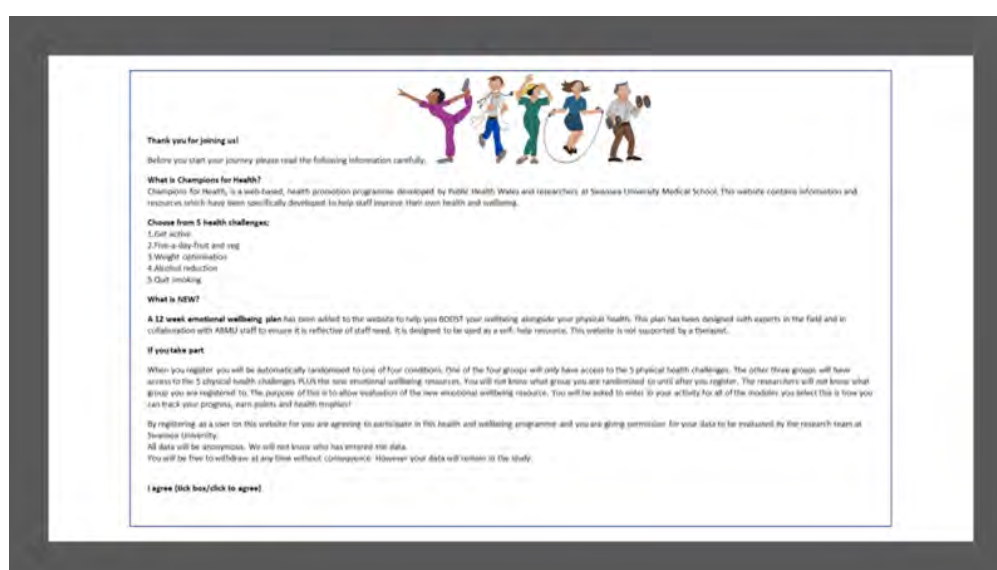


Figure 5.3 Consent form

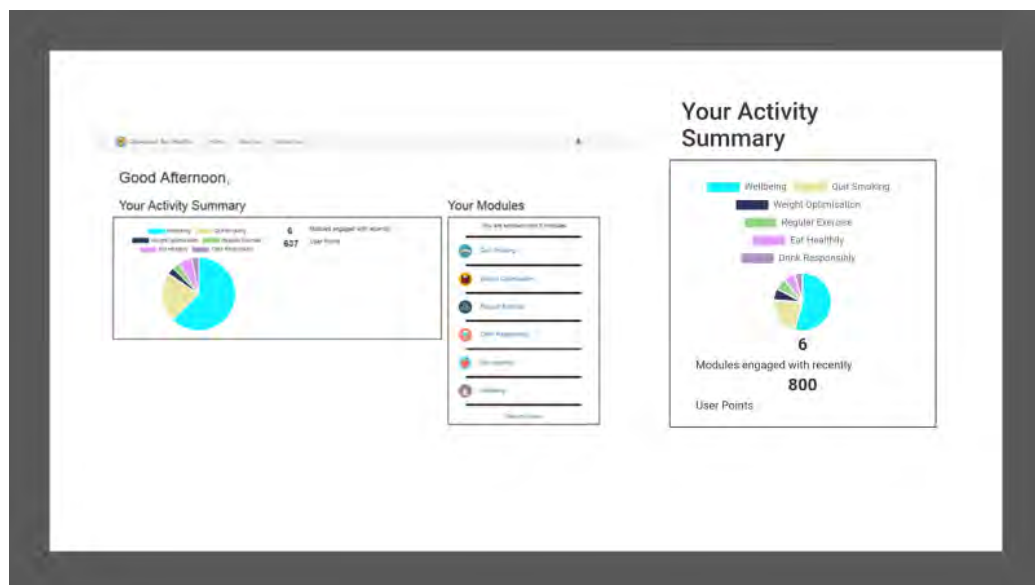


Once registered, participants were able to access the website freely by logging into their account. At this point participants found out if they had access to the well-being intervention or not. Participants were then able to enrol onto the ‘Champions for Health’ modules. The modules were accessed via the home page and also via the drop-down menu at the top of the screen after log in. once enrolled the module automatically displayed in the user dashboard (Fig. 5.4). The dashboard also displayed health points and trophies earned through

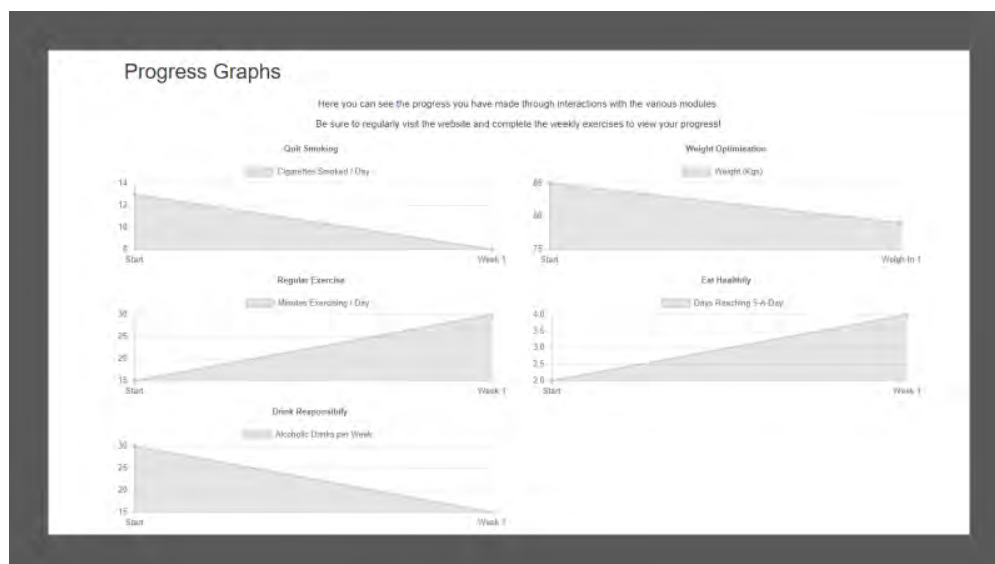


website engagement. Participants were encouraged to access the website weekly to use the ‘track your progress’ function included in all five Champions for Health modules. Data entered via this function were automatically displayed to the user via a series of colourful feedback graphs (Fig. 5.5). One graph was generated per challenge and each graph displayed progress over the successive weeks i.e. if users recorded data for week one, two, three and four this would be shown in the same graph. An activity wheel also displayed recent activity.

**Figure 5.4 User dashboard**



**Figure 5.5 Graphs displayed in user dashboard**



Once a week, participants who had ‘opted in’ received an email reminder. The reminder prompted them to log in and ‘track your progress’. The email reminder was semi-automated, a list of participants who had opted in was retrieved weekly from the website, email addresses were extracted and added to a pre-planned schedule of emails in outlook which were then automatically sent at a pre-specified time and date.

In week 12 participants were reminded, via the home page and weekly email, to log in and navigate to a new feedback module (added at this point to the home page) to complete the outcome measures (post intervention) and structured feedback form. No enrolment was required for this module. Participants could indicate their consent (via a tick box) to be contacted to take part in a focus group discussion to explore their experiences of using the Champions for Health website and staff challenge in further depth with other members of staff who took part. Three email reminders were sent.

### 5.3.12 Outcome measures

#### 5.3.12.1 Warwick-Edinburgh Mental Well-being scale

The 14-item WEMWBS is a validated measure of mental well-being in the general population, responsive to change at both individual and group level (Maheswaran et al., 2012; Spijkerman et al., 2014; Tennant et al., 2007). The tool has been used at national, regional and local level in the UK, for example, in the HSE (2016) and in the APS since April 2011. The validated measure enables researchers to establish where a specific population falls, in relation to

published national population averages, following use of interventions of two-week (or longer) duration (Tennant et al., 2007).

The five point Likert scale measure (which asks for responses between ‘none of the time’ and ‘all of the time’) included questions relating to both eudaimonic (i.e. positive functioning) and hedonic (i.e. life satisfaction) perspectives of subjective well-being (Tennant et al., 2007) and only positively worded items are used. The questions cover psychological functioning, cognitive evaluation and emotional aspects of subjective well-being.

Classification of the WEMWBS is presented as a mean, median or 10th and 90th centile. A score of 43.5 or below is considered a screening threshold for depression (Maheswaran et al., 2012). Estimated ‘meaningful’ change ranges from three to eight WEMWBS points difference between ‘before’ and ‘after’. National means are available for comparison at group level. For example, the HSE 2016 well-being and mental health data reported the following mean scores for men and women respectively, 50.1 and 49.6 (Morris et al., 2017).

The WEMWBS has been used to assess well-being in web-based mental health interventions. For example, Lokman et al. (2017) used the WEMWBS to evaluate well-being following use of a web-based complaint-directed mini-interventions in an adult population in the Netherlands. Powell et al. (2013) reported its use as a primary outcome measure in a large scale RCT study which examined the effectiveness of a 12-week, web-based cognitive behavioural intervention ‘Moodgym’ designed to improve well-being. Corno et al. (2018) employed the WEMWBS to examine women’s prenatal well-being following use of a positive psychology web-based intervention. Galante et al. (2018) reported use as a secondary outcome in an eight-week mindfulness course adapted for Australian university students ‘Mindfulness Skills for Students’. Smail et al. (2017) conducted a mixed-methods, web-based CBT program for individuals with debt and associated stress. They reported positive clinical outcomes. Freeman et al. (2017) employed the WEMWBS in a large study assessing student insomnia, treated with digital CBT across 26 UK universities. Two studies examined effects of a web-based

positive psychology intervention ‘Bite Back’ on well-being in young persons in Australia; Burckhardt et al. (2015) used the long version and Manicavasagar et al. (2014) used the short form, a 7-item version (SWEMWBS) to examine changes in well-being. Prasek (2015) utilised it to determine the effectiveness of a self-guided, web-based mindfulness program ‘Sherman Project’ to reduce perceived stress and improve well-being amongst America university students, staff, and faculty. While four studies reported their intention to use the WEMWBS in RCTs. Sin et al. (2020) reported intention to measure mental well-being using the WEMWBS as the primary outcome measure in a prospective study designed to assess a multi-component digital intervention ‘COPE-support’ for family carers, for people affected by psychosis. Piqueras et al. (2017) included the WEMWBS as a primary outcome in their intended web-based study ‘DetectaWeb Project’ to assess the mental health continuum for children and adolescents. Clarke et al. (2015) reported intention to use the WEMWBS to examine the effectiveness of a fully automated mobile phone and the internet ‘myCompass’ CBT intervention to reduce mental health symptoms, diabetes-related distress, and to improve well-being in young patients with type 1 diabetes and Yuan et al. (2014) described their intention to use WEMWBS to measure changes in well-being pre and post a web-based psychology capital intervention ‘Happy@work’ among an Asian workplace population.

#### 6.3.12.2 The four item Patient Health Questionnaire

The four item Patient Health Questionnaire (PHQ-4) is an ultra-brief self-report questionnaire (Löwe et al., 2010). The items are drawn from the longer PHQ-8 and the GAD-7 questionnaires and are appropriate for use in those aged 18 and above. First use was reported in 2009 (Kroenke et al., 2009). The benefit of the four-item version is the reduction in time required to complete the questionnaire, particularly when used in combination with additional outcome measures within occupational settings (Stanhope, 2016).

Respondents answer four questions which ask how often, over the last two weeks have you been bothered by each problem; Feeling nervous, Anxious or on edge, Not being able to stop or control worrying, Feeling down, depressed or hopeless, and Little interest or pleasure in doing things. Respondents are

asked to indicate how often they experience each problem on a four-point scale; 'not at all', 'several days', 'more than half the days' to 'nearly every day'. Scores range from zero 'not at all' to three 'nearly every day'. Total score is determined by adding together the scores of each of the four items. Scores are rated as normal (0-2), mild (3-5), moderate (6-8), and severe (9-12). Total score more than three for first two questions suggests anxiety and a total score more than three for last two questions suggests depression (Kroenke et al., 2009). Total scores between six and eight are considered 'yellow flags' and scores nine and above 'red flags' in a general population and the death rate is reported per score category with higher score being associated with higher incidence of death (Löwe et al., 2010). The internal consistency is considered excellent (cronbachs alpha 0.78) and an adequate construct validity correlations with the Rosenberg self- esteem scale, Questionnaire on life satisfaction and resilience scale are reported to be;  $r=-0.49$ — $0.40$ ,  $r=0.39$  to  $-0.39$  and  $r=0.35$  to  $0.28$ , respectively (Löwe et al., 2010).

This measure has been validated and is considered a reliable screener for anxiety and depression in the general population (Kroenke et al., 2009; Löwe et al., 2010). A computerised version has also been validated (Cano-Vindel et al., 2018).

The measure has been used in several web-based mental health interventions. For example, Aardoom et al. (2016) evaluated an automated web-based self-help intervention to support individuals with eating disorders. PHQ-4 was included as the secondary outcome measure. Heffner and Mull (2017) measured psychological distress using the PHQ-4 in a study which examined the associations of smartphone ownership and smoking behaviour in American adult smokers. While Jordan et al. (2016) examined the relationship between stress, coping, and the combined influences of perceived stress and coping abilities on health and work performance in American nurses using PHQ-4. Wörfel et al. (2016) explored mental health problems and determined the prevalence of depression among German university students. Anxiety and depressive disorders were assessed using the PHQ-4. Likewise, Szabó et al. (2015) used the PHQ-4 to examine mental health in Hungarian patients with eating disorders and Eaton et al. (2014) reported its use in an American study

describing the development and implementation of a telehealth-enhanced intervention for chronic pain and symptom management. Cavanagh et al. (2013) reported its use in a RCT which compared a brief online MBI with a WLC in a UK student population. The PHQ-4 has been used in web-based surveys for example, Hefner and Eisenberg (2009) successfully assessed anxiety and depression of American college students. Others have reported their intention to use the outcome measure for example, a study protocol outlined a RCT comparing internet-based compassionate mind training with CBT to improve depression in perinatal women (Kelman et al., 2016).

#### 6.3.12.3 Process measure: Acceptance and Action Questionnaire—Revised

The seven item AAQ-II is a validated, one-factor measure of psychological inflexibility (Bond et al., 2011; Fledderus et al., 2012) Psychological flexibility refers to “*the ability to fully contact the present moment in order to engage behavioural patterns supporting movement towards valued end*” (Bennett & Oliver, 2019, p. 57). Acceptance is an example of psychological flexibility and experiential avoidance is an example of inflexibility (Bond et al., 2011).

The AAQ-II was not designed as a tool to diagnose mental disorders, instead it was “*designed to assess a specific model of psychopathology that emphasizes psychological inflexibility*” (Bond et al., 2011, p. 22). Bond et al. (2011) reported the mean alpha coefficient across six studies (n=2,816, UK participants), .84 (.78 - .88), and the 3- and 12-month test-retest reliability, .81 and .79, respectively and concluded that results indicated sound factor structure and good reliability. Higher levels of psychological inflexibility were found to indicate greater psychological distress one year later thus highlighting the AAQ-II’s usefulness. Equally Fledderus et al. (2012) established its reliability and validity in a study of (n=376) adults with mild to moderate depression. When using the tool, higher scores (range 7-49) indicate greater levels of psychological inflexibility and lower scores indicate greater levels of psychological flexibility (Bond et al., 2011). Cut-off points are not published. However, authors have suggested scores between 24-28 indicate depression or anxiety. This is based on their findings that, scores in the range of 24-28 or above were associated with General health questionnaire (GHQ-12), beck

depression inventory (BDI-II), and Global Severity Index (GSI) values that indicate psychological distress (Bond et al., 2011). While examination of the AAQ-II in a sample of Malay cancer patients, suggested (a score of) 17.5 and above indicated significant psychological inflexibility (Shari et al., 2019).

The AAQ-II was developed to establish an internally consistent measure of ACT's model of mental health and behavioural effectiveness (Bond et al., 2011). The AAQ-II replaced the original AAQ-I scale (Hayes, 2004) following reported problematic psychometric consistency. The AAQ-II is widely used (Hayes, 2019; Valencia, 2019). Equally it has been validated for use in several languages including Malaysian (Shari et al., 2019), Spanish (Ruiz et al., 2016) and Portuguese (Pinto-Gouveia et al., 2012). However, some have suggested that the questionnaire measures psychological distress rather than the positive element, acceptance (Tyndall et al., 2019; Wolgast, 2014). For example, a confirmatory factor analyses (n=524) indicated that "*items from the AAQ-II correlated more highly with measures of depression, anxiety, and stress than the Brief Experiential Avoidance Questionnaire*" (Tyndall et al., 2019, p. 278). Despite these criticisms the AAQ-II has been widely used in web-based mental health interventions employing ACT. For example, Pots et al. (2016) conducted a RCT of adults (Netherlands general population), to examine a web-based, ACT intervention for depressive symptoms using AAQ-II to measure participants' willingness and acceptance of unwanted internal events. Likewise, Levin et al. (2016) used the AAQ-II in a RCT exploring a web-based ACT intervention designed to support mental health in a sample of (n=79) students. They also utilised the AAQ-II in an earlier feasibility study; (Levin et al., 2014) in a sample of (n=76) first-year undergraduate students. Equally, Lappalainen et al. (2015) investigated the outcomes of a web-based ACT intervention without face-to-face contact for people (n=39) suffering from depressive symptoms and included AAQ-II as a key outcome measure. Ly et al. (2012) reported a qualitative study which examined the use of ACT to deliver mental health support via a smart phone application. Psychological flexibility was assessed pre and post intervention using AAQ-II. While Köhle et al. (2015) reported their intentions to use the AAQ-II in a RCT exploring the

effects of a web-based self-help ACT intervention for partners of cancer patients.

### 6.3.13 Sample size considerations

Feasibility trial designs do not commonly employ formal power calculations (Thabane et al., 2010). As such the study aimed to recruit approximately 100 participants, 25 in each trial arm to allow comparison across groups and to explore the study objectives.

This decision was informed by findings from similar, published feasibility studies. For example, Levin et al. (2014) included 76 participants in a feasibility study which explored the use of a web-based ACT intervention. Likewise, (Lobban et al., 2017) included 96 participants in a feasibility study of a web-based enhanced relapse prevention intervention ‘ERPonline’ and Woodford et al. (2018) reported their intention to recruit 50 participants to an internet-administered, guided, CBT-based, self-help intervention ‘ENGAGE’ for parents of children previously treated for cancer. Saleh et al. (2017) recruited 17 participants to a web-based stress management feasibility study. Similarly Guarino et al. (2016) recruited 17 methadone maintenance clients to a feasibility study examining efficacy of a mobile phone based intervention. While Stjernswärd and Hansson (2017) recruited 97 participants to a feasibility study which explored a web-based mindfulness intervention for families living with mental illness and Haga et al. (2013) recruited 103 participants to a web-based feasibility study designed to reduce Postpartum Depression risk and enhance subjective well-being. However, others have reported higher participation rates for example, Folk et al. (2020) included 153 caregivers of justice-involved youths in their evaluation of a digital health intervention which utilised social media recruitment strategy.

## 5.4 The Study Website

The website was developed over a sustained period of time and a number of people contributed to its development (chapter 4). The study website was located at <http://champions-for-health.swansea.ac.uk> and was hosted on



Swansea University servers. The study website had nine components. Each component is described in turn.

#### 5.4.1 Study information

Study information refers to all information presented to users via the study website. Study information was displayed on three separate web pages which were externally accessible i.e. any user could access them without the requirement to register.

##### 5.4.1.1 Home page

The ‘Home page’ was titled ‘Champions for Health’ and it included a banner image, a brief description of the programme and six logos which represented the six modules available to registered users (Figure 5.6).

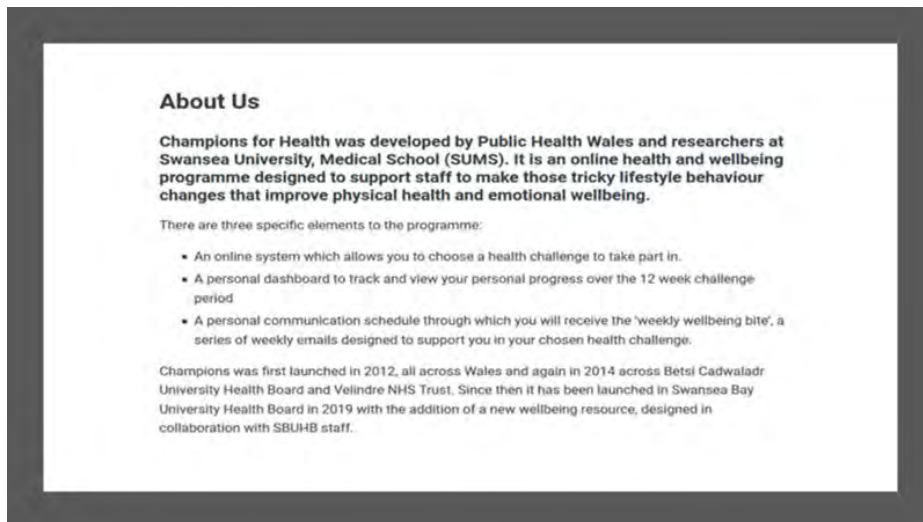
**Figure 5.6 Home page, module view**



##### 6.4.1.2 About us

The ‘About us’ page provided background information pertaining to the development of the programme, acknowledged contributors and provided links to their personal webpages (Fig. 5.7).

**Figure 5.7 About Us**



### 6.4.1.3 Contact Us

The 'Contact Us' page provided a brief description of the principle investigator and first supervisor including an image of both persons and contact details for the principle researcher (Fig. 5.8).

**Figure 5.8 Contact Us**



### 5.4.2 Consent and registration

This process began with the consent form, prior to accessing the registration form and study outcome measures and concluded with a welcome message.

### 5.4.3 Personal profile

The profile page was accessible after registration. This page provided a summary of participant data, populated from the registration form. Participants could edit several fields including age bracket, email, opt in/out for weekly email reminder. This page also displayed WEMWBS and PHQ-4 scores. A feedback message was displayed to guide users towards an appropriate well-being resource, based on their individual score. Three different messages were presented (Table 5.2).

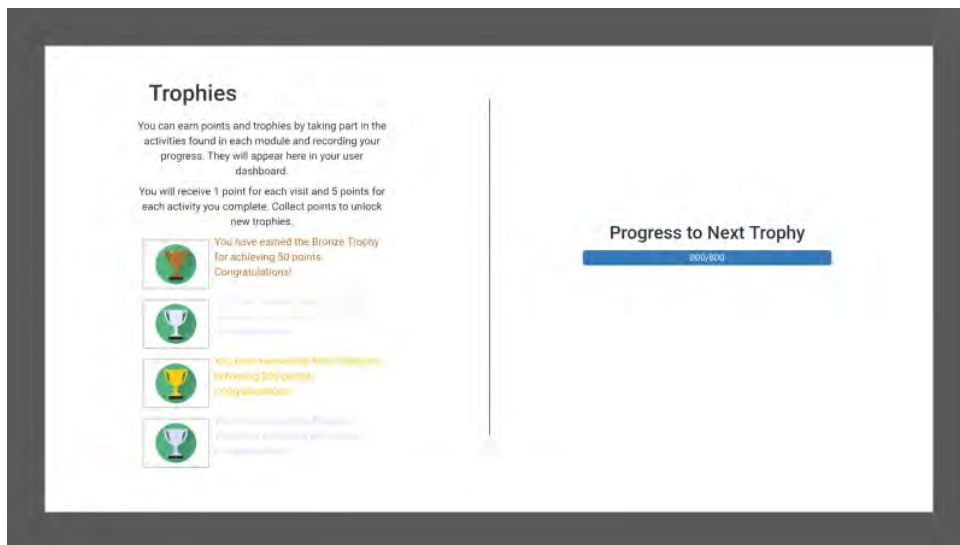
**Table 5.2 Profile messages**

Messages displayed	Threshold for message	
	WEMWBS	PHQ-4
No cause for concern	49 +	0-2
Slight cause for concern, we suggest you try the ACT module	44 - 48	3-5
Cause for concern, we suggest you contact your GP as well as using the ACT module	43.5	6-12

### 5.4.4 User dashboard

The user dashboard displayed all enrolled modules, an activity summary, health points and trophies earned, a progress bar which indicated progress towards next trophy (Fig. 5.9) and feedback graphs (Fig. 5.10).

**Figure 5.9 Trophies displayed in user dashboard**



**Figure 5.10 Feedback displayed in user dashboard**



#### 5.4.5 Gamification features

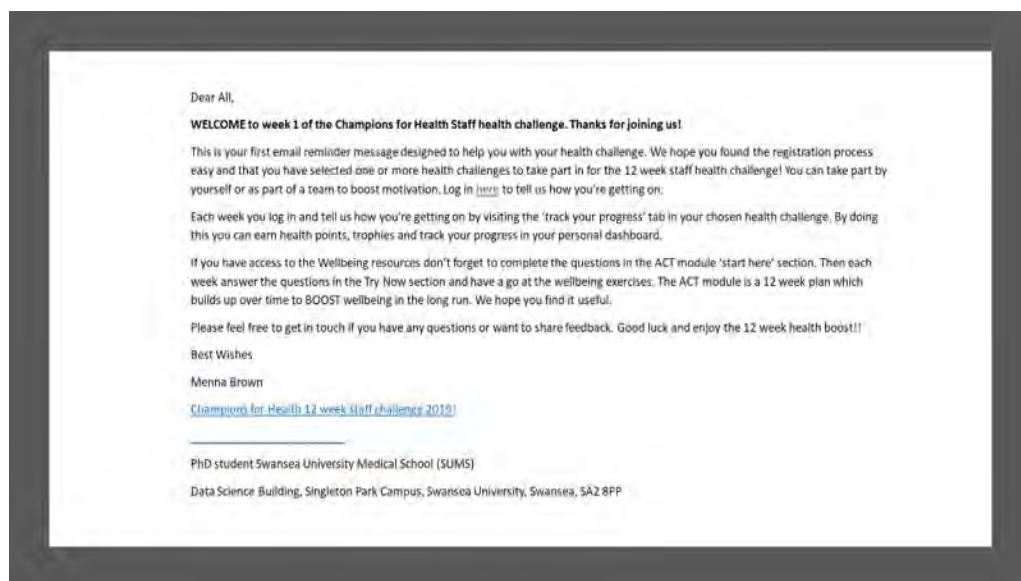
Two gamification features were incorporated into the programme to support sustained engagement. The two features ‘rewards’ and ‘feedback’ were displayed in the user dashboard. Rewards were operationalised as health points (Fig. 5.14) and displayed as numerical points earned via website engagement. One point was rewarded for each log-in and five points awarded each time ‘track your progress’ function was used. Health points were then converted into trophies at pre-determined thresholds. Feedback was operationalised using graphs which displayed progress over successive weeks (Fig. 5.15).

These two gamification features were selected based on the following reasons (1) rewards i.e. health points and trophies were used in the 2012 Champions for Health campaign administered by PHW (2) the PD process indicated that staff who had used the earlier release of the programme has enjoyed the rewards features and found them motivating (3) the systematic review (chapter 3) identified that these features were associated with positive adherence and that they had been previously used in web-delivered mental health interventions.

#### 5.4.6 Communications schedule

The weekly email included a motivational suggestion and the link to access the study website. Users had the option to reply to the weekly email (Table 5.3). Each email reminder was displayed as follows (Fig 5.11).

**Figure 5.11 Format of reminder email**



**Table 5.3 Weekly motivational suggestion**

Week	Motivational suggestion
2	You'll be surprised how small changes can add up to big results 'Success is the sum of small efforts, repeated day in and day out' (Robert Collier) Keep going!
3	Many people find working with a 'buddy' helpful in achieving their Champions for Health goals - is there someone you could join up with to encourage each other?
4	New year seems a very long time ago and those healthy resolutions may have faded. Writing them down and talking about them might help boost your motivation?
5	A handy tip - Don't forget to let your friends, family and colleagues know that you're taking part - why not ask them to help you stick to your challenges? This can help motivate you to make those changes you want to make.
6	Some people love to record their C4H weekly progress, others hate it! Whichever you are, try to keep a record of how you're doing - it can be a great incentive. Your personal dashboard can be a great way to track and monitor changes and progress.
7	Strategically-placed Post-It notes can be a great way to remind ourselves to stick to our C4H challenges. What would you write on yours?
8	How is your personal health challenges going? Have you seen the Change4Life website? It has plenty of ideas to help you with your own health challenge.
9	<p>Did you know, April is <a href="#">stress awareness</a> month! And on April 5<sup>th</sup> (Friday this week) its <a href="#">national walk to work day</a>. Physical exercise is known to reduce stress and being outside in the natural environment has restorative effects. Can you give it a go this April 5<sup>th</sup>? Perhaps you can walk some of your way to work if not all? Let us know how you get on.</p> <p>Listen in this this Mental health in the workplace <a href="#">podcast</a> for additional top tips on promoting positive mental health.</p>
10	Take a moment to remind yourself of the reason why you signed up for the Champions for Health staff challenge 2019. Has the challenge helped? Please feel free to get in touch and let us know how you're getting along, you can reply to this email.
11	Don't worry if you've had a bad week in your C4H challenge. As Henry Ward Beecher said 'Men's best successes come after their disappointments'. Keep going.
12	Last final push this week! the 12 week challenge ends this Friday. That's 12 whole weeks of being kind to yourself ☺

#### 5.4.7 Champions for Health lifestyle behaviour change modules

The ‘Champions for Health’ programme developed by PHW included five lifestyle behaviour change modules; Quit smoking, Alcohol reduction, Weight optimisation, Regular exercise, and Eat healthily. The modules were based on four health behaviour change theories; The HBM (Becker, 1974), The Theory of planned behaviour (Ajzen & Fishbein, 1970), Plan, Do, Study, Act (PDSA) (Coury et al., 2017) and the Self-Regulatory Model (Leventhal et al., 1997).

Users accessed each module via the home page or drop-down menu in the top right-hand side of the main menu bar once logged in. Users enrolled by clicking on the module logo, reading the brief summary description and answering the enrol questions (Table 5.4). Following enrolment, the module appeared in the users’ dashboard and users could access the module content freely from here (Fig. 5.9).

**Table 5.4 Enrolment questions per module**

<b>Module</b>	<b>Enrolment question 1</b>	<b>Enrolment question 2</b>
<b>Quit Smoking</b>	Do you smoke? y/n	How many cigarettes do you smoke per week?
<b>Alcohol Reduction</b>	How many units of alcohol do you drink per week, on average?	How many drinks do you consume on average per day of drinking?
<b>Weight Optimisation</b>	How much do you weigh?	
<b>Eat Healthily</b>	How many portions of fruit and vegetables do you consume on average per day?	How many days per week do you consume the recommended five portions of fruit and vegetables per day?
<b>Regular Exercise</b>	How many minutes do you exercise on average per week?	

Each module included multiple horizontal tabs, each of which displayed an image, text and a ‘track your progress’ area. Each module asked different questions dependent on the behaviour (Table 5.5).

**Table 5.5 Track your progress data collection points per module**

Module	Track your progress question 1	Track your progress question 2
Quit smoking	How many cigarettes did you smoke each day?	
Alcohol reduction	How many alcoholic drinks did you consume each day?	How many units did you consume this week?
Weight optimisation	How much do you weigh?	What healthy swaps did you make this week?
Eat healthily	How many portions of the recommended five portions of fruit and vegetables did you consume each day?	
Regular exercise	How many minutes of exercise did you take each day?	What activities did you take part in this week?

#### 5.4.8 The emotional well-being intervention

The well-being intervention developed was based on ACT. ACT has enjoyed a steady rise in interest as an alternative therapeutic intervention to CBT. ACT is considered a third wave CBT, philosophically rooted in functional contextualism (Hayes, 2004; Jiménez, 2012) and RFT (Hayes 2001). ACT differs from traditional CBT in several ways, most notably it does not consider thoughts and beliefs as correct or incorrect; and symptom reduction is not the goal of treatment but is a by-product of the process (Hayes, 2004). ACT is based on the principles of self-acceptance and a commitment to one’s personal values; and encourages the adoption of behaviours that are in agreement with those personal values. ACT aims to encourage individuals toward (1) acceptance of difficult and unwelcome thoughts or emotions, and (2) promotion and simultaneous adoption of actions and behaviours, into daily practice, which are in line with these individual core values and principle beliefs. ACT interventions commonly incorporate mindfulness and experiential exercises that promote contact with the present moment.



### 5.4.8 Intervention components

All intervention components were accessible via the ‘well-being home page’ (Fig 5.12). The ACT intervention included all six core processes of the ACT model and was designed to build users knowledge slowly over the 12-week study period (Table 5.6). Each week included a description of a core process, an illustration, a ‘Try now’ activity, a range of ‘Try at home’ exercises, a ‘Watch me’ section and a ‘Lesson summary’. From week three onwards, a recap of the previous week was also included. Week three is outlined as an example (Table 5.7, for the full intervention see appendix 10).

**Figure 5.12 Well-being home page**



**Table 5.6 ACT modules**

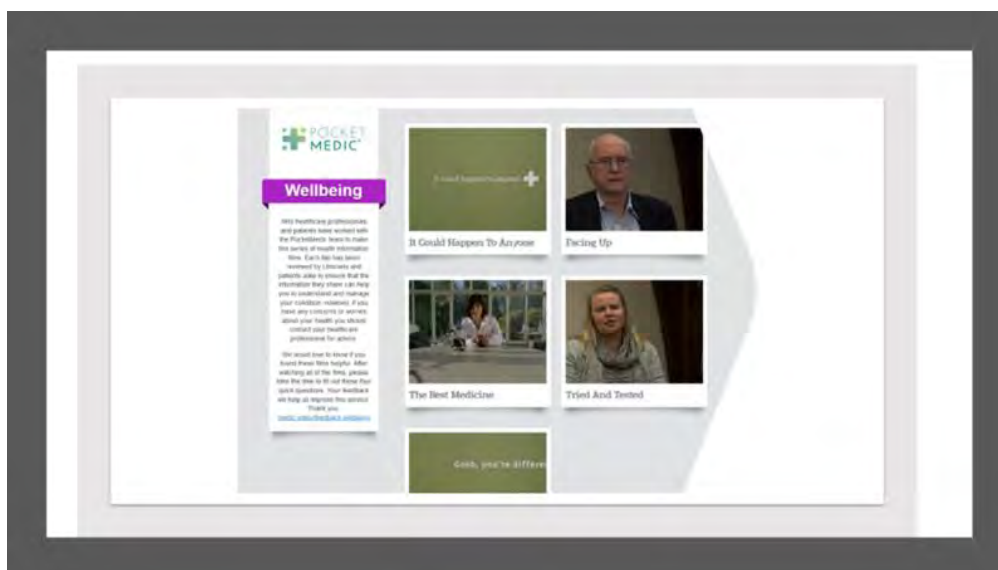
Week	Name
1	Introduction
2	Personal relevance
3	Values exploration
4	Acceptance
5	Cognitive Defusion
6	Being present
7	Self as context
8	Committed action
9	Psychological flexibility
10	Barriers
11	Self-compassion
12	Experimental exercises and additional resources

**Table 5.7 Week 3: Values exploration**

Values	Metaphor	Try now	Watch me	Try at home	Lesson summary
What are Values?	Compass metaphor  Wrong train metaphor:	Popular values	Values and goals (3:41) Dr Russ Harris  Guided Mindful Meditation (5:20)	Values exercise  Values exploration: 80th birthday party  Life as a movie (audio available)	Values are not a future destination. All the little steps along the way are all part of living your life journey. The journey doesn't have an end.  ACT helps you work out what's really important and meaningful to you and to develop goals according to what's most important, and then work through the barriers that get in the way of achieving these goals. Remember life isn't orderly, the journey isn't in a straight line.

The additional intervention components were displayed to participants in intervention 2 and intervention 3. They included the PocketMedic well-being films (Fig 5.13) and the static social norm message (Table 5.8 and Fig 5.14).

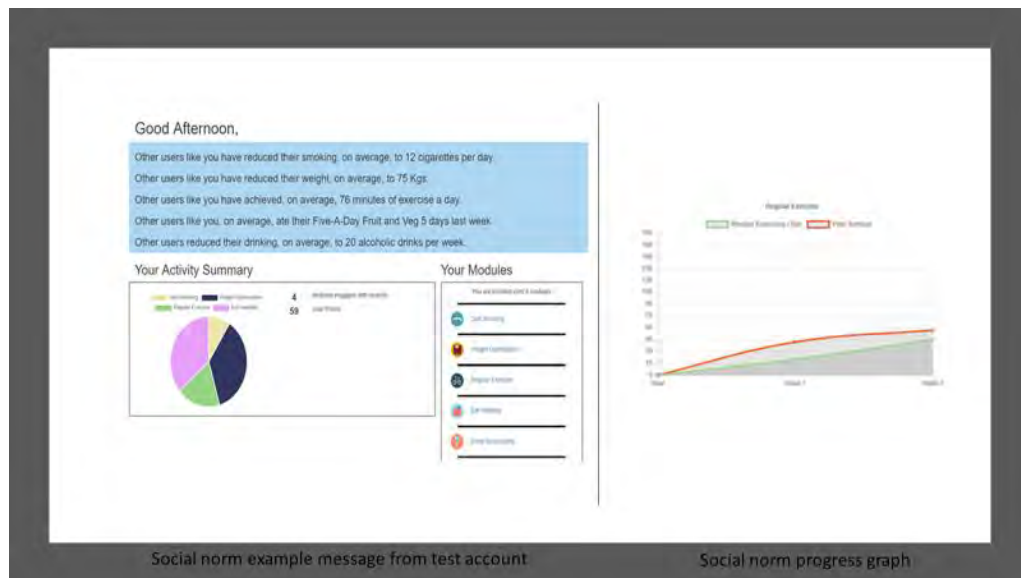
**Figure 5.13 Five, pre-made, well-being films developed by PocketMedic, a commercial digital communications company; It could happen to anyone (6:28 minutes), Facing up (5:01 minutes), The best medicine (6:17 minutes), Tried and tested (8:22 minutes) and Moving on (7:16 minutes).**



**Table 5.8 Static social norm messages, per lifestyle behaviour module**

Lifestyle behaviour change module	Static social norm message
<b>Quit smoking</b>	‘other users like you have reduced their smoking, on average, to 0 cigarettes per day.’
<b>Alcohol reduction</b>	‘other users like you have reduced their drinking, on average, to 0 alcoholic drinks per week’
<b>Weight optimisation</b>	‘other users like you have reduced their weight, on average to 75kgs’.
<b>Regular exercise</b>	‘other users like you have achieved, on average, 150 minutes of moderate exercise per week’
<b>Eat healthily</b>	‘other users like you have, on average, consumed their five-a-day portion of fruit and vegetables 5 days a week’

**Figure 5.14 Static social norm message and graph**



## 5.5 Data Analysis

IBM® SPSS® Statistics version 26 was used.

### 5.5.1 Randomisation procedure

Functionality of the randomisation procedure was assessed by the programmer and discussed with the primary researcher during week one to ensure that the self-reported location data provided during the registration process were used accurately to populate trial arms.

### 5.5.2 Acceptability

Acceptability was measured by the number of participants who provided consent and completed registration and the percentage of eligible participants who enrolled onto the well-being intervention.

### 5.5.3 Participant characteristics

Descriptive statistics was used to provide a summary description of registered users and non-parametric methods, (Kruskal-Wallis (K-S) and Chi-square (C-S) were used to examine statistical differences between trial arms at baseline on the following features; registration week, age and gender, self-rated health, total number of self-reported days off work, self-reported absences of one

week duration or longer, self-rated work performance, scores on the three outcome measures, enrolment to the five Champions for Health modules and enrolment onto the well-being intervention. Recruitment was reported using a CONSORT flow diagram.

#### 5.5.4 Outcome measures

The feasibility study was not powered to test statistical significance, merely explore the impact of the intervention on lifestyle behaviour change and well-being across trial arms in line with CONSORT (Eldridge et al., 2016). Thus, only mean score per trial arm were compared to explore any potential changes between pre and post intervention scores at cluster level.

#### 5.5.5 Adherence

Adherence was operationalised as adherence to study protocol (Kelders, Bohlmeijer, et al., 2013). As such adherence was measured and reported as a percentage i.e. the number of participants who completed the WEMWBS post intervention was divided by the number who completed the WEMWBS at baseline (registration) and multiplied by 100. This calculation was repeated for both PHQ-4 and AAQ-II.

#### 5.5.6 Engagement

Engagement was measured by the completion of interactive weekly tasks within the website. For example, engagement to each of the five ‘Champions for Health’ modules was recorded automatically by the website via the participant-initiated data point ‘track your progress’ function. This allowed measurement of the total number of weeks each participant engaged. Likewise, engagement to the well-being intervention was measured by the ‘Try Now’ function which worked in the same way. Frequency and duration of engagement was measured.

Following this exploratory statistical analysis was conducted using non-parametric methods to explore any differences in frequency and duration of engagement between different trial arms. To compare enrolment and engagement a Chi-Square test was used. Enrolment and engagement were collapsed into a binary variable (yes/no).

### 5.5.7 Qualitative data

Qualitative feedback data were collected via an embedded feedback form, direct email, interview and focus group discussion. Interview and focus group were audio recorded and transcribed verbatim. Data were analysed using inductive thematic analysis informed by the work of (Braun & Clarke, 2006). The process employed was the same as that described in chapter four.

### 5.5.8 Feedback survey

Quantitative data from the structured feedback survey was explored. Means were calculated to identify most common responses.

## 5.6 Results

### 5.6.1 Randomisation procedure

The automated randomisation procedure proved effective and participants were allocated as anticipated i.e. based on their self-reported geographical location.

### 5.6.2 Acceptability

In total 124 participants consented to take part in the study and were randomised to a trial arm and 103 participants completed the full registration form including the two baseline primary outcome measures (Fig. 5.15). Of those participants eligible to access the intervention, almost half (n=41/96, 43%) enrolled.

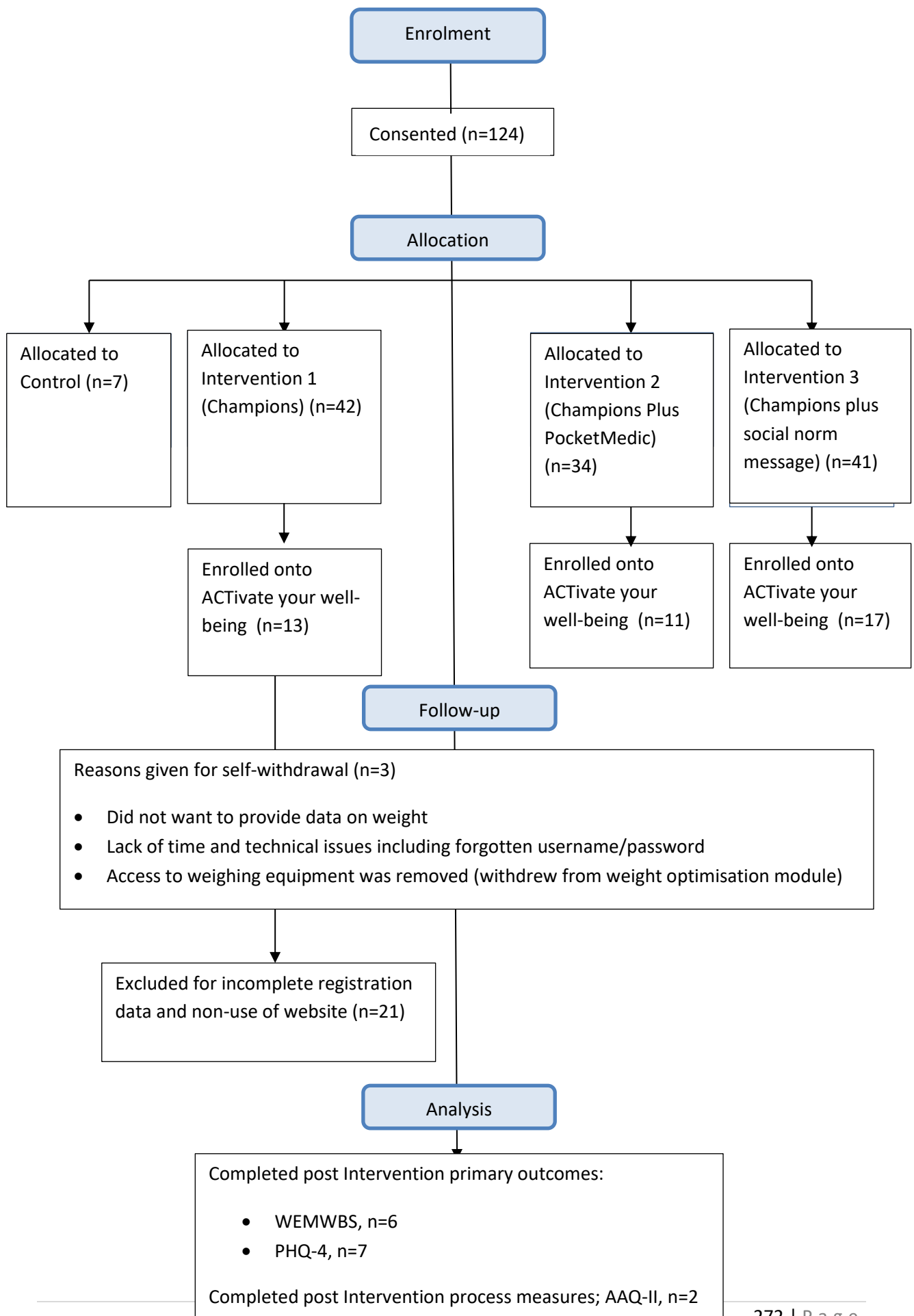
### 5.6.3 Participant characteristics

The majority of participants were female (n=91/103, 88%), spanned all age brackets (18-65 years old), and rated their health as 'good' to 'excellent' (n=82/101, 81%) on a five-point Likert scale. Over half (n=63/103, 61%) self-reported no days off work in the past six months and in line with this, the majority (n=81/103, 79%) did not self-report any 'one week' absences or longer in the past month. The mean general work performance was 7.53 (SD=1.55) on a scale of 1-10 with ten being the highest performance, and all participants opted in to receive the weekly email reminder (Table 5.9).

No significant differences between participants across the four trial arms was detected, at baseline (n=103) for gender (p=0.557, C-S) age (p=0.508, K-W), self-rated health (p=0.363, K-W), days off work (p=0.839, K-W), absences of one week duration (p=0.089, K-W), self-rated work performance (p=0.935, K-W), registration week (p=0.170, K-W), WEMWBS (p=0.242, K-W), PHQ-4 (p=0.269, K-W), or AAQ-II (n=22, p=0.252, K-W).

No difference was observed for enrolment to the Champions for Health modules at baseline between each of the four trial arms (n=103); Weight optimisation (p=0.378, C-S) Exercise (p=0.252, C-S) Alcohol reduction (p=0.876, C-S), Eat healthily (p=0.738, C-S) Quit smoking (p=0.853, C-S), or well-being between the three intervention groups (n=96, p=0.096; C-S).

**Figure 5.15 CONSORT flow diagram**





**Table 5.9 Participant characteristics**

Trial arm	Number randomised	Number analysed	N (%) Female	Age bracket years (n, %)	Mean number of participants who self-reported periods of one-week absences	self-reported days off work. Mean (range and SD)	Self-rated general work performance (scale 1-10 highest). Mean (SD)	Self-rated health (scale poor-excellent) (n, %) Mean (SD)
<b>Control</b>	7	7	6 (86)	26-35 (2, 29) 36-45 (3, 43) 46-55 (1, 14) 56-65 (1, 14)	.14 (0-1, .37)	1.43 (0-5, 2.14)	7.29 (5-9, 1.60)	Poor (0) Fair (2, 29) Good (2, 29) Very good (1, 14) Excellent (2, 29)
<b>Intervention 1</b> (Champions plus ACT)	42	21 <sup>a</sup>	19 (90)	26-35 (8, 38) 36-45 (5, 24) 46-55 (5, 24) 56-65 (3, 14)	.38 (0-1, .49)	9.29 (0-60, 18.41)	7.62 (3-10, 1.74)	Poor (1, 2) Fair (6, 14) Good (8, 19) Very good (5, 12) Excellent (1, 2)
<b>Intervention 2</b> (Champions plus ACT & PocketMedic)	34	34	28 (82)	18-25 (4, 12) 26-35 (10, 29) 36-45 (11, 32) 46-55 (7, 21) 56-65 (2, 6)	.12 (0-2, .40)	.97 (0-5, 1.46)	7.53 (4-10, 1.26)	Poor (0) Fair (7, 21) Good (17, 50) Very good (8, 23) Excellent (2, 6)
<b>Intervention 3</b> (Champions plus ACT & social norm message)	41	41	38 (93)	18-25 (2, 5) 26-35 (10, 24) 36-45 (12, 29) 46-55 (13, 32) 56-65 (4, 10)	.27 (0-2, .50)	6.9 (0-150, 25.32)	7.54 (0-10, 1.70)	Poor (0) Fair (3,7) Good (21, 51) Very good (14,34) Excellent (1, 2)

<sup>a</sup> N=21 users excluded based on incomplete registration.

#### 5.6.4 Outcome measures

The primary outcome measures were completed at baseline by all participants while the process measure was an optional questionnaire available the intervention group, where enrolled on the well-being module.

##### 6.6.4.1 WEMWBS

Baseline WEMWBS M=46.32 (n=103, SD=8.76, range 29-68); Post intervention score increased (n=6, M=53.83, SD, 7.65) and a higher minimum score (M=43) was recorded. When this subgroup was tested five participants showed raised scores, which represented some evidence of an improvement, but this fell below the level of statistical significance (p=0.112; W-S-R). Table 5.10 details the breakdown of all pre and post intervention outcome measures per trial arm.

##### 6.6.4.2 PHQ-4

Baseline PHQ-4 scores were within the normal population range, anxiety M=1.84 (range 0-6, SD, 1.61) and depression M=1.35 (range 0-6, SD, 1.50). A small subset of users met the screening criteria (n=20/103, 20% and n=11/103, 9% respectively). No significant change in combined PHQ-4 scores (n=7) was observed post intervention (p=0.336; W-S). However, anxiety M=1.71, (range 0-4, SD, 1.70) and depression M=.57 (0-2, SD, .78) reduced.

##### 6.6.4.3 Process measure: AAQ-II

Baseline AAQ-II was M=21.7 (n=22, range, 7-43, SD=9.8), indicating psychological inflexibility. Only two participants completed the post intervention questionnaire M=17.5 (range, 8-27, SD, 13.43).

**Table 5.10 Pre and post mean intervention scores, per outcome measure, per trial arm.**

Outcome measure	Intervention 1 (n=21), Mean (SD)		Intervention 2 (n=34), Mean (SD)		Intervention 3 (n=41), Mean (SD)		Control (n=7), Mean (SD)	
	Pre (t1)	Post (t2)	Pre (t1)	Post (t2)	Pre (t1)	Post (t2)	Pre (t1)	Post (t2)

WEMWBS	43.67 (10.18)	65 (n=1)	48.24 (7.63)	50 (6.08) (n=3)	46.39 (8.61)	49 (n=1)	44.57 (9.74)	59 (n=1)
PHQ-4 Depression	1.76 (1.75)	0 (n=1)	1.18 (1.40)	1 (8.16) (n=4)	1.29 (1.53)	1 (n=1)	1.17 (.983)	0 (n=1)
PHQ-4 Anxiety	2.38 (1.96)	0 (n=1)	1.41 (1.61)	2.75 (1.50) (n=4)	1.93 (1.42)	0 (n=1)	1.83 (1.32)	0 (n=1)
AAQ-II	25.71 (13.53) (n=7)	8	16.29 (6.26) (n=7)	27 (n=1)	23 (7.09)	<sup>a</sup>		<sup>b</sup>

<sup>a</sup> no participants completed this measure

<sup>b</sup> control group did not have access to the process measure

### 5.6.5 Adherence

Adherence to study protocol was poor, only six participants completed the WEMWBS (n= 6/103, 6%), seven completed PHQ-4 (n= 7/103, 7%) and two completed AAQ-II (n= 2/22, 9%) post intervention.

### 5.6.6 Engagement

#### 5.6.6.1 Champions for Health: Enrolment

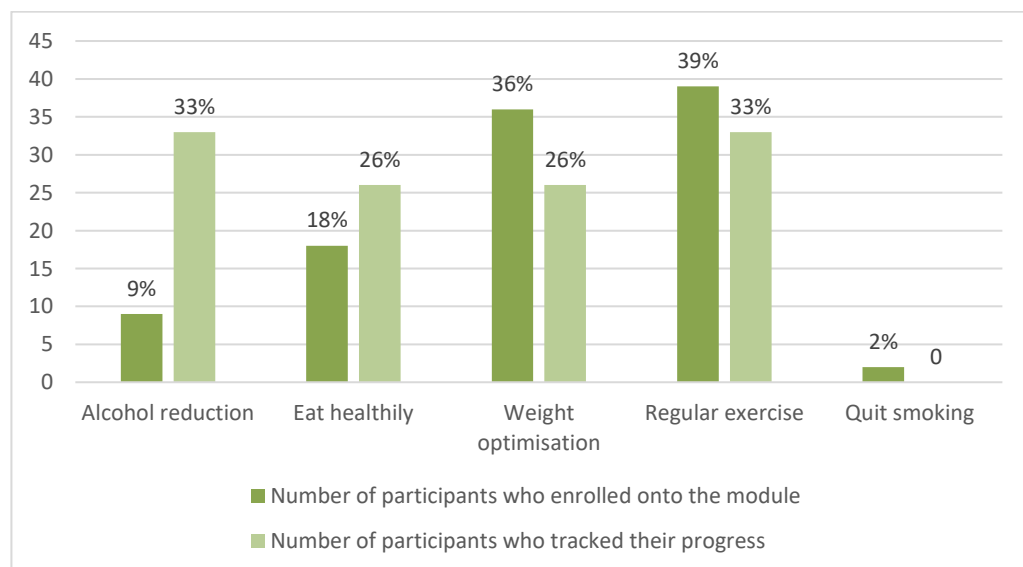
The majority of participants (n=76/103, 74%) enrolled on at least one lifestyle behaviour change module. Almost half (n=50, 49%) enrolled on one module, seventeen (17%) enrolled on two, seven (7%) on three and two (2%) on four modules (Fig. 5.17). The most popular were ‘Regular exercise’ (n=40/103, 39%), and ‘Weight optimisation’ (n=39/103, 38%). Twenty-three (n=23/103, 22%) enrolled onto ‘Eat Healthily’, and nine (n=9/103, 9%) onto ‘Alcohol reduction’. The least popular module was ‘Quit smoking’ (n=2/103, 2%).

#### 5.6.6.2 Champions for Health: Engagement

Of the nine participants who enrolled on ‘Alcohol reduction’, only three (33%) engaged. However, health outcomes improved for these active users; one reported a reduction in days per week that they consumed alcohol from four days to two days, with a reduction from 20 drinks per week to eight. Another participant reduced the number of days they consumed alcohol from four days to three days per week with a reduction from 11 drinks per week to five. While

the third increased the number of days which they consumed alcohol however their overall alcohol consumption reduced from 18 drinks per week to four. Of the 23 participants (18%) who enrolled on ‘Eat healthily’, only six (26%) engaged, one until week six. User data indicated poor fruit and vegetable consumption with few meeting recommended guidelines and some never consumed the recommended five-a-day portion (n=5/23). Almost all who enrolled on the ‘Weight optimisation’ (n=37/39, 95%) module engaged and provided an initial weight (M=75.77kg). A small subsample (n=10/39, 26%) provided a second weight (M=75kg). Of the 40 participants who enrolled (n=13/40) on ‘Regular exercise’ 33% actively engaged. This module saw the longest sustained engagement with activity recorded until week nine. Only two (n=2/103 2%) participants enrolled on ‘Quit smoking’, and neither engaged with the track your progress function. The percentage of participants enrolled and engaged with each lifestyle behaviour change module are and displayed (Fig 5.16).

**Figure 5.16 The percentage of participants enrolled onto each lifestyle behaviour change module and the percentage who went on to engage with the module.**



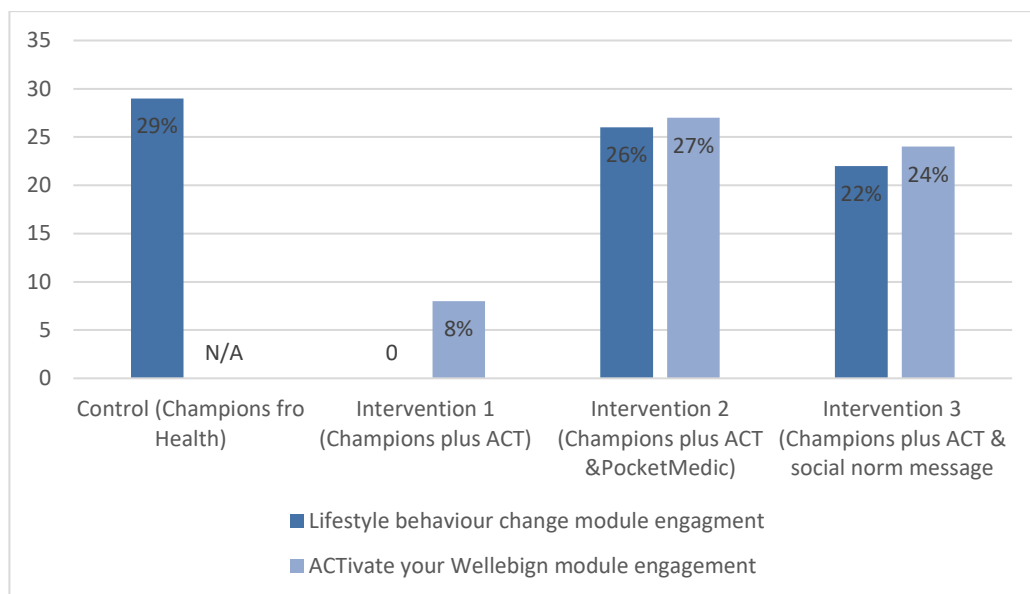
### 5.6.6.3 ACTIVATE your well-being: Enrolment

Almost half of those eligible to enrol on the well-being module enrolled (n=41/96, 42%).

#### 5.6.6.4 ACTIVATE your well-being: Engagement

Only seven (n=7/41, 17%) engaged with the interactive, ‘try now’ exercises. Despite poor engagement this module saw the longest sustained engagement overall as one participant remained active until week ten. Module engagement differed across the three intervention groups although the difference was not statistically significant (n=96, p=0.220; C-S) (Fig. 5.17).

**Figure 5.17 Shows the percentage of participants who engaged in both the lifestyle behaviour change modules and the well-being module.**



#### 5.6.7 Qualitative data

To fully explore feasibility, acceptability and engagement a range of qualitative data were also collected. Fifteen participants contacted the principle researcher via direct email and eight completed the feedback survey. Results indicated that the registration and navigation was easy, however the programme as a whole was not considered useful. Two one-to-one interviews of 25-minute duration were completed and two focus groups which lasted 73 and 77 minutes respectively with four participants in each, were facilitated. All participants were female. Demographic data were not collected.

Following the completion of the feasibility study and in response to a change in the boundary of the HB (chapter 6) the website and intervention was presented to a consumer panel (26.06.2019) which consisted of twelve adults (83% were female), some were university staff and others were members of the general public. The primary researcher delivered a 20-minute presentation and the panel then discussed their views for a further 40-minutes.

Qualitative data from the above sources were analysed together. Overall feedback was positive for example, “*Well done with the idea and good luck with your future projects with it*” (Email respondent). Two participants sent their thanks “*Thanks very much for this opportunity*” (survey respondent) and when asked to describe their experience in three words participants gave the following; *limited, fun, helpful motivating, innovative and useful competitive, inspirational, caring, Gets people thinking*. However one participant stated that an online resource was not what they were looking for “*didn't really help I need a class or a group not an email to help me*” (survey respondent) and another (interview participant) explained that elements of the chosen therapy (ACT) had not been what they were looking for.

Analysis focused on the identification of participant recommendations to inform the ongoing development of the well-being intervention and study website. Many of the recommendations reported below were directly acted on and incorporated in the subsequent RCT (chapter 6).

- Provide an option to set weekly goals and the option to report whether this goal was achieved or not. e.g. ‘I will have 4 alcohol free days this week’.
- The option to return to the previous week to enter progress data.
- Display progress data per activity undertaken e.g. during week one you swam for a total of 80 minutes; you did yoga for 60 minutes or more detailed track your progress options to facilitate competitive and personalised elements.
- Personalisation of the profile area for example, the option to edit data displayed on the screen specifically in reference to weight.
- Streamline access to well-being exercises and activities.
- Include additional signposts to alternative sources of help.
- Incorporate opportunities to connect and interact with others.

- Improve the layout of AAQ-II questionnaire and space out the multiple-choice questions
- People or clinicians talking about their goals and how they set them.
- Management support needed, highlighting the benefits i.e. to reduce sickness absence and presenteeism.
- different questions for different levels of health and fitness to maintain motivation i.e. personalisation of feedback and tracking
- A pop-up message to say well done to encourage people or maybe if their weight has gone up to say oh everyone has a little blip but here's some practical tips to get back on track
- Point out link between mental and physical health
- Ongoing support is necessary maybe a designated well-being officer within the organisation or within the Health Champions Network.
- An ongoing weekly personalised newsletter or brief correspondence.
- Prize draw for those who complete the 12-week course.
- Place testimonials on the home page to encourage other.
- It was felt that providing assurance that the data is being held safely and securely and nobody can access a person's personal details other than the individual themselves on their personalised dashboard.
- Ensure that the website can be accessed on mobile phones and tablets.
- Update the front page to clearly explain the aims and objectives of the website.
- Carefully consider the launch date due to holidays,
- Make it clear on the module tracker where an individual is on their journey – Am I on week 3 or week 4?
- Reassure participants through email that they can pick up the modules whenever they can, they don't have to stop participating if they skip a week.

Several reasons pertaining to non-use and non-adherence were identified from the qualitative data. For example, one participant explained they had been put off from enrolling onto the weight optimisation module as a result of being in a shared office with a computer screen visible to others. A second reported that access to weighing scales was removed unexpectedly after several weeks. As a result, they stopped using the module. Equally another (survey respondent) identified that they stopped using the website as they had been unable to record their progress in one week and it was not possible to go back and enter data for a week missed. This resulted in them ending their personal challenge. Several others reported difficulty recalling username and passwords and stopped using the website as a result. While a password reset was available

users did need to have logged in, in order to access this feature/function. Several participants contacted the primary researcher during the study period and asked to have their password reset. This was enabled and participants were asked to change their password immediately following log in. This feature was updated in the subsequent trial. Others identified that lack of time was a critical factor which limited their ability to engage with the website. Another participant noted that a web-based tool was not ideal for those working in a non-office/computer-based environment. Finally, concern for workplace approval and time release form role to access the website was detailed.

The consumer panel also raised several important points which related to engagement. Specifically, the panel questioned the sustainability of the project. Members discussed the need to encourage engagement through management 'buy in'. It was suggested that due to the perceived intensity of some of the activities that employers must 'buy into' the project to ensure protected time is available for staff to benefit from the activities and exercises included. Their vision for achieving this goal included presentations to managers to display sick rates, demonstrate how a healthy work force is a more productive one and to make it relatable to the organisations objectives. Overall, the panel felt that the initiative was excellent and that any company who bought into the programme would care about their staff.

A second suggestion to support engagement was for a digital designer to be included in the project to make the site more exiting. While the panel loved the images, which were used (i.e. yoga girl) some members felt that more realistic images or photographs might encourage engagement however most of the panel felt that a cartoon image was more generic and therefore suitable to appeal to all. Equally resources should be less wordy and include audio elements to lessen the time required to read through the information and content included for example, *“use sounds to encourage the relaxation element. This could arouse multiple senses. It means that people don't have to read to benefit from the website”*. (Table 5.11).

**Table 5.11 Participant extracts (feasibility respondents)**



### **Registration and use**

*“Really easy to register. I didn’t have any difficulties registering or enrolling and then each time when I logged back in it was really easy” (Interview 1)*

*“Easy to use, visually was nice” (interview 2)*

*“I like that it was for a set time period, I thought oh its 12 weeks I can do that for 12 weeks whereas its not like let’s do this for ever” (Interview 1)*

*“I would have liked to have used it more [didn’t use weekly], I didn’t feel comfortable using it during my working hours...I should have discussed it with my manager really as I’m a well-being champions and she might have accepted that it was a valued use of my time but I felt because it was personal to me rather than of benefit to the department” (interview 2)*

### **Feedback on Champions for Health modules**

*“I liked that it would tell you what you should be doing to keep up with the NHS recommendations and then how it compared that to Wales and the rest of the population. I liked all that information” (interview 1)*

*“I would have liked to set weekly goals” (interview 1)*

*“The health and fitness aspects were quite helpful, I was enrolled on the modules, health eating, weight management and regular exercise. They were quite simple and straight forward and the information there was very useful” (interview 2)*

*“I would like more complex questions in terms of eating healthy - 5 a day was too easy!” (survey respondent)*

*“I found that the track your progress was a bit basic e.g. how many times did you eat your five a day, it was ok. It might just be me, I’m not very competitive, however I’m sorry but I didn’t feel that I was personally very inspired with track your progress” (Email respondent)*

*“Thanks again! It has helped me to focus on my health and keep my weight steady, exercise and eat healthily” (Email respondent)*

*“It’s a good way to get people to be more aware of generally their well-being. It wasn’t about weight loss alcohol it could be about that if that was important to you or I could be about drinking less alcohol, but I felt that it was really holistic”*  
(interview respondent 1)

### **Feedback on the well-being module**

*“I really liked the PocketMedic. I looked at all the films on there”* (focus group)

*“I liked some aspects of the ACT therapy and I found some aspects helpful certainly I’ve suffered from intrusive thoughts and its helpful to sort of just accept them rather than fighting against them”* (interview 1)

*“maybe other forms of therapy such as CBT?”* (survey respondent)

*“I didn’t like certain parts of ACT – I’ve had trouble in the past with unwelcome thoughts, but I don’t think this method of embracing them is helpful or good at all. I think we have disgust reflexes for a reason, to protect us from harm. However, I thought that other part of ACT involving the philosophy of concentrating on your values and where you want to go is very good and helpful”.* (Email respondent)

*“Good resources available but time-consuming to find the activity that would interest you”* (survey respondent)

### **Non-adherence**

*”To me it was purely entering my weight, which I understand needed to be done...where I sit in my office everyone can see my screen clearly and that was why I was not happy to enter my weight”* (email respondent)

*“Couldn’t log in, then other priority’s took over firefighting through work. It’s a time factor thing”* (email respondent)

*“I stopped doing the one about weight management as when I started there were scales up in out-patients that I used to use and then they took them away”*  
(interview 2)

*“I wanted to be able to fill in my previous weeks activities but it rolled over to a new week and I couldn't figure out how then update it. So I stopped tracking my progress” (feedback survey)*

*“I did not undertake it in the end, and cannot log in now. I did not like the fact I had to add my weight if I remember correctly, I'm a very private person (no face book etc) so I wanted to support but not a fuss” (email respondent)*

*“I think I use computers so much that when I want to relax and look after my health and well-being I want to take a break from the screen and get outside in the fresh air with friends and I would welcome more opportunities to relax and connect with others in local area such as (name removed) Park” (email respondent)*

*“Why didn't I do it? Couldn't log in..then other priority's took over ..”fire fighting” through work.....It's a time factor thing.....” (Email respondent)*

## 5.7 Discussion

### 5.7.1 Principal findings

This study explored the feasibility and acceptability of including a well-being intervention, based on ACT, within an existing web-based, workplace, lifestyle behaviour change programme for healthcare staff in Wales.

The automated randomisation procedure proved feasible. Participants were successfully randomised to one of four trial arms based on self-reported hospital location at registration and the principle researcher remained blinded to participants trial arm allocation until data extraction commenced. Equally the cluster design meant that participants working at the same hospital locations were randomised to the same trial arm and thus discussion of intervention content and components with those not in the same trial arm was limited. However, the allocation of clusters did not facilitate an equal distribution of participants across trial arms and as a result the control arm

only had a small number of participants (this is discussed further as a limitation).

The new multifaceted programme also proved acceptable to NHS staff. As indicated by the number of staff who registered to take part (n=124) although only 103 of those completed the full registration form. Recruitment compared equally to previous releases of the ‘Champions’ programme. For example, phase II, administered by PHW recruited (n=140) staff from one similarly sized Welsh HB. Equally the number of participants recruited compared favourably with published feasibility studies. For example, Lappalainen et al. (2015) recruited 39 participants to a seven-week web-delivered ACT intervention for depression which included online feedback delivered by masters level psychology graduates coupled with automated email reminders. Levin et al. (2014) recruited 76 students to a three-week web-based ACT based feasibility study to prevent mental health problems. However, recruitment did not match that reported by PHW for ABMU HB (Phase I, n=355) when an all Wales wide launch and media campaign were undertaken.

To explore acceptability of the well-being intervention within the existing program it was important to examine enrolment rate to the well-being module and to compare it against enrolment to the five lifestyle modules. Almost half (43%) of those eligible to access the intervention (i.e. those randomised to one of three intervention arms) enrolled, this was the highest enrolment rate across all modules. This highlights that initiatives such as these are desirable, and that there is a need for programmes that support well-being in the workplace.

Indeed, over the past decade health and well-being have become common topics (Danna & Griffin, 1999; De Simone, 2014; Osilla et al., 2012; Pescud et al., 2015; Rongen et al., 2013) and one which continues to dominate the research agenda as it is acknowledged that workplace experiences including stress carry over into personal and social domains (Danna & Griffin, 1999). As was considered by participants (chapter 4), when asked to discuss their understanding of well-being. In support of the encouraging enrolment rate, qualitative data collected via interviews, focus groups and open feedback channels indicated that participants welcomed the inclusion of the well-being module within the existing program. For example, feedback data from those

who enrolled onto the well-being module were positive and encouraging. This supports the acceptability of the new multifaceted programme.

Despite positive recruitment to the website and encouraging enrolment onto the well-being module, actual engagement with the 'try now' function was poor, only 17% of enrolled participants engaged. This was the lowest engagement of all modules. However, the well-being module did record the longest period of engagement, with one participant remaining active until week ten. However, the qualitative data again indicated that those staff who engaged with the well-being intervention enjoyed the resources and reported personal benefit. Engagement to the five lifestyle behaviour change modules varied. For example, no engagement was recorded for 'Quit smoking' (only two participants enrolled) while 'Weight optimisation' (95%) saw the highest engagement followed by 'Regular exercise' (33%). Two modules engaged users until week nine, 'Alcohol reduction' and 'Regular exercise'. Overall adherence to the study protocol was poor (7%).

Looking at the global picture, this study found healthcare staffs' well-being scores, measured using the validated 14-item WEMBWS, to be lower than scores reported for the general population (English data). For example, mean scores for men and women, respectively are 50.1 and 49.6 (Tennant et al., 2007) compared to a mean score of 46.3 found in the current study. In addition to this, a subset of participants had PHQ-4 scores which suggested anxiety and depression. These findings add to the global picture which suggests prevalence rates of CMD such as anxiety and depression in the UK are high. In the UK estimated population incidence rates are between 4-10% (NHSdigital, 2018). Elsewhere similar instances are reported. For example, lifetime disorder rates in Australia are reported to be 45.5% (Slade et al., 2009). The individual and economic cost associated with CMD is recognised to be significant. Mental health problems constitute the largest single source of world economic burden, with an estimated global cost of £1.6 trillion (McManus et al., 2009). In the UK, the estimated costs of mental health problems are £70-100 billion each year and account for 4.5% of GDP (McCrone et al., 2008). The current study whilst not powered to detect a change in well-being did identify a small but insignificant increase in mean well-being post intervention (WEMWBS mean

increased from 46.3 to 53.8). However, no significant change in the combined PHQ-4 scores was observed.

Finally, this study was also interested in exploring the impact of the additional intervention elements included into intervention arm two (PocketMedic) and three (the static social norm message). No significant differences were identified for enrolment or engagement across the three intervention groups. However, intervention one had the lowest engagement of all trial arms for both lifestyle modules and the well-being module. While intervention two and three had similar rates for both i.e. 26% and 27% compared to 22% and 24% respectively). Qualitative feedback indicated that the PocketMedic films were viewed and much appreciated. As such future developments could likely benefit from collapsing these elements into one intervention specifically the PocketMedic films. This is line with earlier findings, for example Kelders, Bohlmeijer, et al. (2013) reported that additional intervention elements were not well used in a similar ACT based web delivered intervention for the prevention of depression in the general population.

#### 5.7.2 Comparison with Prior Work

The inclusion of an emotional well-being module within the ‘Champions for Health’ programme created a multifaceted programme, free and easily accessible to a range of healthcare staff. Limited research has explored the potential role of interventions designed to promote and improve well-being and their potential impact to encourage and promote lifestyle behaviour change. This study represents one of the first to explicitly explore the benefit of adding an emotional well-being intervention into an existing lifestyle behaviour change programme. Only two prior studies were identified which incorporated a mental health element within a physical health promotion programme (Cobb & Poirier, 2014; Cook et al., 2007). However, neither explicitly evaluated the additional benefit of a well-being element on lifestyle behaviour choices and neither utilised ACT as the therapeutic approach and nether considered the potential role of a well-being intervention to address poor adherence.

Like the current study Cobb and Poirier (2014) conceptualised well-being in terms of physical, psychological, and social aspects of life. Authors conducted a randomised, placebo-controlled, parallel-group trial with (n=1,503) American adults to evaluate a multimodal well-being intervention ‘Daily challenge’. The intervention consisted of a daily health suggestion, support to achieve it and information identifying how it related to well-being, to complete in a social environment. Adherence was high (63%) and engagement positive. For example, authors reported that 85% of participants visited the study website, and 76% opened the daily email. And importantly the intervention led to a significant improvement in well-being compared to the control group with a dose response relationship. The study did not explore the impact on adherence.

In the earlier study conducted by Cook et al. (2007) the effectiveness of a workplace web-based multimedia health promotion program, designed to improve dietary practices, reduce stress, and increase physical activity was evaluated using a RCT with (n=419) employees from a human resources workforce. As was common at the time this study explored the difference between web-delivered and print based intervention effects. Adherence was high (87%) for the web-based group and authors reported positive effect on all health outcomes. Again, the study did not explore the impact of an emotional well-being intervention on adherence. However, both studies reported higher adherence and engagement than the current study.

While no other multi-faceted interventions were identified, Levin et al. (2014) also examined the feasibility of a prototype web-based ACT programme for preventing mental health problems in a population of (n=76) American university students. The study ran for three weeks and explored two modules prior to full intervention development. The authors reported high programme acceptability, increased ACT knowledge and positive change for depression and anxiety scores compared to a WLC group using the DASS. Like the current study the intervention was based on ACT on the premise that this therapeutic approach which aims to increase psychological flexibility and decrease experiential avoidance could support well-being and prevent mental health problems from arising in a non-clinical population (Biglan et al., 2008).

In fact, ACT has previously been used in a workplace context to encourage positive mental health with success. For example, Flaxman and Bond (2010) used ACT in a face-to-face workplace stress management programme. Their findings indicated that employee distress significantly distressed over the six-month study period. Participants in the Levin et al. (2014) study were financially reimbursed for their time and the trial was much shorter in duration than the 12-weeks used in the current study however the intervention included lessons and supplementary tailored emails was released in a structured sequential format which a pre-determined start and end point. And the lessons included practice exercises and goal setting including the NAME technique also used in the current study. Both lessons focused on key elements of the ACT model and were similar in intent to the those used by current participants. Equally use of a prototype website and the development processes followed was similar. For example, the design i.e. look and feel of the website was informed by qualitative enquiry with anticipated end users. Levin et al. (2014) reported excellent adherence with 92% of intervention group participants completing the full three-week programme and post intervention questionnaires. Where the current study was unable to explore changes in well-being or psychological flexibility due to poor completion of the time two outcome measures. Authors stated that the intervention was designed specifically to address this issue and included a range of interactive multimedia elements. Such additions were, while desirable, not incorporated in the current study due to limited programming expertise.

Lara et al. (2016) conducted a single blinded, two-armed pilot RCT of a multi component web-based intervention to promote healthy eating, physical activity and social connections. The study randomised at individual level not cluster level like the current study however the reported sample size was not dissimilar, 75 older persons and recruitment was from eight diverse large private sector workplace settings. The low recruitment rate across such large organisations (two large supermarkets and depots, a public transport company, a petrochemical manufacturing company, the UK's tax and customs authority, and three local government authorities) suggests that workplace settings may limit interest. As with many similar studies and indeed the current study the



majority of participants were female. The study intervention 'LEAP' consisted of five modules: 'Time', 'Changing Work', 'Moving More', 'Being Social' and 'Eating Well'. A diary and a dashboard were also included. 'Moving More', 'Eating Well' and 'Being Social' were the most frequently used modules. These findings are in line with the current study which found that 'Regular exercise', 'Weight optimisation' and 'Eat healthily' were the most popular modules. The study reported 96% completion rate for the intervention arm and the same number were reported to engage with the intervention on at least one occasion over the eight-week study period, in direct contrast to the current study which saw poor adherence. The LEAP intervention modules which were similar to the current intervention (e.g. Moving More and Eating Well) included direct encouragement to: self-monitor daily step count using a pedometer; to set physical activity and step goals; and to regularly update step count, review goals, schedule activities, and consider the barriers and solutions to being more physically active. While the current intervention provided similar information and included a weekly goal setting area which encouraged users to specify their intentions for exercise i.e. what activity, time, place and duration, it did not include a pedometer and was not solely focused on step count. Equally the 'Eating Well' module can be contrasted to the current 'Eat healthily' module and/or 'Weight optimisation' module both encouraged users to consider their current fruit and vegetable intake however the current module did provide feedback based on self-reported questionnaire data nor did it make personalised suggestions for meal options, snacks directly however it did include information on each of these via external links to resources including the NHS choices website which interestingly the Jose study included as their control arm condition. Both studies included a user dashboard which acted to promote engagement and provide a summary of recent activity. However, Lara et al. (2016) included resources which once used could be saved for later re-use. The study also explored user experience via a series of one-to-one interviews and the intervention was considered user friendly. The study included web-analytics which tracked use of the LEAP intervention.

Geraedts et al. (2013) conducted a RCT and process evaluation to explore the study feasibility of a therapist guided web-based intervention, 'Happy@Work' for employees with depressive symptoms. Whilst the intervention was not based on ACT nor included within a wider lifestyle behaviour change programme some comparisons can be drawn. Authors recruited (n=250) employees across six large organisations of which the majority were female (66%). The intervention was based on problem solving treatment and cognitive therapy and aimed to address workplace stress. However, the intervention was structured and delivered via six sequential lessons (over seven weeks, with each lesson being allocated one week to complete) in line with the current intervention tunnelled delivery format. The intervention also included additional optional components (e.g. mood diary) which participants had the choice to use. Engagement was higher than the current study for example 90% completed lesson one compared to 75% of participants who completed enrolment for at least one lifestyle behaviour change module. However as with the current study dropout by the end of the study period was high and only 36% completed all six lessons. This was again higher than the current study. Email reminders were sent on an individual basis if a lesson was not completed. Equally a dropout questionnaire was sent after one-week inactivity. Participants were allowed to re-engage with the intervention after this questionnaire was sent. These features may be the critical difference between engagement and adherence levels when considering the current study. As with the current findings reasons for dropout and non-use included "Personal/family issues" and "lack of time" (Geraedts et al., 2013). Finally, qualitative feedback from the study also indicated that participants wanted a web-based intervention adding further support to the use of this approach. They also called for mental health support at an organisational level from their employer and/or manager and that support to engage with such interventions was critical to their uptake. These sentiments were echoed in the current study, one participant explicatively stated they had not used the intervention in work time as they did not feel they were allowed to. This has important implications for the success and use of future workplace mental health and well-being interventions.

While Mohr et al. (2010) conducted a single armed feasibility trial to explore a multimodal mental health treatment for depression. The CBT based intervention, 'Moodmanager' was web-delivered intervention with guided email and telephone support/. It consisted of six lessons delivered via text, audio and video (20-minute duration) over a seven-week study period. The intervention also incorporated three interactive tools: 'Activity Scheduling tool', 'Challenging Thoughts Diary tool' and a mood rating tool. Participants were encouraged to record their activity here times per week. Participants were recruited and assessed for eligibility face to face and an exit interview was also conducted. The study explicitly stated its aim to examine feasibility in terms of recruitment, adherence, and depression and to identify whether the inclusion of telephone support increased adherence. The study enrolled only a small number (n=21) of eligible participants (n=97) and the majority were female (81%). Authors concluded that findings supported the commencement of a full-scale trial based on significant improvements in depression measured by the PHQ-8 and the Hamilton rating scale for depression and low dropout (n=2, 9%).

Fledderus et al. (2012) conducted a RCT of an email supported, self-guided, ACT intervention to reduce psychological distress and encourage positive mental health. Amongst adults with mild to moderate depressive symptoms. Whilst the population recruited were not specifically focused on the workplace or healthcare staff some comparisons can be drawn. For example, the study specifically explored at the role of email support, extensive support compared to minimal support across two trial arms with a third WLC trial arm included. The study period was of similar duration i.e. three months. In their study the ACT programme successfully reduced depression, anxiety, fatigue, experiential avoidance and increased positive mental health and mindfulness, post intervention for both intervention groups.

### 5.7.3 Limitations

There are several considerations which must be acknowledged for their potential to either limit the generalisability of the study findings or which impact the conclusions drawn.

Firstly, the majority (88%) of participants were female. This whilst not unexpected was higher than the proportion of females employed across the HB (75%). As a result, it may not be fair to assume that male staff in the HB were accepting of the well-being intervention or indeed the programme as a whole. This has implications for the recruitment strategy employed in future versions of the website and as noted by Kelders, Pots, et al. (2013) more effort should be made to identify features which might appeal to male demographic.

Equally the small sample recruited was of particular relevance to the control arm, as participants were randomised 1:3 in favour of the intervention. While the same recruitment process was undertaken at each of the four cluster sites, only seven members of staff registered from the location randomised to the control arm. Whilst this small sample is not dissimilar to other published studies reporting the effects of similar interventions (Lappalainen et al., 2015; Levin et al., 2016; Levin et al., 2014; Sheeber et al., 2012) cluster size must be attended to. For example, the hospital location in question was smaller than the other three hospital locations and whilst those identifying their location ‘community based’ were included into this particular cluster, a difference in total number of staff within the location remained. Similarly, Intervention 1 had a smaller number of participants. However, this resulted from a high number (n=21) of participants being excluded from the analysis as a result of incomplete registration data. Although no other trial arms had any instances of incomplete participant registration data, this further reduced the sample size and equality between trial arms. The registration process should include mandatory fields to avoid this issue in future iterations.

Limited engagement after initial registration and enrolment was a major study limitation. In total only seven participants engaged with the ‘try now’ elements of the well-being intervention. Equally engagement was poor across the five lifestyle behaviour change modules. The website only recorded engagement to the ‘track your progress’ function within each of these modules. The website did not record the number of times a participant logged into their account, the time spent on each page, other activities undertaken within the website for example how many resources were downloaded, how many external links were followed or any general website activity. It is highly likely that

participants engaged with other programme elements, indeed the focus group and interview data suggested that the site overall was well used. In line with this, it is also encouraging that most participants enrolled and engaged with at least one module during the 12-week study period. The most popular being Regular exercise and Weight optimisation. Indeed, these were often selected in combination. Quit smoking was the least popular with only two users, despite local rates of smoking remaining at 21% (DPH, 2015). Review of earlier studies identified that reports concerning data usage were equally limited and varied (Brown, O'Neill, et al., 2016). Like the current study the number of modules completed was the most commonly reported. The current study also incorporated two gamification features into the website, namely 'rewards' and 'feedback' to encourage sustained engagement. It appears that neither of these features succeeded in their aim. Future developments should consider using different or additional gamification features, for example avatars or social interaction which have been reported to promote engagement elsewhere (Cobb & Poirier, 2014; Doherty et al., 2012) while guided support (Andersson & Cuijpers, 2009), (Spek et al., 2007) and structured feedback have been associated with better adherence (Kelders, Bohlmeijer, et al., 2013).

Further exploration of well-being outcomes was limited due to poor engagement. For example, mean well-being scores are reported to vary by BMI, both men and women classified as obese (using BMI) were found to have lower WEMWBS mean scores compared to overweight men and healthy women who had higher mean well-being scores as measured by the HSE (Morris et al., 2017). Equally mean well-being scores were found to vary according to levels of reported physical activity. Both men and women who were inactive had the lowest mean WEMWBS score and those meeting UK recommended physical activity guidelines had the highest WEMWBS score (Morris et al., 2017). Poor adherence meant that BMI scores could not be explored in relation to well-being outcomes in the current study. However, this was not an intention of the current study and is not a requirement on the CONSORT extension guidance (item 12b) for feasibility studies (Eldridge et al., 2016).

In addition to this due to an error in the programming of the MYSQL database, which has been amended, healthcare worker ‘role’ was not recorded and as such was not examined.

A fourth study limitation resulted from the low adherence. Only seven participants completed the post-intervention primary outcome measures and only two completed the post-intervention process measure. Coupled with poor engagement this limited the exploration of impact on all outcomes. However poor adherence is commonly reported in web-based mental health intervention studies. For example, the CBT based intervention ‘Moodgym’ reported that whilst the intervention was effective for reducing psychological distress it should not be used as a front-line treatment due to high dropout (Twomey et al., 2014). Equally in the systematic review (chapter 3) adherence to web-based mental health and well-being interventions ranged between 3% and 100%. In response alternative ways to encourage completion of outcome measures post-intervention will be pursued. One option is to track individual non-use and request feedback within one week. This may go some way to improving adherence rates as reasons for non-use could be identified and resolved during the study period. Alternatively, the intervention could be shortened to support continued use. Another option might be to redesign engagement data collection points within the website. In this version engagement monitoring was limited to the ‘track your progress’ or ‘try now’ features. Both of which are user initiated. No automated data were recorded. Feedback and interview data suggested that participants engaged at many additional time points, which was not captured in the analysis. This should be addressed and considered alongside published reasons for non-adherence e.g. “lack of time participate, disinterest, no need for treatment, hardware or technical issues, program perceived as noneffective, life events, felt better after a few modules, disappointed by group assignment, holiday, work commitments, poor health, and no longer wish to participate” (chapter 3). Qualitative feedback collected in the current study identified similar reasons.

Finally, the study relied on self-report measures and data on absenteeism or sick leave were not checked against employment records of participants for ethical reasons. Thus, all data must be considered in line with this.

#### 5.7.4 Future directions

Feedback highlighted specific ways to develop the intervention to address poor engagement from the staff perspective. This will be used to support future development. For example, recommendations identified in the results section will be implemented where funding, expertise and time allows.

A wider recruitment strategy will also be required prior to undertaking a full scale RCT, additional HBs and/or different organisational settings could be invited to take part to ensure adequate recruitment required for a full statistical analysis.

Finally, and in line with the PD approach additional qualitative enquiry and usability testing could be undertaken to inform the changes made prior to release.

#### 5.8 Conclusion

The web-based interface used in this healthcare setting offered an opportunity to support public sector staff, in the workplace, to make positive lifestyle changes through convenient and accessible means. The inclusion of the emotional well-being intervention, in combination with the lifestyle modules represents a significant step forward in terms of prevention and early intervention for self-management of positive health behaviours and builds on the UK mental health prevention agenda. The multifaceted programme targeted both lifestyle behaviours and emotional well-being in one integrated programme. This is the unique feature of this programme.

The aim of this feasibility study was met. The randomisation procedure proved feasible and the cluster design whilst needing further examination of cluster size, also proved effective. Equally recruitment and enrolment to the website was encouraging and qualitative data collected supported the view that the inclusion of a well-being intervention, within an existing lifestyle behaviour change program was indeed acceptable to healthcare staff.

While this feasibility study was not powered to statistically assess the impact of the additional well-being element on physical health outcomes, adherence and engagement to the wider programme nor well-being. Based on the results a number of key recommendations need to be addressed prior to running a full scale RCT; a more streamlined emotional well-being resource, a password reset function, the ability to assess website usage data more comprehensively including additional user generated data points, email prompt after one week non-use, and a final update based on current and additional end-user input. However, with wider ranging recruitment methods and additional staff groups a study to assess effectiveness of the well-being intervention and to examine the impact on adherence would be feasible.



## Chapter 6: RCT

---

This chapter outlines the cluster RCT which was undertaken in 2020. The RCT used the updated intervention and study website. The chapter concludes with a discussion of the study findings and key limitations including the impact of COVID-19.

### 6.1 Aim

This study aimed to explore whether including an emotional well-being intervention, based on ACT, within a lifestyle behaviour change programme had a positive impact on HRLB, adherence and engagement, and emotional well-being.

#### 6.1.1 Objectives

The study objectives were:

1. To determine whether the inclusion of the well-being intervention ‘ACTivate your well-being’ increased HRLB change (i.e. do participants randomised to receive the intervention improve their HRLBs per selected health challenge, more than those in the control condition?).
2. To determine whether the inclusion the well-being intervention increased adherence and engagement to the programme (i.e. is adherence and engagement higher for those randomised to receive the intervention compared to the control condition?).
3. To determine whether the well-being intervention increased well-being (i.e. do those who engage with the intervention realise improvements to their well-being, as measured by the study outcome measures?).
4. To determine whether engagement with the well-being module was higher for SBUHB participants (on the basis that they or their peers had contributed to the PD development phase).

### 6.1.2 Study hypotheses

It was hypothesised that the inclusion of the emotional well-being intervention within the wider programme would increase participants well-being and as a result, this would increase their adherence and engagement to the wider programme. This increased engagement would then lead to greater improvements in health outcomes as a result of sustained effort to make changes to their HRLB.

It was also hypothesised that participants from SBUHB would have higher adherence and engagement as a result of their (or their organisations) involvement in the PD development process. Prior research has suggested that the inclusion of anticipated end-users in the design and development of web-based resources can improve adherence.

## 6.2 Methods

### 6.2.1 Study protocol

The study protocol was registered with ISRCTN (14.2.2020). ISRCTN18190978.

### 6.2.2 Ethical approval

The study received ethical approval from the Swansea University Medical School, Research Ethics Committee on 02.09.2019 (#2019 – 0056). Research & Development approval from ABMU HB JSRC was re-confirmed (14.08.2019) as service evaluation.

### 6.2.3 Trial design

A two-armed cluster RCT.

### 6.2.4 Trial arms

The two trial arms included the following components (Table 6.1).

**Table 6.1 RCT trial arm components**

<b>Trial arm</b>	<b>Champions for Health</b>	<b>ACTivate your well-being</b>
<b>Control</b>	Quit smoking, Alcohol reduction, Weight optimisation, Regular exercise, Eat healthily	
<b>Intervention</b>	Quit smoking, Alcohol reduction, Weight optimisation, Regular exercise, Eat healthily	ACT skill, ACT metaphor, Experiential exercises, Guided meditation, ACT clips, Well-being goal setting area

### 6.2.5 Participants

Participants were staff from the selected HB, staff from one Welsh University and staff from one small to medium sized enterprise (SME).

The participating HB underwent a significant boundary change between 2019 and 2020. As a result, the document review (chapter 4) was refreshed and the external HB website was re-reviewed to identify the hospitals and clinics remaining. Four key sites were identified: Singleton, NPT, Cefn Coed, and Morriston. As a result, the population served by ABMU HB (renamed Swansea Bay University Health Board (SBUHB) and the number of staff employed, decreased to 400,000 and 12,500 respectively.

In light of the smaller population, additional HBs were approached to participate. A series of meetings were scheduled via the director of public health (SBUHB) for the primary researcher to make a presentation to several management teams from all seven Welsh HBs to invite them to participate in the study and offer the ‘Champions for Health’ programme to their staff for 12-weeks in the first instance. Unfortunately, the director of public health left her post unexpectedly and the primary researcher was not able to attend the meetings as planned. In response alternative organisational groups were considered for inclusion. Staff from one Welsh university (Swansea University) were invited to participate. In 2020 Swansea university served a population of 20,620 students. Staff worked across a dual campus, similar to the included HB.

A local SME was also recruited via the Well-being through Work - In Work Support service (IWS). A Welsh government funded scheme which provides support for SME staff experiencing muscle or joint pain and/or stress, anxiety, low mood or depression. The service is available to any SME staff employed in Swansea, NPT or Bridgend County Boroughs. In 2020 'Champions for Health' was included into their portfolio. The partnership manager had initial responsibility for recruitment. Following a business breakfast recruitment event one SME selected 'Champions for Health' and the primary researcher delivered a presentation (24.01.20) to the Human Resource team and successfully concluded recruitment. Their aim was to trial the study website in the first instance, to inform future enrolment across the whole organisation.

#### 6.2.6 Eligibility

Inclusion criteria were

1. A member of staff at a participating organisation, at the time of the study
2. Aged 18 plus
3. Access to an internet enabled device
4. Ability to read English
5. Ability to provide informed consent

#### 6.2.7 Clusters

Participants were randomised at cluster level (described in chapter 5). Two clusters were manually created (Table 6.2), based on the number of staff per location and prior recruitment efforts in an attempt to overcome the limitation identified in the feasibility study.

**Table 6.2 Organisation locations and cluster assignment**

Site name	Location	Cluster 1	Cluster 2
Swansea University	Bay campus	x	
	Singleton park campus		x
SBUHB	Singleton Hospital	x	
	NPT Hospital	x	
	Cefn Coed Hospital		x
	Morrison Hospital		x

#### 6.2.8 Randomisation

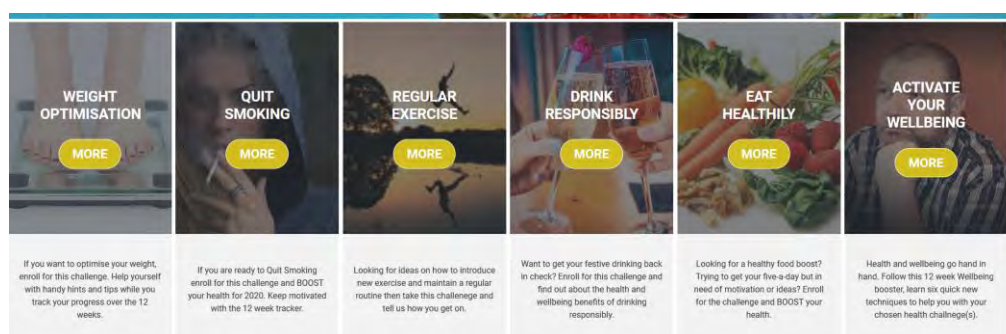
The programmer prepared two types of user profiles, one with access to the well-being module (intervention group) and one without (control group) and randomly allocated each cluster to a trial arm. SME participants were automatically allocated to intervention based on the terms of the agreement with IWS.

#### 6.2.9 Allocation concealment

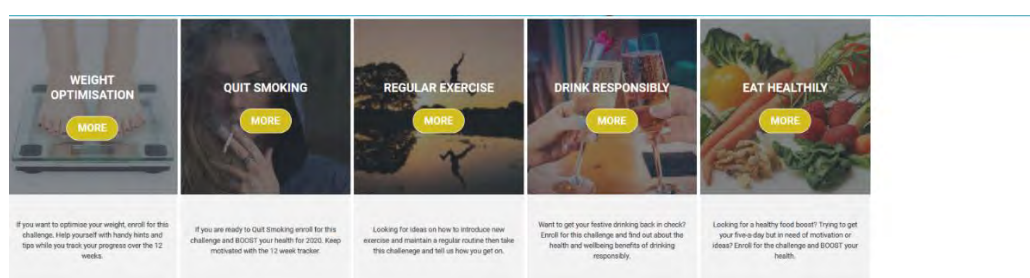
Only the programmer had access to the code used to assign users to a trial arm. The primary researcher was blinded to cluster allocation until the data extraction phase.

Participants were blinded to trial arm allocation during the consent and registration process. However, once registered and logged into the study website, it was immediately apparent whether they had access to the well-being intervention (Fig. 6.1) or not (Fig. 6.2). Thus, participants were not blinded to trial arm allocation after registration.

**Figure 6.1 Updated Intervention home page**



**Figure 6.2 Updated control home page**



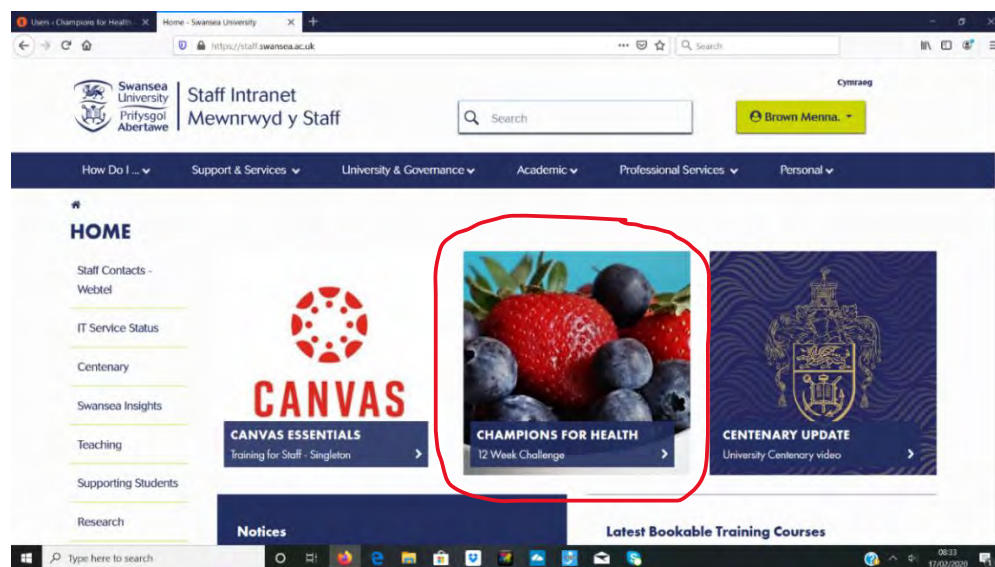
### 6.2.10 Recruitment

Recruitment was undertaken between 14.2.20 and 21.2.20, during which the four hospital sites and two university campuses were each visited once. At each site the primary researcher walked around the hospital site, wearing a Swansea university ID badge, and handed out the participant information sheet, displayed the study flyer and offered free portions of fruit to interested staff. In some hospitals individual permission was required from the sister on duty to display the study flyer and in other sites the general office staff provided permission. During recruitment, staff were free to ask questions. Interested staff were asked to display the study flyer in communal staff areas to increase visibility and raise awareness of the website. The primary researcher made efforts to approach all hospital ward and reception desks, departmental reception desks and open access staff areas across both university campuses (where permitted). Twice the primary researcher was invited to give a brief verbal presentation. In addition, electronic invitation and bi-lingual study flyers were displayed on SBUHB intranet (17.2.20 and 25.2.20) and Swansea University intranet (14.2.20 - 17.2.20, Fig. 6.3) and on electronic and physical notice boards at both sites. An

email was sent directly to all past participants and all 340, ‘Well-being Champions’ were invited to participate via email.

Following the official launch (17.2.20) two informal ‘drop in’ sessions were held, the first at Swansea University (25.2.20) was organised in collaboration with Swansea University Medical School marketing team. A one-hour lunchtime ‘drop in’ was held (Singleton park campus, ILS1) where all staff from the university and Singleton hospital (due to its geographical proximity) were invited for a chat and a free portion of fruit. The primary researcher was available to support registration to the website, answer any questions and to discuss health and well-being in general (Fig. 6.4). The second was held at the SBUHB Head Quarters (10.3.20), organised with the support of a member of staff who had participated in the PD phase of the study and whom the primary researcher had remained in contact with. The same opportunities were offered again.

**Figure 6.3 Swansea University internet advertisement**



**Figure 6.4 Drop-in session held at Swansea University**



#### 6.2.11 Procedure

Interested staff consented and registered via the study website (Fig 6.5) (appendix 11 outlines the updates). As before, once registered, participants were able to access the website freely by logging into their account. Participants were then able to select and enrol onto the lifestyle modules (Fig 6.6). Enrolment to the well-being intervention was automatic for those in the intervention arm.

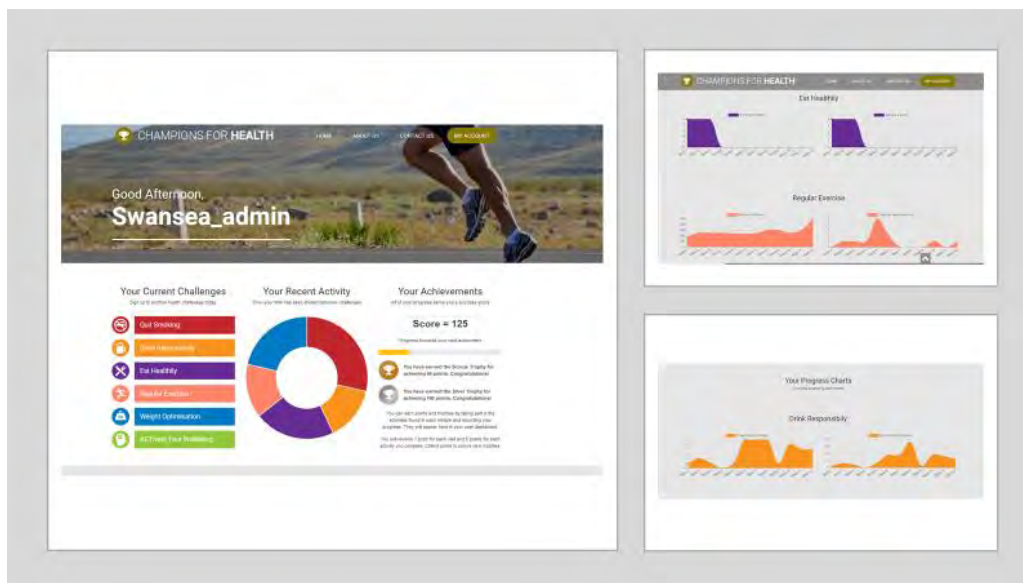
Participants were encouraged to access the website and ‘track their progress’ weekly. Once a week the primary researcher emailed participants who had ‘opted in’. The email message acted as a prompt or reminder to visit the study website and take part. Participants were free to access the website at any point during the 12-weeks. In the final week all participants were asked, to complete the post intervention outcome measures and provide feedback. Three email reminders were sent. After one week ‘non-use’ an email prompt was sent to participants to enquire if they still wanted to take part and to highlight the feedback and final questionnaire area, should they wish to end their challenge.



**Figure 6.5 Updated website images**



**Figure 6.6 Updated User Dashboard**



### 6.2.12 Outcome measures

The outcome measures remained the same as in the feasibility study i.e. WEMWBS and PHQ-4. The AAQ-II was included into the registration process and therefore became a mandatory component for all users.

### 6.2.13 Sample size considerations

A literature review was conducted to identify relevant articles which reported use of WEMWBS to measure changes in well-being following the application of a psychological intervention across adult populations.

Eight articles were examined including a review study (Maheswaran et al., 2012) which evaluated the responsiveness of WEMWBS as an outcome measure in 12 intervention studies across a range of populations (11/12 were adult populations, 3/12 included a control group). Authors utilised the standardised response mean (SRM) probability of change statistic ( $\hat{P}$ ) at group level and standard error of measurement (SEM) at individual level. Findings indicated that WEMWBS was responsive to change across a variety of mental health conditions. In order to assess the usefulness of each individual study included in the review, each were compared against the intended RCT using a three-point scale (Table 6.3). Each study was assessed across five categories (population, age, sex, intervention and duration of intervention) and a score between one and three was determined for each category thus a total score of 18 was possible. A total of 19 interventions were assessed (Table 6.4). Data were extracted from those scoring 14 and above (Table 6.5).

**Table 6.3 Three-point scale**

Score awarded	Population	Age	Gender	Intervention	Duration	Total score
3	Healthy adults and organisational setting	Adults	Mixed	Web-based delivery, focused on well-being or health behaviour change	10 weeks +	14-18
2	Adults	Specific adult age range		Focused on well-being or health behaviour change but not web based	2-9 weeks	10-13
1	Adolescents	<18	Male or female only	Focused on other topic and not web based	1 week or <	5-9

**Table 6.4 Interventions reviewed and scored (n=19)**

Evaluators	Population	Age	Gender	Intervention	Duration (weeks)	Total score
Perth and Kinross Local Authority	Unpaid carers	Adults	Mixed	Complementary therapy to support emotional health and well-being	12	13
Foundation for Positive Mental Health	Healthy self-referred working adults	30-65	Mixed	Self-help audio intervention	12	14
Family Links	Healthy Parents	30-40	Mixed	Group-based parenting programme	10	12
Body and Mind, Coventry and Warwickshire Mind	Individuals with schizophrenia, bipolar, depression and anxiety disorders	Adults	Mixed	1-1 sessions providing nutritional advice, physical activity and relaxation therapy	12	13
Parenting Early Intervention Pathfinder (PEIP)	Healthy parents of children with problem behaviour	Adults	Mixed	Three parenting programmes: Triple P, Incredible Years and Strengthening Families, Strengthening Communities	8-12	12
Recovery through Healthy Living Evaluation, Warwick Medical School	Patients with mental illness attending psychiatric day hospital.	Adults	Mixed	Recovery programmes	12	11

Up for it?	Healthy self-referred adults	Adults	Mixed	Health and lifestyle intervention programme offering; weight management, stress management, physical activity and stop smoking	6	13
Lanarkshire Sligo Sport and Recreation Partnership	Healthy self-referred adults	40-60	Mixed	Impact of walking in promoting positive mental health	8	13
PsyWell RCT, Warwick Medical School	Self-referred adults	Adults	Mixed	Mixed Internet based CBT skills training programme	5	14
Mindfulness in Schools RCT Cambridge Medical School	Healthy adolescents	14-15	Male	Mindfulness training covering the principles and practice of mindfulness meditation	4	6
NHS Mental Health OP clinic, Bath	Individuals with Schizophrenia	Adults	Mixed	Provision of Clozapine monitoring services by different cadres of health professionals	12	12
Mental Health Research Unit, Derby University	Healthy recruited adults	Adults	Mixed	Compassion computer game, involving repeatedly searching for and finding a compassionate face amongst an array of distractor faces	1	12
Powell et al. (2013)	General population in England	18+	Mixed	Web based CBT intervention for improving mental well-being (MoodGYM)	6	15
Crone, O'Connell, Tyson, Clark-Stone, Opher, & James (2013)	Patients with anxiety, depression, stress, low self-esteem, confidence, poor well-being, chronic illness or pain.	18+	Mixed	Improve mental well-being via 'Art Lift' intervention in a GP (UK) setting	10	12
Schrank, Riches, Coggins, Rashid, Tylee, & Slade (2014).	People with psychosis	*	*	Positive psychotherapy intervention (WELLFOCUS PPT) to improve well-being. Group intervention	11	
Seear, & Vella-Brodrick, (2013)	General population	Adults	Mixed	Two interventions: <i>three good things</i> and <i>best possible selves</i> and role of mindfulness.	1	12

Odou & Vella-Brodrick (2013)	General population	Adults	Mixed	Effects of mental imagery ability (MIA) on the efficacy of two positive psychology interventions (PPIs) to enhance well-being	1	12
McConachie, McKenzie, Morris, & Walley (2014)	Support staff working with individuals with intellectual disability	adults	Mixed	Acceptance and mindfulness-based stress management workshop	6	13
Clarke et al. (2015)	Young persons with Type 1 Diabetes	Adolescents	Mixed	Fully-automated CBT mobile phone and Web-based psychotherapeutic intervention ( <i>myCompass</i> ) for reducing mental health symptoms and diabetes-related distress, and improving positive well-being	7	11

\*Not reported

**Table 6.5 Data extracted from the studies meeting the cut off score (n=3)**

Study	Sample size	Mean T1 (pre intervention) (SD)	Change in score: post intervention Mean T2 (SD)
Foundation for Positive Mental Health	50	44.6 (8.0)	5.7 (6.3)
PsyWell RCT, Warwick Medical School	557	42.5 (9.4)	2.3 (7.7)
Powell et al. (2013)	1529	42.20 (9.81 *)	2.26

\* SD was estimated (based on SE =0.251) using the following calculation;  $SD = \text{square root } n \times SE$

Entering the data from Table 6.5 into the following sample size calculation (formula) tool <https://www.stat.ubc.ca/~rollin/stats/ssize/n2.html> an estimated sample size was calculated.

Reported rates of adherence, completion or dropout vary in the literature. For example, a systematic review of internet delivered interventions for anxiety and depression identified a 1-50% dropout rate in RCTs (Christensen et al., 2009). While another reported that 80% completion rate (Swift & Greenberg, 2012). However, iCBT average dropout has been reported at 32% (Kaltenthaler et al., 2008) and 56% completion (Waller & Gilbody, 2009) and 26% completion for unguided iCBT (Richardson & Richards, 2012). Thus, an estimated 50% dropout was added to the sample size estimate (Table 6.6).

**Table 6.6 Estimated sample sizes**

Study	ES (change in score/ Mean T1 x 100) %	Estimated sample size
Foundation for Positive Mental Health	12.7	31
PsyWell RCT, Warwick Medical School	5.4	263
Powell et al. (2013)	5.3	296

The calculation was then checked and validated against the following formula (Julious, 2009).

$$n_A = \frac{21\sigma^2}{d^2}$$

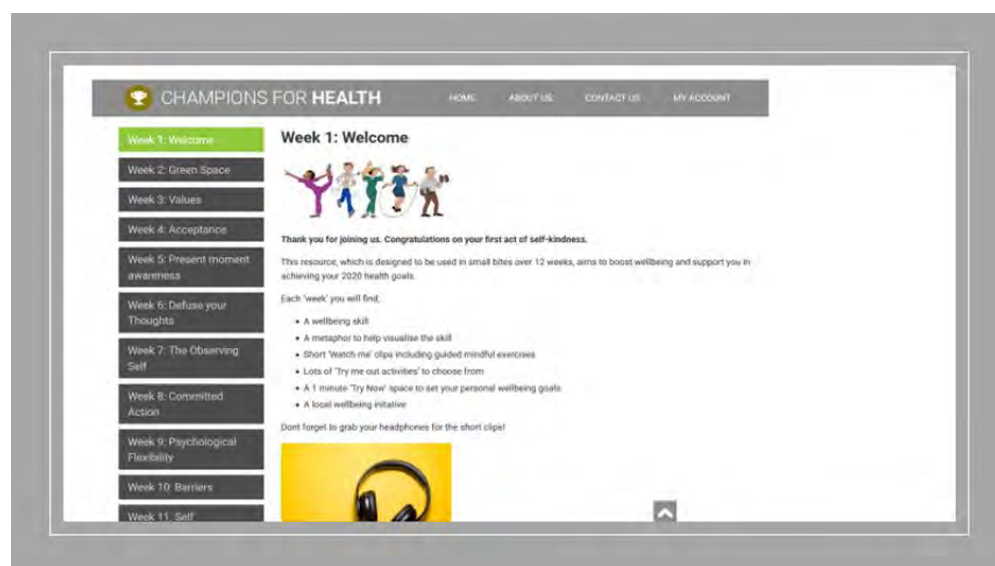
#### 6.2.14 Estimated sample size

Based on the above, an estimated 559 participants were required per trial arm to detect a difference in well-being score, measured by WEMWBS.

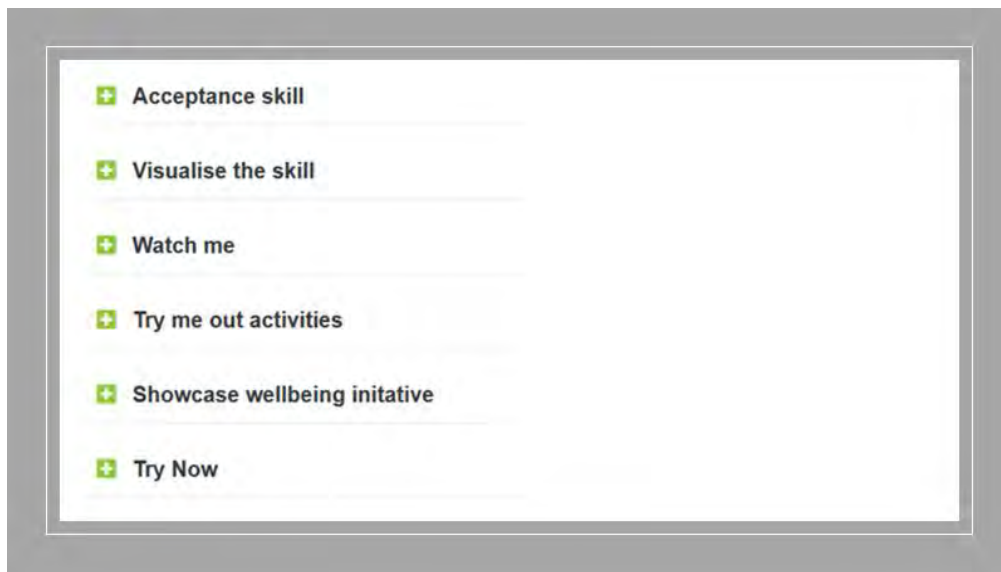
### 6.3 ACTivate your Well-being

The well-being intervention was updated in terms of its content, structure and visual display (Fig 6.5, Fig 6.6). Firstly, the content was streamlined (full update and content outlined in appendix 12). The psycho-educational ‘pop-up’ resources were incorporated into the therapeutic sections. For example, the PocketMedic well-being films were added to week one, the ‘Green space gallery’ was added to week two, the ‘Sleep’ resources were added to week 12, and the ‘Relaxation’ resources were integrated throughout. In addition, the therapeutic content, was condensed and the volume of text reduced, additional scenarios and audio files were added where possible to reduce the dependence on text. These changes were based on qualitative feedback (chapter 5) with the aim to simplify the resource for workplace use, and on findings from (Kelders, Bohlmeijer, et al., 2013) which indicated additional resources were rarely used. This created 12 standalone sessions, navigated via one vertical menu (Fig.7), each session was based on a different core principle. The structure of each week was also updated. Each week now included six elements (Table 6.7) listed in an expandable/collapsible vertical sub-menu (Fig.8).

**Figure 6.7 Vertical menu ‘ACTivate your well-being’**



**Figure 6.8 Vertical sub-menu**





**Table 6.7 Example, week 3**

<b>Week</b>	<b>ACT: core principle</b>	<b>Skill</b>	<b>Visualise the skill</b>	<b>'Watch me' clips</b>	<b>'Try me out' Experiential exercises</b>	<b>Showcase well-being initiative</b>	<b>'Try now'</b>
3	Values	Values	Compass metaphor	Values vs goals (Dr Russ Harris), Guided mindful meditation 1.	Popular self-values exercise, Life as a movie, Camera roll, 80th Birthday party, Batteries exercise, Ten steps to trying on a value	Well-being week at SBUHB. Examples of opportunities available and information on how to take part	Weekly goal setting area

## 6.4 Data Analysis

IBM® SPSS® Statistics version 26 was used.

### 6.4.1 Participant characteristics

Descriptive statistics (frequency, mean, percentage) was used to provide a summary description of registered users.

### 6.4.2 Trial arm

Descriptive statistics were used to examine statistical differences between trial arms at baseline. Non-parametric methods were used; Chi-square test (C-S) was used to examine differences between gender, supervisory status, place or employment and enrolment to lifestyle modules (in categorical variables). Independent samples Mann Whitney U test (M-W) was used to explore age, self-rated health, self-rated work performance, total number of self-reported days off work and scores on the three outcome measures. Participant flow was reported using a CONSORT flow diagram.

### 6.4.3 Outcome measures

The non-parametric Wilcoxon signed rank test (W-S-R) was used to identify any change in score for the three outcome measures pre to post intervention.

### 6.4.4 Adherence

Adherence to the study was measured and reported as described in chapter 5.

### 6.4.5 Engagement

#### 6.4.5.1 Enrolment

Enrolment to each lifestyle module was automatically recorded by the website and measured using descriptive statistics.

#### 6.4.5.2 Engagement

Engagement was automatically recorded. For example, engagement with a lifestyle module was recorded via the participant-initiated 'Track your progress' and 'Goal-setting' functions. Each time a participant engaged with these functions their activity was recorded. Likewise, engagement to 'ACTivate your well-being' was measured by a similar participant-initiated function called 'Try now'. This data was then extracted at the end of the study.

Frequency and type of engagement with these functions was explored using descriptive statistics. A Chi-Square test was used to compare engagement (as a binary variable, yes/no).

#### 6.4.6 HRLB modules

Health data entered per lifestyle module (via 'Track your progress') was compared at two time points, enrolment and the last recorded data entry point per participant. For example, the mean number of minutes exercised at enrolment was compared to the mean number of minutes exercised at the last recorded data entry week. Mean (M) score was calculated for comparison pre- and post-intervention.

#### 6.4.7 Sub-group analysis

Where allowing, subgroup analysis was conducted to explore baseline characteristics using Mann Whitney U test or Chi square test.

#### 6.4.8 Feedback survey and participant communication

Mean score were calculated to identify the most common responses to quantitative questions. Qualitative feedback data were examined visually and categorised thematically.

### 6.5 Results

#### 6.5.1 Participant characteristics

A total of 182 participants consented to take part and completed full registration. Of that, 168 were randomised to a trial arm (Fig. 6.9). The following section reports data on all participants including those not randomised unless stated otherwise.

Overall the majority of participants were female (n=139/182, 76%), employed by the University (n=135/182, 74%) in a variety of roles, did not supervise other staff (n=129/182, 71%), rated their health as 'good' to 'excellent' (n=142/182, 78%) on a five-point Likert scale and spanned all six age brackets (18-65 plus years old). Almost half self-reported no days off work in the past six months (n=85/182, 47%) and on average participants rated their general work performance 6.64 (SD, 2.57) on a scale of 1-10 with ten being the highest (Table

6.8). The majority (n=144/182, 79%) of participants opted in to receive the weekly email reminder.

**Table 6.8 RCT Participant characteristics (n=182)**

<b>Characteristics</b>		
<b>Randomised, n (%)</b>		168 (92)
<b>Total recruited</b>		182
<b>Gender, n (%)</b>	Female	139 (76)
	Male	41 (22)
	Prefer not to say	2 (1)
<b>Employer, n (%)</b>	Swansea University	135 (74)
	SBUHB	33 (18)
	SME	14 (8)
<b>Occupation (role), n (% per organisation)</b>		
NHS	Technical and craft occupations	1 (3)
	Routine manual and service occupations	3 (9)
	Clerical and intermediate occupations	9 (27)
	Middle or junior managers	6 (18)
	Senior managers or administrators	2 (6)
	Professional occupation	11 (33)
	Teaching and Learning	1 (3)
University	Research	27 (20)
	Clerical and intermediate occupations	24 (18)
	Middle or junior managers	11 (8)
	Senior managers or administrators	5 (4)
	Teaching and Learning	9 (7)
	Professional occupation	11 (8)
	Professional Services	38 (28)
	Management	1 (1)
SME	Innovation	2 (1)
	Other	7 (5)
	Clerical and intermediate occupations	3 (21)
	Professional occupation	10 (71)
	Senior managers or administrators	1 (7)
<b>Supervised others, n (%)</b>		129 (71)
<b>Age bracket (years), n (%)</b>	18-25	9 (5)
	26-35	66 (36)
	36-45	49 (27)
	46-55	38 (21)
	56-65	19 (10)
	65+	1 (1)
<b>Self-reported days off work, mean (SD)</b>		3.75 (12)
<b>Self-rated general health, n (%)</b>		
<b>Self-rated general health, n (%)</b>	Poor	7 (4)
	Fair	33 (18)
	Good	84 (46)
	Very good	47 (26)
	Excellent	11 (6)

Pre-Intervention Outcome measures scores mean (SD)		
	WEMWBS	46.01 (8.02)
	PHQ-4	2.95 (2.51)
	AAQ-II	18.84 (8.34)

### 6.5.2 Trial Arms

Participant characteristic per trial arm were examined for differences (Table 6.9).

**Table 6.9 RCT participant characteristics per trial arm (n=182)**

Characteristics		Trial arm	
		Intervention	Control
<b>Allocated, n (%)</b>		45 (25)	137 (75)
<b>Gender, n (%)</b>	Female	34 (76)	105 (77)
	Male	9 (20)	32 (23)
	Prefer not to say	2 (4)	0
<b>Employer, n (%)</b>	University	23 (51)	112 (82)
	SBUHB	8 (18)	25 (18)
	SME	14 (31)	0
<b>Occupation, n (%)</b>			
NHS/SME	Technical and craft occupations	0	1 (1)
	Routine manual and service occupations	2 (4)	1 (1)
	Clerical and intermediate occupations	9 (20)	27 (20)
	Middle or junior managers	5 (11)	12 (9)
	Senior managers/ administrators	2 (4)	6 (4)
	Professional occupation	13 (29)	19 (14)
University	University Research	4 (9)	23 (17)
	University Teaching and Learning	1 (2)	9 (7)
	University Professional Services	6 (13)	32 (23)
	University Management	0	1 (1)
	University Innovation	2 (4)	0
	University Other	1 (2)	6 (4)
<b>Supervised others, n (%)</b>		13 (29)	40 (29)
<b>Age bracket (years), n (%)</b>	18-25	2 (4)	7 (5)
	26-35	16 (36)	50 (36)
	36-45	15 (33)	34 (25)
	46-55	9 (20)	29 (21)
	56-65	3 (7)	16 (12)
	65+	0	1 (1)
<b>Self-reported days off work, mean (SD)</b>		2.28 (4)	4.23 (13)
<b>Self-rated general work performance score<sup>a</sup>, mean (SD)</b>		6.91 (2)	6.55 (2)
<b>Self-rated general health, n (%)</b>	Poor	0	7 (5)
	Fair	10 (22)	23 (17)
	Good	20 (44)	64 (47)
	Very good	13 (29)	34 (25)
	Excellent	2 (4)	9 (7)

Pre intervention outcome measures, mean (SD)			
	WEMWBS	46.51 (6.53)	45.8 (8.47)
	PHQ-4	2.84 (2.54)	2.98 (2.51)
	AAQ-II	18.73 (7.57)	18.87(8.61)
Enrolment to lifestyle modules, n (%)			
	Quit smoking	0	1 (1)
	Drink responsibly	5 (11)	12 (9)
	Eat healthily	9 (20)	25 (18)
	Exercise regularly	14 (31)	39 (28)
	Weight optimisation	9 (20)	39 (28)
	Well-being	16 (36)	n/a

<sup>a</sup> On a scale of 1-10, with 10 being the highest.

At baseline a significant difference between participants place of employment (organisation) was detected (n=182, p<0.001', C-S), due to the fact that 14 SME staff were automatically allocated to intervention (Table 6.10). When these staff were removed from the analysis there was no significant difference (n=168, p=0.339, C-S).

**Table 6.10 Number of staff allocated to each trial arm per employing organisation**

		Organisation			Total
		University	NHS	SME	
Trial arm	Intervention	23	8	14	45
	Control	112	25	0	137
Total		135	33	14	182

Equally at baseline a significant difference between participants gender was observed (n=182, p=0.044, C-S). On examination it was evident that two participants in the intervention group reported their gender as 'prefer not to say'. When these participants were removed from the analysis there was no significant difference (n=180, p=0.741, C-S). No other significant differences between trial arm were observed (Table 6.11).

**Table 6.11 Examination of trial arm differences at baseline (n=182)**

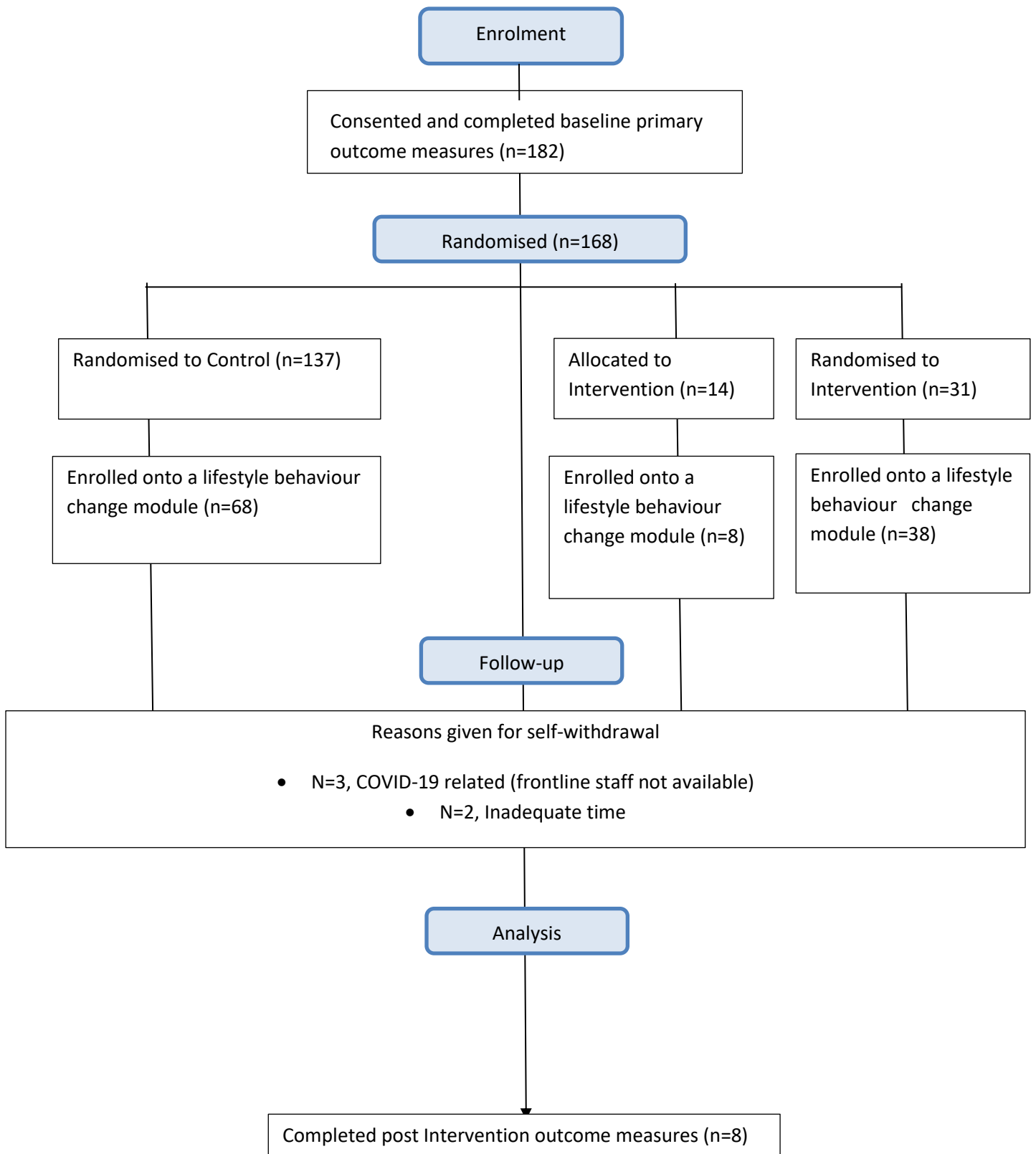
Variable	Significance
Supervisory status	p=0.969, (C-S)
Age	p=0.684 (M-W)
Self-rated work performance	p=0.546 (M-W)
Self-rated health	p=0.860 (M-W)
self-reported day off work	p=0.553 (M-W)
WEMWBS	p=0.642 (M-W)
PHQ-4	p=0.693 (M-W)
AAQ-II	p=0.815 (M-W)

Finally, no differences were observed between the two trial arms regarding enrolment or engagement to the HRLB modules at baseline (Table 6.12).

**Table 6.12 Examination of baseline differences for lifestyle modules (n=182, C-S)**

Lifestyle module	Enrolment	Engagement
Quit Smoking	p=0.565 (C-S)	p=0.565 (C-S)
Drink responsibly	p=0.638 (C-S)	p=0.638 (C-S)
Eat healthily	p=0.794 (C-S)	p=0.794 (C-S)
Exercise regularly	p=0.735 (C-S)	p=0.664 (C-S)
Weight optimisation	p=0.263 (C-S)	p= 0.451 (C-S)

**Figure 6.9 CONSORT flow diagram**





### 6.5.3 Outcome measures

The primary outcome measures were completed at baseline by all participants (n=182) and at post intervention (n=8).

#### 6.5.3.1 WEMWBS

Baseline M=46.01 (n=182, SD, 8.02, range 23-67). Post-intervention M=46.25 (n=8, SD, 6.84, range 34-57), no significant difference was observed (p=0.778 W-S-R). Intervention baseline M=46.51 (n=45, SD, 6.53, range 33-60) increased post intervention M=49.50 (n=2, SD, 4.95, range 46-53). But this was not statistically significant (p=0.180, W-S-R). Control baseline M=45.84 (n=137, SD, 8.47, range 23-67) decreased post intervention M=45.17 (n=6, SD, 7.41, range 46-57). No significant difference was observed (p=0.752, W-S-R).

#### 6.5.3.2 PHQ-4

Baseline anxiety and depression (combined) scores, were slightly above (combined M=2.95, SD, 2.51, range 0-12) the normal population range of 0-2 but fell below the 'yellow flag' combined score of 6-8 (Kroenke et al., 2009; Löwe et al., 2010). The combined PHQ-4 reduced post intervention (M=1.63, SD=2.13, n=8, range 0-5) but the difference was not statistically significant (p=0.854, W-S-R).

Intervention baseline M=2.84 (n=45, SD, 2.54, range 0-10) decreased to 0 post intervention (n=2, SD, 0, range 0) but the difference was not statistically significant (p=1.000, W-S-R). Control baseline M=2.98 (n=137, SD, 2.51, range 0-12) decreased post intervention M=2.17 (n=6, SD, 2.22, range 0-5). No significant difference was observed (p=0.854, W-S-R).

#### 6.5.3.3 AAQ-II

Baseline psychological flexibility M=17.25 (n=182, SD, 6.75, range 7-44) increased to M=19.63 (n=8, SD, 6.30, range 9-28) but this was not statically significant, p=0.261, W-S-R). Intervention baseline M=18.73 (n=45, SD, 7.57, range 4-38) decreased post intervention M=17.50 (n=2, SD, 2.12, range 16-19) indicating an improvement however it was not statistically significant (p=0.655, W-S-R). Control baseline M=18.87 (n=137, SD, 8.61, range 47-4) increased post intervention M=20.33 (n=6, SD, 7.23, range 9-28) but again was not statistically significant (p=0.344, W-S-R).

#### 6.5.4 Adherence

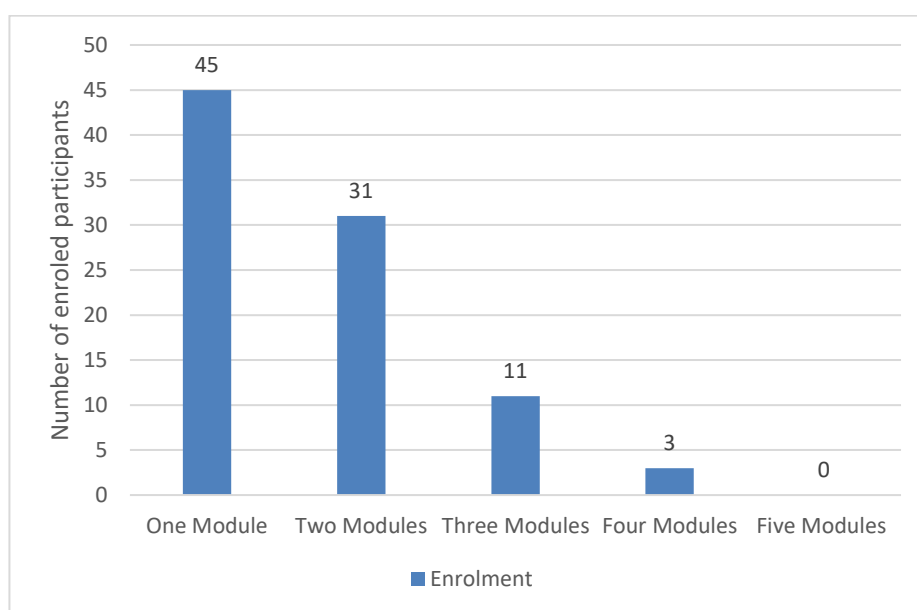
Adherence to study protocol was poor only eight participants completed the outcome measures at post intervention (n=8/182, 4%). Of those only two (n=2/8, 25%) were intervention group.

#### 6.5.5 Engagement

##### 6.5.5.1 Enrolment

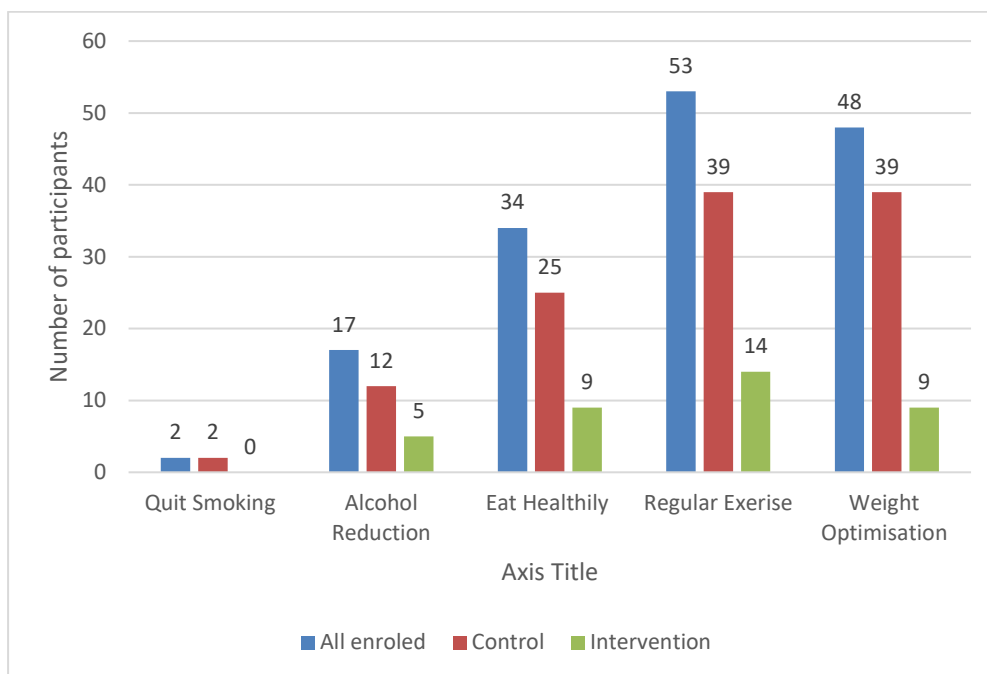
Almost half of the participants enrolled onto a HRLB module (n=90/182, 49%), 45 (n=45/182, 25%) enrolled onto one HRLB module, 31 onto two HRLB modules (n=31/182, 17%), 11 onto three HRLB modules (n=11/182, 6%) and three onto four HRLB modules (n=4/182, 2%). None enrolled onto all five HRLB modules (Fig 6.10).

**Figure 6.10 Enrolment onto lifestyle modules (n=90)**



Enrolment to the five HRLB modules varied. The least popular module was ‘Quit smoking’. The most popular were ‘Weight optimisation’ and ‘Regular exercise’ (Fig 6.10). Enrolment to the HRLB modules overall did not differ significantly between trial arms (p=0.931, C=S) (Fig 6.11, Table 6.13).

**Figure 6.11 Enrolment per lifestyle module, per trial arm (n=90)**



**Table 6.13 Enrolment per trial arm**

Trial arm	Module				
	Quit smoking	Alcohol reduction	Eat healthily	Regular exercise	Weight optimisation
<b>Control</b> 137 (75.3)	2 (1)	12 (9)	25 (18)	39 (28)	39 (28)
<b>Intervention</b> 45 (24.7)	0	5 (11)	9 (20)	14 (31)	9 (20)
<b>Total</b>	2 (1)	17 (9)	34 (19)	53 (29)	48 (26)

### 6.5.5.2 Engagement

All but one of those who enrolled onto a lifestyle module went on to engage in their selected module (n=89/90, 99%). Only two participants engaged with the well-being module (Table 6.14).

**Table 6.14 Number of participants who engaged with a module, per trial arm**

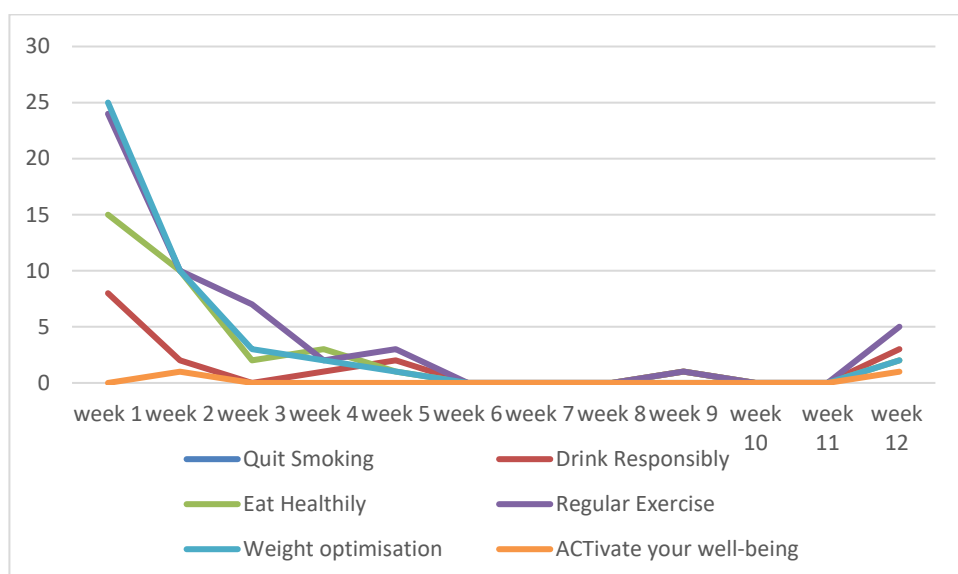
Trial arm	Module					
	Quit Smoking	Drink Responsibly	Eat Healthily	Regular Exercise	Weight Optimisation	ACTivate your well-being
<b>Control</b> 137 (75)	1 (1)	12 (9)	25 (18)	38 (28)	35 (25)	n/a
<b>Intervention</b> 45 (25)	0	5 (11)	9 (20)	14 (31)	9 (20)	2 (4)
<b>Total</b> 182	1 (1)	17 (9)	34 (19)	52 (29)	44 (24)	2 (4)

<sup>n/a</sup> Not applicable. No access to this module.

The duration of engagement varied across the lifestyle modules (Fig. 6.12) as did use of the goal setting function (Table 6.15). The least used module was Quit smoking, only one of the two enrolled participants (n=1/2, 50%) engaged with the module, and for only one week.

All 17 ‘Drink responsibly’ participants engaged for at least for one week, three participants (n=3/17, 6%) engaged for the full 12-weeks and 11 participants used the goal setting function (n=11/17, 65%). All 34 ‘Eat healthily’ participants engaged for at least for one week, two participants (n=2/34, 6%) engaged for the full 12-weeks and half used the goal setting function (n=17/34, 50%). Forty-four (n=44/48, 92%) ‘Weight optimisation’ participants engaged for at least for one week, two (n=2/44, 4%) participants engaged for the full 12-weeks and the majority used the goal setting function (n=36/48, 75%). Equally almost all (n=52/53, 98%) ‘Regular exercise’ participants engaged for at least for one week, five (n=5/53, 9%) engaged for the full 12-weeks and over half used the goal setting function (n=35/53, 66%). Engagement did not differ significantly between trial arms (n=182, p=0.998, C-S).

**Figure 6.12 Number of participants who completed each week, per HRLB module**



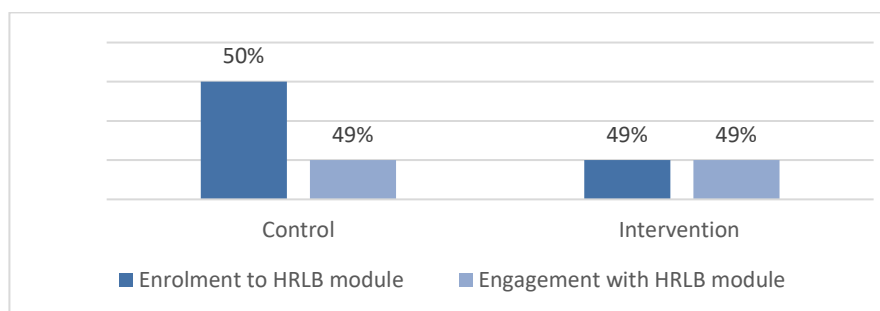
Duration of engagement per lifestyle module did not significantly differ between trial arms (n=182, M-W); ‘Quit Smoking’ (p=0.567, M-W), ‘Drink responsibly’ (p=0.565, M-W), ‘Eat healthily’ (p=0.739, M-W), ‘Exercise regularly’ (p=0.777, M-W), ‘Weight optimisation’ (p=0.604, M-W). Nor did module completion (n=182, p=0.985, M-W).

Use of ‘Goal setting’ (Table 6.15) did not significantly differ between trial arms (n=182, M-W); ‘Quit Smoking’ (p=1.0), ‘Drink responsibly’ (p=0.357), ‘Eat healthily’ (p=0.639), ‘Exercise regularly’ (p=0.880), or ‘Weight optimisation’ (p=0.413).

**Table 6.15 Use of Goal setting function, per module (n=90)**

Module	Engaged	Use of ‘Goal setting’ function	Longest engagement duration
N (%)			Weeks (participants)
<b>Quit smoking</b>	1	0	1 (1)
<b>Drink responsibly</b>	17	11 (65)	12 (3)
<b>Eat healthily</b>	34	17 (50)	12 (2)
<b>Regular exercise</b>	52	35 (66)	12 (5)
<b>Weight optimisation</b>	44	36 (75)	12 (2)
<b>Well-being</b>	2	2 (100)	12 (1)

**Figure 6.13 Percentage of users who enrolled and engaged in a HRLB module, per trial arm**



### 6.5.6 Health Related Lifestyle Behaviour

Improvements were observed for three HRLB modules, but none met statistical significance (Table 6.16).

**Table 6.16 Lifestyle module, physical health improvements per trial arm**

Trial arm	Drink responsibly		Regular exercise		Weight optimisation	
	units consumed M (SD)		minutes exercised M (SD)		BMI M (SD)	
	T1	T2	T1	T2	T1	T2
<b>Combined (n)</b>	16	8	52	29	43	16
	16.75 (11.70)	7.63 (5.85)	136.46 (104)	200 (134.43)	29.44 (9.40)	27.63 (3.07)
<b>Significance (M-W)</b>	p=0.663		p=0.900		p=0.477	
<b>Control (n)</b>	11	4	39	23	34	13
	17.82 (13.07)	6.75 (7.63)	137.77 (108.164)	190.96 (129.88)	29.59 (10.22)	27.46 (2.87)
<b>Intervention</b>	5	4	13	6	9	3
	14.40 (8.73)	8.50 (4.43)	132.54 (94.33)	235 (158.52)	28.89 (5.73)	28.33 (4.50)

### 6.5.7 Subgroup analysis

Users who engaged (n=89) in a HRLB module were compared to those who registered but did not engage (n=93). The one participant who enrolled but did not engage was included in the latter group. No significant differences were observed at baseline for WEMWBS (p=0.647, M-W), PHQ-4 (p=0.275, M-W), AAQ-II (p=0.843, M-W), self-rated health (p=0.260, M-W), self-rated work performance (p=0.414, M-W), self-reported days off work (p=0.699, M-W), gender (p=0.316, C-S), supervisory status (p=0.946, C-S), or organisation (p=0.257, C-S).

Participants who engaged and completed post intervention outcome measures (n=8) were compared to those who engaged but did not (n=81). A slight difference was observed for baseline PHQ-4 (n=89, p=0.057, M-S) however it only neared statistical significance. When mean scores were compared, those who completed, had a lower PHQ4 score at baseline M=1.50 (n=8, SD, 2.39 range 0-7) compared to M=2.90 (n=81, SD, 2.53 range 0-12) for those who didn't. No other significant differences were observed WEMWBS (p=0.966, M-W), AAQ-II (p=0.779, M-W), self-rated health (p=0.963, M-W), self-rated work performance (p=0.133, M-W), self-reported days off work (p=0.823, M-W), gender (p=0.312, C-S), supervisory status (p=0.838, C-S), or organisation (p=0.280, C-S).

Participants who engaged and completed a module (n=8) were compared to those who engaged but did not complete (n=81). A significant difference was observed for baseline PHQ-4 (n=89, p=0.001, M-W). When the mean scores were compared those, who completed a module had lower baseline PHQ-4 M=.38 (SD, 7.44, range 0-2) compared to M=3.01 (SD, 2.53, range 0-12). Of those who completed a module, half completed two or three modules. All were university staff.

Intervention participants who engaged (n=2) were compared to those who did not (n=43). A significant difference was observed for baseline PHQ-4 (n=45 p=0.044, M-W). When the mean scores were compared those, who had engaged had lower baseline PHQ-4 M=.00 compared to M=2.98 (SD, 2.52, range 0-10).

No other significant differences were observed WEMWBS ( $p=0.935$ , M-W), AAQ-II ( $p=0.440$ , M-W), self-rated health ( $p=0.769$ , M-W), self-rated work performance ( $p=0.514$ , M-W), self-reported days off work ( $p=0.290$ , M-W), gender ( $p=0.544$ , C-S), supervisory status ( $p=0.356$ , C-S) or organisation ( $p=0.368$ , C-S).

#### 6.5.8 Feedback survey

The feedback survey was completed by nine ( $n=9/182$ , 5%) participants. Results indicated that the registration process was acceptable, the website useful and the well-being module was easy to navigate and useful.

Self-reported success was mixed, on a five point scale (1 'not at all successful' to 5 'very successful') three participants reported they were 'not at all successful' in their chosen challenges ( $n=3/9$ , 33%), three were slightly successful ( $n=3/9$ , 33.3%), one was fairly successful ( $n=1/9$ , 11%), and two were very successful ( $n=2/9$ , 22%).

When asked what element of the website users most enjoyed, the majority ( $n=8/9$ , 89%) selected 'track your progress' and one ( $n=1/9$ , 11%) selected 'motivational goal setting' For the well-being module all selected a different response; Try at home, Watch, PocketMedic, Try now.

When asked to consider the following 'Compared to before you took part in Champions for Health, are you now...?' a range of answers were selected 'Making a change to your weight in the right direction' ( $n=4/9$ , 44%), 'Doing more walking' ( $n=3/9$ , 33%), 'Eating your 5-a-day more regularly' ( $n=2/9$ , 22%) and 'Drinking within recommended levels more often each week?' ( $n=1/9$ , 11%) and 'Looking after your own well-being' ( $n=1/9$ , 11%). Users were asked 'Which of the following made it harder to stick with the 12-week health challenge?' 'COVID-19' was listed six times ( $n=6/9$ , 67%) and difficulty logging in ( $n=1/9$ , 11%).

The free comments text box was completed by eight participants ( $n=8/9$ , 89%) (Table 6.16). Feedback centred on the impact of COVID-19, suggestions for resources, general comments on the website and the well-being resource (Table 6.17).



**Table 6.17 Participant extracts (Feedback)**

**COVID-19**

*“The Coronavirus pandemic”*

*“COVID-19 pandemic reduced my time for exercise”.*

*“Worldwide pandemic”*

*“The changes with COVID-19 and life in general”*

*“At times struggling to purchase sufficient fruit and veg due to coronavirus restrictions and trying to avoid shops”*

*“Lock down – fitting in work and homeschooling, and only being allowed to exercise once per day outdoors. Not much space for exercise indoors when house full of people, so options were limited”*

*“In general, I think it was a useful resource. However, with the uprooting of work, home and life with the current pandemic, it was unfortunate timing. I managed to keep on top of things at the start, but found it more difficult mentally to find the motivation as the weeks wore on”*

**Resource suggestions**

*“I did make my own spreadsheet to log weight and daily exercise. Would be good to actually include something like that on your website...On the fitness challenge, it would be useful to have definitions of what counts as strength exercises and as moderate to vigorous exercise, so you don't have to look them up”*

*“On the recording tools, it would be useful to be able to add new goals or amend goals separately from logging a weekly result”*

*“The BMI calculator (provided as a link) is really good. However, it would be better if you could record BMI to a decimal point. My BMI has been dropping and is now almost 1.5 lower but has shown as the same for 7 ish weeks. On the graph it therefore seems like there is no progress but if it was to the decimal point it would be more motivating”*

*“Healthy eating, I found this really helpful. However, it could be improved by allowing you to record how many of the 5 a day you eat every day”*

*"I haven't particularly been doing any more of the options in... "Compared to before you took part in Champions for Health", but I have been doing more weights, though that wasn't an option. It would have been nice to be able to write in daily progress in a diary form rather than only filling in at the end of the week. Sometimes I found it hard to remember exactly what I had done by the end of the week. I also would have liked more suggestions within the website of what exercise to do, and suggestions for starting slowly and then building up the minutes as the intervention progressed, because I wasn't too sure where to start. An app would be ideal"*

### **Website in general**

*"It was helpful receiving the weekly email reminders, as I would have forgot otherwise"*

*"The tool is very useful overall. The reason it is useful to me is that it encourages you to consider what you have signed up to and gets you to think about it regularly. If you are motivated, this helps keep you on track and think about your goals. I also find the idea of goal setting, reflecting and re-evaluating useful"*

*"The additional information that was available was also really good. Even though I am fit and healthy, a lot of the info was new. I have used the fact sheet about how many of each item counts as one of your 5 a day many times. It is saved on my phone as a pdf and I look at it several times a week"*

*"The resources weren't what I was looking for"*

### **Well-being resource**

*"I can't find the well-being resource!" (control participant)*

Participant communication and feedback was also received via the 'Contact Us' form on the website and via direct email either as a result of a query initiated from the contact form or a reply to the weekly email reminder which was sent by the primary researcher. In total thirty participants emailed the primary researcher. The majority of emails were received during the two-week registration period and they related to difficulties accessing or completing the registration process (n=19/29, 65%). For example, several SBUHB participants

were either unable to access the registration page or complete the registration process. Access to the website was limited to modern web browsers (i.e. Firefox, Microsoft Edge and Chrome). This was not evident until after recruitment began at which point it emerged that the default browser at SBUHB was Microsoft explorer (an old and insecure browser). As a result, staff could only view the Champions for Health home page. After this point access was restricted, i.e. they could not access the registration page to take part. The primary researcher became aware of this issue immediately following the website launch via participant generated emails, after a few days of questioning and communication with the programmer and the communications department at the HB the cause of the issue was identified and an updated advertisement was placed on the HB intranet advising staff to use an appropriate browser, also all those who contacted the primary researcher were informed individually and provided with information to enable them to register. For those unable to complete the registration process no reason was identified. The primary researcher liaised with those staff who got in-touch and advised them individually on how best to proceed i.e. to check that all fields were completed, to refresh the web browser, to try again from a different device.

Other communication topics were, uncertainty on how to use the website, after registration “I've signed up and answered some psychological screening questions and told you my BMI. Now what? Website is really unclear” (one user), uncertainty on how to locate the feedback from “I am struggling to find the feedback form. Could you send me a link to it please” (one user) two suggestions for changes, one related to the weekly email “May I kindly suggest you have a link to the website on the email. It would help us, participants to redirect to website straight from your email” and the other to the use of weight not BMI in the weight optimisation module “I signed up on the champions for health website and have been updating my info. One suggestion I have is if you could add a weight and/or body fat percentage tracking instead of BMI, as BMI isn't really a good measure of healthy weight for lots of people” and two positive messages, the second of which highlighted the impact of lockdown; “Signed up! Good luck”, “Thanks for running this, I appreciate that you have your own goals and purposes but it has been a useful framework to track a few things over the

last 3 months. Just back "in work" after a week "off" - didn't go anywhere obviously - and added the final week's data. I think the lockdown has had a few benefits, one of which is I have nearly two hours a day where I am not stuck on the M4 / Fabian Way getting in and out of Swansea. I've tried to use that time to do long walks with the dog". A final email requested access to the well-being module in the future "It doesn't look as though I have been randomised to receive ACTivate your Well-being. Will there be an opportunity to do that in the future when the trial has finished? I am really keen to do the course".

During the study seven (n=7/144, 4%) users contacted the primary researcher and asked to be removed from the mailing list that they had opted into (weekly email reminder). Three users indicated that as a result of COVID-19 they were unable to continue as they were frontline NHS staff for example, "Am frontline NHS staff and my focus on my role at this time", "Please could I stop receiving emails for the health challenge. I'm finding with everything going on this sadly has become the last thing on my mind and I'm not taking it as seriously as I would like" and "redeployed in work I haven't been active with your programme. In view of this please remove me from your study". Two indicated inadequate time, "I signed up to it then never went back on (too busy). So, the emails are not needed" and another "I've missed the first two weeks of challenges. Will be better prepared another time. Thank you" and the others did not provide a reason "I would like to unsubscribe from this challenge".

## 6.6 Discussion

### 6.6.1 Principal findings

This study aimed to explore the impact of including a 12-week, structured, sequential emotional well-being intervention, based on ACT, into a web-based, workplace, HRLB change programme on the following three outcomes: HRLB behaviour change, adherence and engagement, and emotional well-being. Its secondary aim was to explore whether the PD process used to develop the intervention had a positive impact on engagement. Principle findings for each objective are outlined in turn.

In total 182 staff from three organisations and multiple locations registered to take part. The majority of participants (76%) were from Swansea University with the remaining participants from SBUHB (18%) and one local SME (8%). University and HB participants were randomised to either control or intervention. SME staff were allocated to the intervention. Those in the intervention arm were automatically enrolled onto ‘ACTivate your well-being’. The majority of participants were female (74%), did not supervise other staff and considered their health to be ‘good’. Less than half reported no days off work in the last six months. Self-rated work performance was positive. Baseline well-being scores were below published population averages.

#### 6.8.1.1 Study objective one: HRLB outcomes

It was hypothesised that the inclusion of the emotional well-being intervention would support individuals to sustain engagement with selected HRLB module(s) and as a result improve health outcomes.

Analysis of ‘Track your progress’ data indicated that health improvements were observed in three of the five HRLB modules. Data indicated that participants who engaged with the programme successfully reduced their mean alcohol consumption, saw a reduction in BMI, and increased the mean minutes of exercise undertaken. No observation for ‘Eat healthily’ could be identified due to varied data recording. This suggested that engagement with the HRLB modules successfully supported health improvement. No additional benefit was observed for intervention group participants. The reasons for this are explored further as study limitations.

#### 6.8.1.2 Study objective two: Adherence and engagement

It was hypothesised that the inclusion of the well-being intervention would increase adherence and engagement to the programme. On the basis that increased well-being, may enable and/or support individuals to stay engaged with their selected HRLB module(s) for the study duration.

In this study adherence was considered, completion of pre and post intervention outcome measures. While engagement was considered, active use of the website measured by two embedded functions ‘Track your progress’ and ‘Goal

setting'. Of these the former was most commonly used, although use of the latter ranged from 50-75% per HRLB module.

Overall, engagement to the HRLB modules was positive. Almost half (49%) enrolled onto one or more HRLB modules. The most popular remained 'Regular Exercise' and 'Weight Optimisation', similar findings have been reported elsewhere (Schulz et al., 2015). The least popular remained 'Quit Smoking'. All but one of those who enrolled went on to engage in their selected HRLB module. No significant differences were observed between control and intervention group participants. Eight participants completed the 12-week programme, with four of the five HRLB modules being completed. Two completers were intervention group participants. On examination it was observed that the majority of those who completed a HRLB module were female, employed by the university, did not supervise others, rated their health as 'good' and self-reported less than four days off work in the past six months. The only significant difference observed between completers and non-completers was a lower PHQ-4 score at baseline (indicating positive well-being) for completers. This may indicate that those in greater need were less likely to complete the full programme.

Adherence was poor, only eight participants completed all three post intervention outcome measures. On examination, participants who completed the time two outcome measures recorded higher engagement with the HRLB modules. This may indicate that increased engagement supports adherence. In line with the above these participants recorded a significantly lower baseline PHQ-4 score. This may indicate that those in greater need of well-being support were also less likely to adhere.

#### 6.8.1.3 Study objective three: Well-being

It was hypothesised that engagement with the emotional well-being intervention would lead to positive improvements in well-being.

Enrolment to the well-being intervention was automated to reduce barriers to use and encourage easy access to the resource. However, this meant that enrolment could not be measured. Engagement was minimal, only two intervention participants engaged as measured by the embedded 'Try now'

function, a weekly well-being goal setting and reflection area. No other interaction points were included, so it was not possible to determine whether participants in the intervention group read the weekly materials, explored the well-being skill, downloaded the PDF resources, watched the YouTube links, tried the experiential exercises or explored the well-being showcase section. This is considered further as study limitation.

Of the two participants who engaged, one completed the full 12-weeks. However, both went on to complete their selected HRLB modules. On examination, both were University staff, one male and one female, aged 36-45 (bracket) years old, neither supervised other staff, self-rated their health as 'good' and reported a maximum of five days sickness absence in the past six months. While mean WEMWBS score increased for these two participants, it was not statistically significant. It is also not meaningful to compare data for two participants. Thus, it was not possible to address the research question. Reasons for this are explored further as a study limitation.

#### 6.8.1.4 Study objective four: PD

It was anticipated that SBUHB staff would engage and adhere to the programme more than other staff groups due to their organisation's involvement in the PD development phase (chapter 4). However, this was not found to be the case. No differences were observed for adherence or engagement based on organisation. Thus, the PD process did not encourage engagement with the end-product. Reasons for this are explored further as a study limitation.

#### 6.6.2 Comparison with prior studies

Study findings are first compared to the feasibility study (chapter 5). The number of participants recruited was similar (n=142, n=182 respectively). Thus, whilst exceeding the feasibility study sample size, the RCT was under powered. However, the level of interest suggested demand for web-based health and well-being resources remains current.

Recruited participant characteristics were also comparable (88% female compared to 76% in the RCT), self-rated work performance was higher and more participants self-reported no days off (61% and 47% respectively). Equally there were subtle differences in enrolment to the HRLB modules. For example,

more participants in the feasibility study enrolled onto a HRLB module (74% compared to 49% in the RCT). However, enrolment and engagement were almost identical. Popularity of the HRLB modules, measured by enrolment rate, followed the same pattern. In both studies only two users enrolled onto ‘Quit smoking’.

Looking at adherence, rates were similar, in the feasibility study only seven (7%) users completed a post intervention outcome measure compared to eight in the RCT (4%). Thus, the RCT failed to address the earlier limitations surrounding poor adherence to study protocol. Despite including a non-use email prompt.

Slight differences in mean outcome measure scores were observed. For example, mean baseline WEMWBS was identical (46), both studies saw a non-significant improvement post-intervention. Mean baseline PHQ-4 score was similar (1.84 compared to 2.95) and neither saw a significant improvement post intervention. While AAQ-II scores were lower at baseline in the RCT which (indicates greater psychological flexibility) and increased post intervention for control group (18.87-20.33) indicating a non-significant decrease in flexibility. However, the timing of the study may have influenced this outcome (COVID-19 pandemic resulted in UK wide rise in mental health difficulties (Hamza Shuja et al., 2020). This post intervention mean score rose above the marker for psychological flexibility however it remained well below the suggested cut off point for depression and anxiety screening (24-28). RCT intervention participants saw a non-significant increase in flexibility, post-intervention (18.73-17.15). Likewise, the feasibility study saw a greater, yet still insignificant improvement (21.7-17.5). However, numbers were too small to be meaningful.

Furthermore, the RCT study, like the feasibility study was also limited by the cluster design. The RCT was under-represented in the intervention group while the feasibility study was under-represented in the control group. This issue is considered further as a limitation.

The current RCT can be compared to other published findings. For example, Howarth et al. (2018) identified ‘modest evidence’ for effectiveness of



workplace interventions. Following review of 22 web-delivered, health interventions which explored impact on health-related outcomes in employed persons using a RCT design. Only nine studies were deemed effective. Of interest, interventions which targeted alcohol reduction were least likely to report a positive effect. Followed only by interventions designed to improve well-being and stress related musculoskeletal conditions. Like the current study staff from both public and private sector workforces were recruited (including nurses and health professionals), the majority of which were desk-based. Equally gender ratios were similar (i.e. favoured female participants, 69%) as was the mean intended intervention duration (12-weeks, range two-weeks to nine-months). Overall authors reported that workplace interventions were most successful when they focused on only one health behaviour (Irvine et al., 2011; Mainsbridge et al., 2014; Pedersen et al., 2014), were embedded into staff workflows via downloaded software onto workplace devices and the intervention consisted of short, simple tasks which facilitated easy participation. Studies like the current one, which targeted complex multifactorial, lifestyle behaviour change were not as effective.

Equally an earlier review (Schröer et al., 2014) of workplace lifestyle interventions concluded that workplace health promotion programmes should focus on either physical activity or weight or nutrition behaviour to maximize effectiveness. While a review of multiple systematic reviews exploring behaviour change in healthcare settings, stated that interventions which support change via social norms using education, reminders and feedback had a greater chance of succeeding (Johnson & May, 2015). The current study included these features. Zhang et al. (2017) piloted use of a smart phone-based programme for heart disease 'Care4Heart'. The intervention was delivered over four-weeks and similar to the current study video clips designed to promote relaxation were included along with the option to track HRLB (e.g. daily calorie intake). Results indicated positive improvement for knowledge, awareness and behaviour management regarding blood cholesterol. Similar to the current study, Bricker et al. (2018) conducted a follow up RCT (their earlier study Jones et al., 2015 was a clinical RCT). They reported that their web-delivered, eight component ACT based, smoking cessation intervention for adults diagnosed with

depression was effective. Interestingly no additional benefits were observed for the ACT based intervention compared to an active control (government smoking website). The reported retention rate (88%) was significantly higher than the current study.

In consideration of adherence, Howarth et al. (2018) reported attrition ranged from 0 to 60% (M=21%). While a direct comparison cannot be drawn as adherence was calculated differently, current rates were likely lower. Of interest the two studies which targeted mental health and stress management reported the highest attrition (56% and 60%). Half of the studies reviewed included push notifications and personalised feedback. It is possible that these additional automated features may account for the difference.

In line with the above, Kelders et al. (2011) explored users' characteristics in a web-delivered lifestyle behaviour intervention. In their study participants were considered 'users' if they engaged with the intervention at least once. Their study reported 64% of 147 respondents were 'users'. This finding is in line with that of the current study where 49% of 182 respondents could be considered 'users'. Authors concluded that age and health condition at baseline predicted use. Specifically, those who were healthier and more knowledgeable regarding healthy lifestyles engaged the most. The current study meanwhile identified that completers and those that adhered had lower baseline PHQ-4 scores.

Browne et al. (2019) examined 15 systematic reviews which explored the effectiveness of RCT interventions designed to improve diet, most did not identify a clear relationship between intervention effectiveness, intervention setting, mode of delivery or intervention provider. Finally, a recent narrative review of 19 web-based, smart phone or email delivered interventions targeting physical activity, weight management and diet quality in cancer survivors, suggested that the majority were underpowered. Equally most studies recruited white females (Williams et al., 2020). Thus, similar limitations are reported elsewhere in the literature.

### 6.6.3 Study limitations

This study had several significant limitations which limited generalisability of findings and affected ability to address the study aim and objectives.

#### 6.6.3.1 Sample size

First, the small sample size meant the study was underpowered. Several reasons for this are considered.

The change to the participating HB boundary reduced the pool of staff eligible to participate. One large hospital and several smaller community hospitals and practices were removed. The primary researcher made several attempts to recruit additional HBs prior to launch however at the last minute a high-level member of staff (at SBUHB) unexpectedly left her post and was not replaced prior to the RCT start date, which meant that access to additional HBs was removed. The RCT study could not be rescheduled due to the time frames surrounding the principle researchers PhD. While additional populations were included (university and SME staff) recruitment remained inadequate.

It is possible the recruitment methods used also limited sample size. For example, while similar methods were used in the feasibility study, i.e., free portions of fruit, flyers, intranet advertisement etc, the current study did not use a dedicated study recruitment area at key sites and did not display the university banner or offer health promotion leaflets as the feasibility study did. Instead the primary researcher moved throughout each location talking with staff and handing out study flyers and engaging with staff at their desk or work environment. It is possible that this reduced staff's ability to ask questions or engage with the information being shared as they were not on a break or travelling between workspaces. Indeed, they may not have welcomed the interruption despite all caution being taken during the recruitment process to ensure no staff were disturbed.

Furthermore, the study website was not linked to any social media, this may also have limited recruitment. This decision was selected on the basis that organisational social media accounts are directed at external users i.e. not staff. A discussion was held with the communications department at the HB and the University and this decision was reached based on the respective purposes of

their social media accounts. However, some staff at the university ‘shared’ the study link and ‘Champions for Health’ title on their personal social media accounts. This became obvious when the primary researcher was ‘tagged’ in a ‘post’ or informed in person. It is likely that should the programme be delivered to a wider audience in the future that the use of social media advertisement could significantly increase recruitment (Benedict et al., 2019). However, the ethics of such methods are not fully explored (Gelinas et al., 2017).

Finally, recruitment was also negatively affected by a series of unforeseen technical issues which limited HB staff uptake. Significant technical issues were experienced during the registration process. Identified post ‘launch’ it emerged that the study website was browser sensitive. While the home page displayed on all browsers the interactive elements did not. For example, if the website was accessed via an old browser, the registration page was not accessible, and no error message displayed. The HBs default browser (at the time) was ‘internet explorer’ which was not compatible with the study website. This limited HB staff’s ability to both explore their initial interest in the study or register to take part. It could be assumed that only the most dedicated or determined would have progressed beyond this point. For example, several of those who discovered they were unable to register contacted the primary researcher via the website to ask for help. Once a point of contact had been made the primary researcher was able to send clear instructions on how to register i.e. use one of the following web browsers Chrome, Microsoft Edge or Firefox.

To further complicate the matter several HB participants experienced issues completing the registration process and again only those who contacted the primary researcher received instructions on how to correct the issue. In the majority of cases a field had not been completed. Once this issue had been identified the primary researcher informed the communications department at the HB and an updated study advert was placed on the intranet with clear instructions on how to avoid both these issues. However, it is likely that recruitment was affected as a result. This may explain, in part, the poor uptake by HB staff.

### 6.6.3.2 Cluster design

The second key limitation concerned the use of the cluster design which resulted in unequal trial arms. While a range of staff from different organisations and locations were recruited, the cluster design used led to a disproportionate number of participants being randomised to the control group (n=137) compared to the intervention group (n=45). This occurred despite careful consideration of site location and size and automatic allocation of SME staff to the intervention. The result of this imbalance was a severely reduced pool of participants to access the well-being intervention and ultimately only two participants engaged with it. However, the small sample size and particularly the small number of HB staff recruited and randomised to the intervention group could explain this imbalance. The implications of which being that differences between trial arms based on use of the well-being intervention could not be examined.

However, the intervention group consisted of mainly SME staff who were recruited via a different stream (on the basis that their organisation wanted a small number of staff to explore the resource prior to launching it more widely across their organisation) and were automatically allocated to the intervention. It is possible that their motivations or purpose behind use may have been different from other participants who signed up on an individual basis presumably due to an interest in their personal health and well-being. For example, SME staff may have planned to merely explore the available resources rather than use the programme to support their personal well-being. Thus, this may in part explain their lack of engagement.

Furthermore, it is of course possible that intervention group participants did engage with the well-being intervention, but their engagement was not recorded as they did not use the 'Try now' function. Prior studies have measured log in rate, time spent per page, and site views as a means to measure engagement (Cobb & Poirier, 2014). However, others considered 'users' to be anyone who was active with the intervention content or used the intervention at least once (Kelders et al., 2011; Lara et al., 2016). As with the feasibility study this is in itself a study limitation which must be addressed before any future iterations of the programme can be considered.

#### 6.6.3.3 Study website

A third limitation concerned the study website itself. The literature has noted several key features which influence engagement including, load speed, layout, use of white space, fonts, text size and quantity of text (e.g. 1000-2500 words broken up with subheadings, bullet points, and lists is preferable). Website navigation should be streamlined to enable users to locate information easily and quickly. Information should be clearly, and accurately categorised and embedded and external links should include a clear description of their relevance to the user (Garett et al., 2016; Gehrke & Turban, 1999; Pengnate et al., 2019; Zhang & Von Dran, 2000). Colour should be considered (Cyr et al., 2010) and finally, the website should be mobile responsive.

While the study website adhered to usability traditions and placed items in accepted places (e.g. registration / log in option on top right of main menu bar), used clear layout and common menus options (e.g. side menu bar in well-being area), included white space, clear function buttons (e.g. Track your progress button was clearly labelled and represented by a large gold button), progress bars (e.g. to next health trophy, within the registration process), instructions for use (e.g. on the home page and well-being page), clearly labelled and marked all links to external websites (in the HRLB modules). It did not employ a chat box, social media links and nor was it supported by a therapist (guided). Furthermore, feedback indicated that the feedback survey was not accessible from a mobile device. It is possible that the addition of these features, or indeed other features for example, avatars or social interaction (Doherty et al., 2012) may have led to a more positive website experience. However, feedback indicated that the website was well liked, and that navigation was easy.

#### 6.6.3.4 PD

A fourth study limitation was the significant time lapse between the PD project being undertaken (2015) and the final RCT (2020). It is likely that this limited any benefits of adopting this collaborative and inclusive design process. For example, over the five-year period a significant number of organisational changes occurred at the participating HB which meant that the PD process was not prominent or visible to staff or indeed management (several key staff contacted during the project left the HB during this time period). In addition to

his HB staff were under-represented in the final RCT and comprised only a small minority (18%) of intervention group participants. It is likely that this further limited the potential to evaluate the PD process.

In a similar vein staff who participated in the feasibility study remained eligible to participate in the current study. As a result, some participants may have had prior experience or exposure to the intervention. This is a limitation noted in the literature (Van Teijlingen & Hundley, 2001). However, the current study was conducted a full calendar year after the feasibility trial and the proportion of staff registered to take part in the current study was very small which reduced the potential impact of this. Only a small number of participants (n=33) were recruited from the HB. This was a significant reduction from the number recruited to the feasibility study (n=124). In addition, the RCT included staff from additional organisations which had not previously participated and as such the impact may have been lessened. However, the registration page or feedback survey could have included a question which provided an answer to this and any future iterations should incorporate this question into the data collection points.

#### 6.6.3.5 Gender

Fifth, the sample recruited may not be representative of the population overall. For example, participants who consented and engaged may have had a pre-existing interest in health, lifestyle behaviours and or well-being. Also, more female than male participants were recruited, which limits generalisability to the wider population. This is noted as limitation by others (Kelders et al., 2011). Equally, Drew et al. (2019) highlighted that engaging men into mental health interventions was a challenge. Their review and meta-analysis examined outcomes for ten male-only lifestyle style behaviour change interventions delivered via the web, it concluded that effectiveness was inconclusive and further research was required to identify specific system features which supported improvements for men.

#### 6.6.3.6 Well-being intervention

A sixth study limitation was the automatic enrolment of intervention participants to 'ACTivate your well-being'. The main purpose of which was to reduce barriers to use. It has been suggested that any content which users' access should be a maximum of three 'clicks' away (Zeldman, 2001) and thus automatic

enrolment offered one way to connect users with the well-being resource more quickly. However, this decision meant that it was not possible to measure the number of intervention group participants who showed an interest in the well-being module. This also meant that a comparison between enrolment figures could not be drawn between this study and the feasibility study nor can there be a discussion on levels of initial interest and those who went on to engage with the well-being module.

Of the 45 participants randomised to the intervention arm, eight were HB staff, none of which engaged, 23 were university staff of which two engaged and none of the 14 SME staff engaged. The extremely poor levels of engagement limited ability to address the research question.

However, it is possible that participants did not engage with the resource for several reasons, as noted above the majority were randomised to the control arm and therefore did not have an opportunity to access the intervention content. Equally university staff randomised to the intervention were those located at Bay campus, a significant majority of which are male. Prior research (and the feasibility study) suggests men are less likely to register than females. Finally, the onset of COVID-19 is likely to have impacted recruitment and engagement in this population (outlined below).

#### 6.6.3.7 COVID-19

Finally, the unexpected and unprecedented impact of COVID-19 is likely to have reduced recruitment, adherence and engagement, and interest in the well-being intervention as a whole. On January 23rd, 2020 China initiated quarantine in the Wuhan province, and by January 30th the virus had been identified in 18 countries worldwide (WHO, 2019b) and was classified as a pandemic. Recruitment to the final RCT began in early February and the RCT was launched on 14.2.20. Therefore, it is possible that the lower number of HB staff recruited to this study phase (compared to the feasibility trial) was in part related to their growing awareness of the global pandemic. By March 23rd, 2020 the UK had officially entered a national lockdown but prior to this healthcare staff had been informed of impending changes to their working conditions (Matt Hancock informed the House of Lords on March 16th that social distancing



should be implemented and SAGE data had been reported in the national news). By which point the study had reached its halfway point. Many participants were frontline staff and as such had immediate pandemic related responsibilities to consider. Thus, the timing of the study is likely to have had an impact on sample size and adherence and engagement.

The primary researcher discussed the implications and safety issues with the first supervisor and it was decided that the study should continue to run on the basis that withdrawing access to a programme designed to support and encourage healthy behaviour and support well-being at a time of exponential worldwide crisis would not be responsible. At the time the study website had many engaged users. As such the primary researcher addressed the pandemic in the weekly (week six) email reminder and informed users that the website would remain open and that should they need additional resources or support to make contact for appropriate signposting. It was also noted that self-care (outlined above) would be critical in the coming months. A reminder for all users that they were free to stop using the website (without consequence) should they need to, was also included alongside un-subscription instructions.

The onset of the pandemic is of particular relevance to the study population, HB and some university staff, were ‘key workers’, in light of their critical frontline roles within NHS Wales. Research suggests that at times of acute stress self-care, reflection and physical activity are not prioritised (Riegel et al., 2019; Stults-Kolehmainen & Sinha, 2014). High levels of stress, anxiety and worry are widely reported for this population (Hamza Shuja et al., 2020; Nanjundaswamy et al., 2020; Pearman et al., 2020; Siddiqui et al., 2021), with associated impact on QoL (Çelmeçe & Menekay, 2020). A population which is known to be self-reliant (Shanafelt et al., 2020). Thus, it is likely that the recruitment of HB staff was reduced as a result of their increased awareness of the global situation, and knowledge and understanding of the implications of such, in the build up to the eventual national lockdown.

Equally prior research also suggests that use of resources which promote, positive well-being and/or HRLBs, are less likely to be undertaken in times of difficulty, as abstract future gain is less motivating (Parthasarathi et al., 2017;

Riegel et al., 2019; Stults-Kolehmainen & Sinha, 2014). For example, the ability to care for one's own needs during times of distress is often reduced, and for healthcare workers the patients' needs are often prioritised (Unadkat & Farquhar, 2020). The intervention and the programme as a whole could be considered an act of self-care. Self-care is defined as an “*ability to promote health, prevent disease, maintain health, and cope with illness and disability with or without the support of a health-care provider*” (WHO, 2020d) i.e. it is ‘*the practice of actively looking after your own personal mental, physical and emotional well-being*’ (WHO, 2020d). The practice of self-care varies from person to person. The burden of working through a crisis requires greater psychological flexibility, effective coping strategies, and access to supportive resources (Fiebig et al., 2020). Frontline healthcare staff faced a higher risk of infection and death as a result of exposure to COVID-19 (Shaukat et al., 2020) and worked longer hours (Cabarkapa et al., 2020) thus representing a crisis period both individually and collectively. As such participants may have been less able to participate in and/or continue to engage with their HRLB module(s) or to dedicate time for themselves in the pursuit of positive well-being. Despite an understanding that continued focus on and engagement with strategies that support emotional well-being, positive mental health and/or self-care, being critically important (during the pandemic) (Cabarkapa et al., 2020; Maben & Bridges, 2020). In line with the above many HB staff who initially registered to take part dropped out after week three (aside one who remained engaged until week ten). Several emails were received which detailed frontline responsibilities as a reason for dropout.

While this is of particular relevance to HB and university staff with clinical or medical responsibilities, it is also widely reported that those in the general population were negatively affected by the pandemic in terms of reduced mental health (Shevlin et al., 2020). Thus, it is likely that the fall in engagement after week five, was related to the pandemic. However, of those who did continue, eight (university staff) went on to complete the full 12-weeks.

In line with the above, no follow up interviews or focus groups could be facilitated (post intervention), as anticipated. Therefore, further exploration of participant (engaged and non-engaged users, control and intervention arms users

etc) perspectives and experiences was limited to the feedback survey and any direct communications received. Qualitative methods of enquiry offer valuable insight into user experience beyond that collected by a quantitative survey. Thus, this limited full exploration of engagement. Thus the pandemic was a significant study limitation which reduced ability to address the research aims and objectives.

#### 6.6.4 Implications for research

Several implications for research are identified.

Firstly, the limited use of the well-being intervention has implications for future study design. Researchers should focus on increasing engagement to the intervention alongside the more popular HRLB modules. This could be achieved via several routes. Add a requirement to respond to the weekly email, answer a weekly well-being question, or via increased data tracking embedded into the intervention. The intervention could be delivered separately via email or video to intervention group participants. This might increase engagement and encourage use. Alternatively, the intervention could be delivered prior to providing access to the HRLB modules, to identify whether the intervention was effective (or not), for whom and whether this translated into increased engagement and in turn any health improvements. Although this would mean that participants would be required to engage for a 24-week period which is a substantial increase on study duration and commitment. These measures could increase ability to identify the effects of increased well-being on behavioural change and allow the study objectives to be addressed.

Secondly participant feedback should be fully addressed and used to inform future iterations of the study website. For example, technical issues relating to workplace access, demand for an app format and mobile responsiveness, should be addressed. Equally a shorter time lapse between PD workshops and focus groups and final implementation is advocated to explore benefit. Qualitative enquiry following the final RCT would also support this objective. Finally randomise participants at individual level on a 1:1 ratio to avoid unequal trial arms.

### 6.6.5 Implications for practice

Positive recruitment to the study website indicated a desire for web-based, workplace initiatives which address well-being and promote positive lifestyles. Equally staff well-being (measured by mean WEMWBS score) was lower than mean scores reported for the general population which indicates a need for interventions which encourage self-care and offer a means by which to develop positive emotional well-being. Thus, alongside additional recruitment activities, adequate management 'buy-in' is required to encourage wider uptake and address the long term consequences of the current pandemic which has seen a decline in mental health amongst HB staff and the public alike.

## 6.7 Conclusion

This RCT failed to find any positive impact from the inclusion of a well-being intervention, based on ACT, within the web-based, workplace, lifestyle behaviour change programme. No differences were observed between control and intervention for enrolment or engagement to the HRLB modules nor resultant physical health improvements. Adherence and engagement remained poor. Equally no improvements were observed for well-being, by those who were eligible to engage with the intervention. However, recruitment did not meet the required number for a fully powered statistical analysis likely impacted by COVID-19 which was a significant study limitation. Finally, on the basis of this RCT it cannot be concluded that the use of the PD methods and approach used, supported positive and sustained user engagement with the end-product i.e. the multi-faceted health and well-being study website.

Further research is required to fully explore whether the inclusion of a resource designed to improve emotional well-being, with the aim to support and improve adherence and engagement to a range of HRLB challenges, is effective. Future research should aim to address the significant study limitations identified. The PD process should be shortened, participation across the organisation widened and additional interactive and user generated methods should be incorporated. This may allow any benefits of the approach to be fully realised. Equally, the

well-being intervention should be re-designed in line with anticipated end user requirements and embedded into workplace infrastructure. Additional, management/organisational level support is required to facilitate recruitment and enable adequate workplace engagement. Following such it may be possible to explore whether the study hypothesis is supported or not and benefits for those in need of health and well-being support in busy and complex public sector workforces may be realised.

## Chapter 7: Discussion

---

This chapter provides a final discussion of the work presented in this thesis in relation to the research question, aim and objectives.

### 7.1 The Research Question

Five research objectives were addressed. Firstly, a PD project was undertaken to explore anticipated end-user perspective; to gain an understanding of well-being and to identify design and content criteria for the intervention and study website. Secondly two systematic literature reviews were conducted which explored the effectiveness of participant selected criteria. The outcome of which informed the third objective and facilitated the development of an emotional well-being intervention, based on ACT. The fourth objective established acceptance of the intervention within the existing ‘Champions for Health’ programme and feasibility of the study website overall. This enabled the final objective to be undertaken, an RCT evaluation.

The overall intention was to create a holistic resource which addressed individuals physical and mental health needs in one succinct programme and to consider the following research question. ‘Does the inclusion of a well-being intervention within a web-based lifestyle behaviour change programme lead to improvements in; lifestyle behaviour change, adherence and engagement, and emotional well-being, in public sector staff in Wales?’

It was hypothesised that the inclusion of such would increase well-being (for those randomised to receive the intervention) which in turn would support adherence and engagement and lead to improvements in HRLB.

## 7.2 Summary of Findings

7.2.1 Objective 1: Explore anticipated end-user perspective to gain an understanding of well-being in the context of their workplace, identify criteria, design elements, therapeutic approach, resources and components to be incorporated into the well-being intervention and study website

Sustained engagement over a one-year period from a core group of 38 participants was achieved via a three-staged PD project. Something which is known to be difficult within a public sector workplace context (Hirschheim, 1983; Pilemalm & Timpka, 2008). The selection of PD ensured varied research methods were incorporated which supported exploration of end-user need. Particularly useful was the inclusion of qualitative research methods, which cultivated a collaborative environment and ensured that participants could share personal insights, experiences, reflect on decisions made and contribute openly to discussions.

The principal finding from this research stage was an understanding of well-being from the end-user perspective. The identification of barriers to access and perceived need. Well-being was understood in terms of balance across life domains, which took account of enjoyment, responsibility, and choice. Critically well-being was perceived to be compromised when negative experiences in one life domain impacted ability to engage in another. Several workplace factors which contributed to this were identified: lack of perceived organisational support, unhelpful sickness and absence policies, remote and lone working, organisational change and uncertainty, and the taboo nature of mental health and well-being in the workplace. Individual factors included: a lack self-awareness, inability to cope with change, lack of self-care and pressure placed on self. Barriers to positive well-being were also identified: a lack of organisational support, poor visibility of mental health and well-being in the workplace and ineffective staff supervision or training to address poor staff well-being. While barriers to use (of the intended resource) included: limited time to and access of WIFI enabled devices during the working day (i.e. breaks, or dedicated well-being time) and a lack of safe/private space to access resources intended for this purpose, coupled with a perceived lack of organisational support. Finally, reduced cognitive ability (resulting from high

stress/anxiety) to engage was noted. Overall, this culminated in the call for a tool which provided quick skills to learn in times of positive mental health and well-being, which could be called on during periods of emotional difficulty.

The use of multiple PD design phases enabled participants to actively identify design and resource criteria which was perceived to meet their needs; a bright cheerful colour scheme, clear and consistent message, stress management and relaxation tools alongside sleep hygiene information, shared stories and quick use tools. Technological components focused on interactivity, mobile responsiveness and cross-platform access. Findings have contributed to the emerging health and wellness, PD literature.

### 7.2.2 Objective 2: Conduct a systematic literature review to explore the effectiveness of participant selected criteria identified from objective one

The first systematic literature review identified wide use of gamification features in web-based interventions designed to manage CMD and/or well-being. Eight gamification features were identified in use, in this context, 'story/theme' being the most common. However explicit acknowledgement of the application of gamification features to encourage sustained engagement was uncommon. The review did not find that specific gamification features promoted higher adherence. Despite a lower mean adherence for 'progress' (53%) compared to 'story/theme' (76%) this difference was not statistically significant. Equally no significant differences were observed for different quantities of gamification features in use, despite mean adherence being higher for studies which incorporated three (over on or two) gamification features. Additional exploration of intervention features such as guided/automated delivery, sequential or free navigation, number of treatment modules, or CMD sub-population, did not observe any significant differences in mean adherence either. What the review did suggest was, interventions intended to last ten weeks or longer, had higher mean adherence (although this was not statistically significant). This was the first review to explore gamification in a mental health and well-being context and the review impacted knowledge and understanding in this area.



The second systematic review established that ACT was effective via web-based delivery, for the management of depression and anxiety but not QoL. However, no included studies specifically targeted QoL and two did not include an outcome measure which could be included in the QoL meta-analysis calculation and only two studies included an outcome measure examining well-being. The review identified positive adherence with a range of 48%-100%, with a higher mean adherence (83%) than that reported for other therapeutic approaches delivered via the web. The review findings established that web-delivered ACT was effective and acceptable.

### 7.2.3 Objective 3: Develop the emotional well-being intervention

The intervention developed, 'ACTivate your well-being,' was informed by the above. The intervention was piloted via a high-fidelity website. After which it was revised and added to the updated study website and explored in the randomised cluster feasibility study. Following additional qualitative enquiry, it was updated further, prior to use in the final RCT. Where it was delivered alongside five, existing HRLB change modules. All intervention and study website components were designed to be self-guided and a weekly email reminder was included for those who opted in. The study website also incorporated gamification features: goal setting, rewards, points and progress.

The final iteration of the intervention was a 12-week, sequentially structured, emotional well-being intervention, based on ACT. The six core principles of ACT, common ACT experiential exercises, metaphors, and guided mindful mediations were incorporated each week. Alongside a variety of participant selected resources including active and mindful relaxation, psycho-educational materials, downloadable resources and a well-being goal setting and reflective area. This was the first web-delivered, ACT based, well-being focused, resource, developed alongside a PD approach identified.

### 7.2.4 Objective 4: Explore acceptance of the well-being intervention within the existing programme and explore feasibility of running the study website at scale to determine whether a RCT was warranted

Findings from the feasibility study indicated the inclusion of an emotional well-being intervention within a lifestyle behaviour change programme was

acceptable to public sector staff in Wales. Evidenced by the registration (n=124) and subsequent use of the study website by (n=103) participants and 43% enrolment rate of intervention arm participants, onto the well-being intervention. Enrolment to the lifestyle module was positive (74%) as was engagement (0-95%), however none completed the full programme. Overall study feasibility and acceptability was established. Findings suggested that web-based resources which address physical health and emotional well-being in one succinct programme are desirable, in a workplace context.

#### 7.2.5 Objective 5: Evaluate the impact of the well-being intervention, using a RCT to identify whether a multifaceted lifestyle behaviour change programme has a positive impact on: HRLB, adherence and engagement and emotional well-being

The final RCT indicated continued interest in web-based health and well-being programmes. Recruitment was positive (n=182) participants registered from a range of organisational settings in Wales. Engagement to the HRLB modules was encouraging but lower than the feasibility study (49%) and health improvements were observed for three of the five HRLB modules. Eight participants completed the full 12-week programme (8%). Completers and those who adhered had lower PHQ-4 scores at baseline which suggested those with poorer well-being were less likely to engage. Adherence remained problematic (4%).

Cluster allocation proved ineffective and resulted in inadequate numbers of participants allocated to the intervention. Only two participants recorded engagement activity with 'ACTivate your well-being', much lower than in the feasibility study. Thus, it was not possible to evaluate the impact of the intervention as planned. It was likely that COVID-19 impacted on enrolment and engagement to the final RCT. Participants were NHS Wales and university staff (some of which had clinical roles) many of whom were (and remain) frontline staff fighting against COVID-19. Equally other staff groups were impacted by the UK wide lockdown (March 2020). Overall, no significant improvements to HRLB, adherence and engagement or well-being were observed. As such the research hypothesis was rejected. Furthermore, while the implementation of PD was successful in earlier research phases, it

ultimately failed to support adherence and engagement in the final research phase. The ongoing relevance of the intervention and website is evidenced through its inclusion within the IWS service, SBUHB.

## 7.3 Comparison to the Published Literature

### 7.3.1 Multifaceted interventions

HRLB change is a highly complex process. Several theoretical models attempt to explain and predict the likelihood of such. However, while some of these models have identified the role of social cognitive beliefs such as motivational intention (i.e. an individual's belief in their ability to achieve the desired behaviour change), self-efficacy (i.e. an individual's confidence in their ability to achieve the desired behavioural change) and mood (e.g. transtheoretical model, Prochaska and DiClemente (1982) identified cognitive and affective experiential processes, one of which identified the role of paying attention to feelings, in the process of behavioural change), consideration of mental health status and the potential role of increased well-being, to support individuals' ability to initiate, undertake and sustain HRLB change has not been widely examined (Kwasnicka et al., 2016; McKenzie & Harris, 2013).

Only two prior studies were identified which incorporated a mental health element within a web-based lifestyle behaviour change programme (Cobb & Poirier, 2014; Cook et al., 2007). However, neither explicitly evaluated the additional benefit of simultaneously providing a mental health resource to encourage and support HRLB change. Equally neither focused on a well-being approach as a means to encourage and support behaviour change and neither used ACT as the therapeutic approach. Finally, neither considered the potential impact of adding a well-being intervention to encourage adherence and engagement.

Cook et al. (2007) recruited participants from a workplace setting (although not healthcare) and addressed two lifestyle behaviours, diet and physical activity alongside stress over a three-month period. Positive adherence was reported (85%) as was a reduction in symptoms of distress. While Cobb and

Poirier (2014) focused directly on the relationship of health behaviour on well-being via a short social, daily intervention. Adherence was not reported but engagement was positive. No other multi-faceted interventions were identified which aimed to support and encourage HRLB change through the provision of a mental health focused intervention. Although, a qualitative study (McKenzie & Harris, 2013) explored Australian patients and general practitioners' views of lifestyle behaviour change and psychological distress. They reported participant extracts which discussed the role of stress, including work related stress, in relation to lifestyle behaviour change. Authors suggested that participants felt stressful situations experienced in the workplace resulted in poor lifestyle choices. While this is just one study and the authors explored impact of psychological distress rather than well-being per se (which is defined/operationalised slightly differently), their findings are of interest.

It may also be helpful to compare findings to those reported for HRLB change programmes. Both the feasibility and RCT study reported positive improvements for some lifestyle behaviours. Mixed results are reported elsewhere, Kelders et al. (2011) reported no positive effects of an intervention designed to improve diet and exercise. Norman et al. (2007) reviewed 47 different physical health interventions designed to improve diet, exercise and weight management, 24 of which did not report positive results. While a meta-analysis of web-based weight medication interventions reported an overall modest improvement (Kodama et al., 2012).

While many studies address one or two lifestyle behaviours (i.e. smoking and tobacco, diet and physical activity, or disease related behaviours), few have addressed multiple HRLBs in one intervention (Prochaska & Prochaska, 2011). For example, King et al. (2015) identified 220 studies of single interventions. Several two-cluster interventions were found; an eight-week RCT which examined effectiveness of a web-based intervention for lifestyle improvement which included personalised feedback in a population of (138) Chinese cardiac patients (Duan et al., 2018). The intervention targeted physical activity followed by fruit and vegetable consumption. Findings indicated improved motivation, self-efficacy, planning, and social support. Similarly, another eight-week RCT examined effectiveness of a web-based

intervention to increase physical activity and fruit and vegetable consumption in a population who indicated desire reduce their cardiovascular risk (Storm et al., 2016). The intervention included personalised feedback which identified compliance with national guidelines, somewhat similar to the information used in the final RCT. Study findings indicated positive behaviour change three-months post intervention. Authors highlighted the role of self-efficacy and planning as potential facilitators. Features included in the final RCT study. Equally, high dropout was reported.

Of those which have addressed multiple HRLBs in one intervention programme, interventions comprising psychoeducation and skills training and targeting multiple risk behaviours simultaneously have led to small positive changes for diet and physical activity (Meader et al., 2016). Although included studies were not web-based. Similar to the current study an intervention which addressed five lifestyle behaviours reported a small but positive outcome. The intervention, a Dutch programme ‘myHealthyBehavior’ was sequential and incorporated tailored feedback (Schulz et al., 2014).

However, this appears to be an emerging research area. For example, a study protocol for a life-course, multiple HRLB intervention ‘MoBILE’ was identified (Bendtsen et al., 2020). Alongside an ongoing three-year workplace health promotion programme study ‘activate your health’ (Kugathasan et al., 2019) which included staff from 11 private sector organisations and offered several interventions to explore the impact of different combinations of lifestyle interventions on behaviour change and health improvement. Such interventions aim to address the effects of clustered lifestyle behaviours and their higher associated risk for chronic disease (Myint et al., 2009).

In the absence of similar multifaceted interventions, it is helpful to compare findings with studies that have evaluated the effectiveness of other well-being interventions. The final RCT found no improvement to well-being. However, this is not uncommon. A meta-analysis of nine web-based intervention studies demonstrated non-significant results for depression and only potential for well-being improvement, in patients with type 2 diabetes (Hadjiconstantinou et al., 2016). However, others have reported improvements (Bolier et al., 2013; Sin

& Lyubomirsky, 2009; Weiss et al., 2016). Powell et al. (2013) and Twomey et al. (2014) reported improvements in emotional well-being following use of CBT based 'Moodgym', in a general population. J. Mitchell et al. (2009) reported significant improvements in well-being following use of a strengths based positive psychology intervention. Lappalainen et al. (2013) found positive outcomes in a comparison study of a guided CBT/ACT intervention with personal health technologies (mobile phone applications, and personal monitoring devices). Equally Aikens et al. (2014) reported positive outcomes from a workplace MBI designed to treat stress and increase resiliency and well-being. A significant decrease in stress and increase in well-being were observed.

### 7.3.2 ACT

The emotional well-being intervention developed and implemented was based on ACT, which in turn is based on RFT (Hayes et al., 2009). It has been proposed that ACT applied in a 'context driven approach' has much relevance to HRLB change. A study by Zhang et al. (2018) describe the 'context driven approach' as an examination of social, psychological, and situational factors which influence behaviour via cognitive and emotional routes. The authors outlined the way in which the core processes of the ACT model are relevant and appropriate for application in this context. HRLB change is argued to occur through the development of psychological flexibility, defined as "*the ability to contact the present moment more fully with acceptance and mindfulness as a conscious human being*" (Zhang et al., 2018, p. 1).

Psychological flexibility supports behavioural change via its focus on identifying and curating individual core values and learning to live in a way that shows commitment and consistency with those (personal and consciously selected) core values. In addition to this the importance of accepting and acknowledging that unwanted thoughts, feelings, sensations and memories often make it very difficult to achieve, due to their influence on habitual and automatic responses (Hayes et al., 2009). Psychological flexibility is considered contextual as it relates to and affects individual's internal relationship with their unwanted thoughts, feelings, sensations and memories (i.e. it does not change the events themselves only the way they are viewed

and responded to). Psychological flexibility is proposed to support behavioural change through three processes: increasing acceptance of unwanted thoughts, feelings, sensations and memories, and increasing commitment to personal values. Finally increased awareness of internal and external experiences supports individuals to adapt their automatic, habitual behavioural response and to change them for more helpful ones i.e. those that are in line with their core values (e.g. to quit smoking, to exercise more regular, to eat well) (Zhang et al., 2018).

Evidence and support for ACT in health behaviour change comes from traditional face-to-face delivery. For example, Butryn et al. (2011) piloted a (two-part, two hour) ACT intervention to encourage physical activity in a sample of young adult females. Three core values were incorporated, Mindfulness, Values clarification, and Willingness. Results saw a significant increase in ACT intervention participants (n=35) physical activity levels. Moffitt and Mohr (2015) compared the effects of a 12-week, digitally delivered walking programme against the same programme supplemented with an automated, ACT based instructional DVD to encourage and support physical activity, in a sample of (n=59) adults not currently engaged in regular exercise. The study found that the ACT intervention significantly increased step count and led to greater levels of physical activity. Equally ACT has been established as an effective approach for smoking cessation, via face-to-face delivery (Bricker, Mull, et al., 2014; Gifford et al., 2004) and via smart phone delivery (Bricker, Mull, et al., 2014) for weight management (Lillis & Kendra, 2014) in several RCT studies. Thus, the ACT model is considered an effective means by which to support HRLB change (Hayes et al., 2009; Zhang et al., 2018).

However, the current thesis study did not employ ACT in this way, instead it sought to employ web-delivered ACT to support public sector staff's well-being, with the aim to increase it over a 12-week period. This approach is similar to three studies reported in a systematic review of student well-being (Howell & Passmore, 2019); positive effects were reported following a three-week and six-week ACT intervention (Levin et al., 2016; Levin et al., 2014). While Räsänen et al. (2016) reported positive outcomes following a seven-

week ACT intervention which included Finnish university students. However, the first two sessions were in-person. All these interventions were shorter in duration than the current 12-week intervention and targeted a younger demographic. Earlier findings have indicated that younger age is associated with higher engagement to web-delivered interventions (Kelders, Bohlmeijer, et al., 2013). It is possible that both the workplace context and older average age of participants observed, limited engagement in the final RCT. Equally others have reported positive engagement with ACT based web-delivered mental health interventions Kelson et al. (2019) reported average attrition of 19%, one of the reasons this approach was considered for use.

### 7.3.3 Adherence and engagement

Adherence and engagement to web-based interventions was also considered through the lens of end-user participation. PD is poised as the answer to this critical issue. While the application of PD in this context is rapidly increasing no study was identified which explicitly reported or directly evaluated its influence on adherence or engagement to a web-based health and well-being intervention, unlike the current study which reported no observable benefits in the final RCT despite positive recruitment in the feasibility study. Equally one review of serious games for the management of depression and anxiety, reported that of 20 interventions, seven partially incorporated end-users and only three fully engaged end-users via a PD approach (Dekker & Williams, 2017). Previously a review identified that a quarter of (110) workplace interventions were developed in response to explicit staff needs and very few involved organisational partnerships (Harden et al., 1999). However, this is an emerging field, for example, a systematic review identified 69 PD studies which included various levels of reporting of PD methods and stakeholder involvement (Vandekerckhove et al., 2020). Thus, it is possible that future studies will seek to report observable impact. Similar to the current study the majority of studies reviewed by Vandekerckhove et al. (2020) identified that PD successfully supported the development of a range of eHealth interventions. For example, How et al. (2017) concluded application was useful and effective in the design of cognitive telerehabilitation.



Since the conception of this thesis, web-delivered and web-based interventions designed to address lifestyle behaviour change, CMD or well-being has increased exponentially. Delivery mode has also expanded significantly to encompass smart phone and apps. Whilst these delivery modes were not the focus of this thesis, it remains important to explore and consider key developments across this field. However, a recent review of apps for HRLB change did not observe significant effect (Milne-Ives et al., 2020).

Understanding factors which influence adherence and engagement to digital health interventions is important. As witnessed here.

As noted earlier (chapter 2) a variety of intervention features have been explored in the search to identify ‘active ingredients’ and their role, if any on adherence and engagement. A systematic review examined the effectiveness of ten online social network health behaviour change interventions. Findings suggested moderate evidence for social networking and reiterated the need for focused attention on addressing adherence and engagement (Maher et al., 2014). While the current study did not include social networking, (due to ethical considerations regarding ability to effectively moderate a networking platform) it did embed gamified features to encourage engagement. The two qualitative interviews conducted after the feasibility study (chapter 5) noted their value however it is not possible to generalise from this or to identify whether the gamified features, contributed to engagement. Since the first systematic review (chapter 3) was conducted, one study has directly explored the role of gamification in this context (Kelders et al., 2018). Authors reported that the inclusion of badges within a single use well-being intervention (compared to a non-gamified version of the same intervention) in a pilot setting and real-life context, increased cognitive engagement, but not behavioural engagement.

The role of other persuasive technologies continues to be of interest in this context. A recent mixed methods study carried out a secondary evaluation of data collected during the ‘Risk Modification Trial’, a RCT of a web-based lifestyle intervention. The intervention was delivered monthly via one-hour interactive segments included tailored information on CHD risk. Usage data and interview data were combined to explore engagement. Participants who

experienced a negative emotional reaction in response to their personalised CHD risk score were less likely to engage with the intervention (Usher-Smith et al., 2017). This is in contrast to some behaviour change theories which suggest that perceived risk (to chronic disease) is a motivator for behavioural change. This may shed light on the feasibility findings where participants WEMWBS scores were lower than that reported for the general population. It is possible, in light of this, that some individuals might have seen their low scores and lost motivation to take part. However, the scores related to well-being not health risk so it might not apply. In addition to this Usher-Smith et al. (2017) found that those with prior failed attempts at behavioural change were less likely to engage with the intervention. This too may shed light on the final RCT, it is possible that HB staff who took part in the feasibility study (and did not complete the programme) were less likely to engage in the RCT despite initial interest. Although again this cannot be quantified as participants were not asked to identify whether they had taken part previously. The study also highlighted barriers for use which included, forgetting the study website address or login details, website inflexibility, and lack of time. These barriers were similar to those identified in all three empirical study stages. However, these barriers were not associated with engagement.

Baltierra et al. (2016) explored usage data and engagement in a multi-component online intervention for young Black men and transgender women designed to reduce risky sexual behaviours, promote healthy living and build social support. Authors tracked time spent using the web-based intervention which included gamified rewards (points were operationalised in a similar way), over a one-month trial period. Findings suggested that engagement was difficult to measure. However, authors advocated for multiple measurement metrics. They highlighted the nature of web-based interaction as multi-tasked, where participants are likely to be engaged in additional tasks at the same time either online or off (e.g. have multiple web pages open at once, switching between tasks, and undertaking real life tasks). Thus, measurement of log-in time is not necessarily a reliable measurement of engagement. The study website did not incorporate multiple measurement metrics nor google analytics, while this may have shed light on user engagement beyond the

weekly interaction points, others have suggested that time spent online, (measured by google analytics), is not necessarily a reliable proxy for intervention engagement (Donkin et al., 2013).

## 7.4 Study Limitations

Overall, the study design had several limitations. Specific limitations relevant to each study phase are outlined in chapters 4 (p. 156), 5 (p. 247) and 6 (p. 304).

### 7.4.1 Implementation of PD and intervention development

PD was selected for its focus on the collaborative inclusion of workers and its aim to explore their skill, tacit knowledge, and experience, to inform the design and development of the study website and intervention. Underlying this approach is the understanding that the inclusion of end-users will facilitate and realise a ‘better fit’ which will support end-user engagement (Clement & Van den Besselaar, 1993; Kensing & Blomberg, 1998; Orłowski et al., 2015). Ultimately while participants remained engaged for a sustained period of time, this did not translate into positive adherence to the final RCT. However as noted (chapter 6) COVID-19 was a significant factor in this.

It is possible that the approach selected was not appropriate or that it was not implemented effectively. For example, the well-being intervention was developed alongside the PD focus groups and workshops. Which focused on identifying participant understanding of well-being, well-being needs, ideas for the intervention including resource suggestions, interactive features, design criteria and usability. Techniques like storytelling, CARD, the future workshop or use of games were not implemented. Games have been used to communicate and understand the perspectives of diverse participants to reach a shared understanding. Games should be unfamiliar and novel to remove barriers, reduce hierarchical (role) effects and ensure learning at an equal rate. Games also foster a sense of shared enjoyment which aids communication and understanding (Kuhn & Muller, 1993), supports participation, interaction, and allows freedom to explore new ideas safely (Muller, 2007). A wide variety of

games have been created for different research and organisational settings. For example, a carpentry board game was devised on the principle of monopoly. The game provided floor plans to shop workers to aid redesign of their space (Muller, 2007). Video game cards based on film clips of real-world work scenarios, edited and formatted into a set of cards using screen shots, have been used to encourage reflection on behaviour within the physical workspace (de Jong et al., 2009). Other examples of games include PICTIVE “*a paper and pencil game for detailed screen design*” (Muller, 2007, p. 36) and Icon design, a guessing game to create new icons for use and interface theatre, used in very large groups settings (Muller, 2007). However, key intervention components were discussed; resources, therapeutic approach, experiential exercises and a pilot evaluation was conducted which included participant interviews to explore use of experiential exercises, content volume, ACT clips and outcome measures alongside visual display and navigation. Equally this is not uncommon, and others report this approach i.e. clinicians and therapists are consulted to develop the therapeutic content (How et al., 2017). Furthermore, while the CeHRes Roadmap (Kip et al., 2019; van Gemert-Pijnen et al., 2018) was not formally employed in this study, the components of this tool were incorporated into the PD process undertake (i.e. contextual inquiry, values specification, design overutilisation and summative evaluation).

#### 7.4.2 Therapeutic approach

The therapeutic approach selected for the well-being intervention may have limited ability to address the research question. Web-delivered ACT for the management of well-being is relatively new. The current evidence base for use in this context, at the time of the systematic literature review (chapter 3), was limited. Only three of the studies included a measure of well-being. While a subsequent systematic review (Hedman-Lagerlöf et al., 2018) did not find MBIs any more effective than other active treatments.

A more traditional therapeutic approach, like CBT, with a clear and established evidence base for the management of well-being may have offered a more reliable means by which to address the research question. For example, Powell et al. (2013) reported positive outcomes from a CBT based intervention ‘Moodgym’ which saw an average three-point improvement to well-being as

measured by WEMWBS scale compared to control group. Later supported by Twomey et al. (2014). Equally a recent systematic review of eight mHealth apps applying CBT principles, improved well-being (Rathbone et al., 2017). Shandley et al. (2010) reported positive outcomes for female participants aged 18-25 years, following use a serious game-based intervention 'Reach Out Central'. While Brenninkmeijer et al. (2019) reported CBT and work focused CBT irrespective of baseline self-efficacy, depression and anxiety was effective at supporting full and partial return to the workplace. Furthermore, the relative prominence of CBT within the NHS may also have meant that users might have engaged more with this familiar approach.

However, as suggested earlier, the evidence base for web-delivered ACT is emerging, and recent findings have continued to provide support. For example, a systematic review and meta-analysis of 12 MBIs for depression, anxiety and QoL reported an overall positive effect (Sevilla-Llewellyn-Jones et al., 2018). While a recent systematic review and meta-analysis of five studies exploring student well-being, found ACT effective (Howell & Passmore, 2019) and an earlier systematic review found no observable differences between therapeutic approach for occupational well-being interventions (Carolan et al., 2017).

#### 7.4.3 Cluster design

The cluster design implemented proved problematic in both the feasibility and RCT. This design was selected based on several important considerations (chapter 5). Whilst the cluster design was successful in restricting contamination between trial arms, the resulting unequal distribution of participants ultimately had a significant impact on study findings, despite consideration, of site size in the RCT (multiple sites were combined in an attempt to create two equal sized clusters). However, the issue persisted, and an inadequate number of participants were randomised to the intervention. This failure was of particular relevance for University staff. After data extraction, it was evident that Bay campus staff were randomised to the intervention. However only 23 staff registered compared to 112 staff at Singleton campus. This meant that the intervention arm was underrepresented. Further examination of staff demographics could have informed cluster allocation. Bay campus predominantly consists of male staff; men were

underrepresented in the feasibility study. Cluster allocation at departmental level may have mitigated this issue. Thus, the implementation of the clusters was a significant study limitation.

#### 7.4.4 Sample size

The small number of participants recruited to each study phase was a significant study limitation. While 38 members of staff took part in the PD project, this represented a small proportion of HB staff. The PD study identified management support as a critical barrier to positive well-being and use (of the end-product), participants highlighted the critical role of management support to address their well-being needs. Indeed the workplace health promotion literature has long since acknowledged that successful workplace “*health promotion involves both workers and management collectively endeavouring to change the workplace into a health-promoting setting*” (Chu et al., 2000, p. 156).

While each study phase was supported by the director of public health at the HB, Employee Well-being, and staff representatives at each site, this did not translate into perceived approval for HB staff. For example, the study was only visible at times of recruitment and no specific message of support or encouragement for staff was obtained (chapter 6). This should be addressed in future implementation of workplace health and well-being initiatives. Indeed, it has been acknowledged previously in the workplace health promotion literature. For example, one systematic review concluded that while there was evidence for effectiveness of health promotion (dietary intake) interventions should be implemented across multiple levels to realise additional benefits (Mhurchu et al., 2010).

Exclusive focus on supporting and encouraging individual level change, without organisational level intervention may also have limited study outcomes. For example, ‘Champions for Health’ as a programme represents an individual level intervention rather than organisational level. For example, initiatives to address role ambiguity and conflict in the workplace, specific workplace psychosocial conditions (Noblet & LaMontagne, 2006) which mean staff feel valued in the workplace (Karasek Jr, 1979) were not included.

Studies which have explored the employer and employee relationship have highlighted the importance of perceived organisational support and positive social environments within the workplace (Rhoades & Eisenberger, 2002). A systematic review suggested that interventions which increased frequency of shared activities within the organisational environments were associated with increased staff well-being (Daniels et al., 2017). This is of interest as, the qualitative focus groups highlighted the perceived role of organisational support in staff well-being, and in facilitating access and engagement to well-being interventions in the workplace. However, the selected HB did have a range of positive workplace well-being strategies in place i.e. the ‘Well-being champions’ scheme, which the primary researcher engaged with throughout. Such ‘dual level’ interventions are thought to have greater ability to change and address lifestyle behaviour (Noblet & LaMontagne, 2006). Equally, while recruitment to the final RCT surpassed that of the feasibility study, it failed to achieve a fully powered statistical analysis.

#### 7.4.5 Simultaneous intervention delivery

The design of both the feasibility study and RCT enabled registered intervention group participants, to access five HRLB modules and the well-being intervention simultaneously. The intention was to support participants achieve their selected HRLB change, by supporting and developing their emotional well-being over the 12-week study duration. However, this approach, may have limited ability to explore and evaluate the impact of well-being provision. For example, it is possible that the weekly intervention delivery format was not adequate to realise improvements in well-being quickly enough to support adherence and engagement to selected HRLB modules. The intervention introduced users to the six core principles of ACT slowly and it is possible that prolonged use was required to increase psychological flexibility.

There are several ways in which this could be addressed in the future. First the intervention could be delivered prior to participants selecting a HRLB module. Users could be instructed to complete the full intervention first. For example, HRLB modules could be ‘locked’ until completion. Or users could be instructed to complete a proportion of the intervention prior to accessing the

HRRLB modules. Or the intervention could be delivered daily via email to encourage simultaneous use. Similar to the daily challenge (Cobb & Poirier, 2014) which reported a positive effect on well-being. Thus, the implementation of the well-being intervention within the study website may have limited findings.

However, the increased study duration has practical implications which must be considered. For example, the ‘staff health challenge’ approach adopted may not be suitable, it is likely that participants would complete the well-being intervention at different times, thus would access the lifestyle modules at different times. This has implications for recruitment, and feasibility of the semi-automated email reminder. Equally recent findings do not support extended intervention use (Hensel et al., 2019).

Alternatively, the ACT intervention components could be integrated into each HRRLB module to create one streamlined resource. The intervention components could be tailored to encourage consideration of personal values specific to the target behaviour. This approach is more in line with the way ACT has been previously and successfully implemented (Bricker, Bush, et al., 2014; Moffitt & Mohr, 2015; Zhang et al., 2018) and it may remove any barriers to use such as stigma (regarding accessing mental health and/or well-being resources, of particular relevance in a large often open plan workplace contexts).

#### 7.4.6 Generalisability

Generalisability of study findings to the wider population is an important consideration. Several limitations were observed, for example, the majority of participants (throughout) were female. While this is reported by others (Kelders, Pots, et al., 2013) it remains a study limitation. Equally the study included less staff from the lower-paid roles, also reported elsewhere (Sorensen et al., 2002).

In addition, data collected in the feasibility study and RCT were based on self-report measures and should be interpreted with caution. Rhodes et al. (2017) highlight a poor correlation between self-report of health behaviour and actual behaviour as such the reliance of self-reported HRLB and any assumptions



drawn regarding health improvements over time must be interpreted with caution. Equally inaccurate recall of HRLB, selective reporting and socially desirable responses has been identified (Mhurchu et al., 2010). To address this additional qualitative data collection points could be included in the study website. For example, a digital food diary (within the ‘Weight optimisation’ and ‘Eat healthily’ modules) or commercial tools (e.g. Strava) could be integrated into the study website (‘Regular exercise’) to provide an accurate measure of exercise and engage participants who are already interested. Equally advancements in Psychology and Computer Science have led to auto recognition of facial expressions and emotion detection via wireless routers (Zhao et al., 2016), data mining techniques used in text analysis (Yadollahi et al., 2017) and wearable tracking devices (Dubois, 2017). Such techniques, whilst beyond the implementation scope of the current thesis suggest that self-report measures taken at baseline and post intervention may be limited. However, the current thesis used a validated measure of well-being which included both endemic and hedonic perspectives of well-being. An approach widely used in this area of research. It also provided the option for free text comments and asked participants to identify their selected activities (feasibility study) and set motivational goals (RCT).

Finally, all registered study participants were self-selected. Motivations for participation were not collected. It is possible that users did not represent the general population. Additional questionnaires were not included due to time considerations for registration.

## **7.5 Interdisciplinary and Cross-organisational Study Context**

Much of the work undertaken in the current thesis involved interdisciplinary and cross-organisational working. Whilst the primary researcher was primarily based at Swansea University Medical School, (Singleton campus) the interdisciplinary context of this thesis i.e. the web-based delivery format meant that the primary researcher was also based within the Computer Science department at Swansea University (Bay Campus). In addition to navigating

these two academic departments, the primary researcher was required to work across multi organisations: Swansea University, PHW and SBUHB. Whilst based at Swansea University, the initial few years of the project included a dual base between the Swansea University and PHW offices (Llanharan and Cardiff). This arose as the current thesis built on the work of PHWs ‘Champions for Health’ campaign. Thus collaborative, inter-disciplinary working and cross-organisational working was embedded right from the start.

#### 7.5.1 Interdisciplinary working

There has been a recent trend towards interdisciplinary working in academia (Bridle et al., 2013; Jones, 2010) and current research calls encourage interdisciplinary approaches (e.g. Horizon 2020; European Commission 2011). Interdisciplinary working involves working across two or more academic disciplines; drawing connections between ideas and concepts across these disciplines, to support new learning. It has been defined as “*inquiries which critically draw upon two or more disciplines and which lead to an integration of disciplinary insights*” (Haynes, 2002, p. 17) and the ‘*production of research which crosses disciplinary boundaries*’ (Hicks et al., 2010, p. 464).

Several benefits of interdisciplinary study have been identified. Some academics have proposed that through exposure to interdisciplinarity, real world research impact can be expanded, and consideration of wider societal questions explored. Equally adopting an interdisciplinary approach is considered an effective way to address an issue which cannot be addressed from a single perspective (Bridle et al., 2013). Through collaborative and effective consideration (of an issue) from a variety of perspectives new light understanding can be uncovered.

For some interdisciplinary study is aligned with the constructivist paradigm. For example, through the acquisition of new knowledge, gained via experiential and contextual learning (from a new discipline), lines of thinking and exploration that is identified and selected by the individual and exploration of topics across subject boundaries and process of learning and reflecting on what has been learned from a variety of perspectives, is active and student led. Thus, a positive educational benefit is considered.

However, it has also been associated with several barriers such as limited or ineffective educational collaboration, prolonged learning periods and uncertainty. Equally a number of challenges are noted including, lack of common understanding and differing languages across disciplines (Bracken & Oughton, 2006; Brewer, 1999; Bridle et al., 2013; Jones, 2010; Knapp et al., 2015).

The later was relevant to the current thesis. For example, the use of differing terminology in computer science compared to Psychology and Medicine was apparent from the start. The term ‘user’ in computer science commonly denotes an individual who engages with the technology under development. In contrast the term ‘user’ within the field of Psychology and Medicine refers to individuals with varied (e.g. drug or nicotine) addictions. Instead of user, here the term ‘participant’ or ‘patient’ might be applied. The differencing terminology encountered by the primary researcher led to much deliberation, which term should be used, and in which context? Additional discipline specific language was encountered over the course of the study. Some have suggested that such challenges have the potential to limit study outcomes if not addressed adequately (Knapp et al., 2015).

Whilst not directly applicable, the ‘ten rules of cross-disciplinary learning’ Knapp et al. (2015) provided much insight into the varied skills required for both the inter-disciplinary and the cross organisational working context in which the current thesis was carried out. The ability to recognise when an approach, or way of working, was not effective was important. For example, during the development phase (chapter 4) the primary researcher engaged with several different computer scientists to co-create the new study website in line with participant led criteria and accepted traditions in HCI and usability. This included working with an established web-developer, several computer science students, and a commercial web development company. Discussion, initial enquiry, and communication with these varied computer scientists required rapid new learning, understanding of critical processes, practices and terminologies and effective communication to successfully facilitate the desired outcome. The process was not always effective. The supervision of and interaction with some of the computer science students required effective

communication of project goals, time frames and resources, and included working not only with each individual team but also all teams in combination. Ultimately this was unsuccessful, and a new approach was required. The dynamics of multiple student teams, with multiple requirements, learning needs and abilities combined with the primary researcher's introduction into their field of research was too much to manage. While a functioning website was created it, took significantly longer than anticipated and did not meet the requirements agreed with each team. As is often the case the workload was not equally distributed, and some students felt unfairly burdened. To complicate matters further the matter was not resolved as the primary researcher began maternity leave unexpectedly early and the project ceased. There were several learning points taken from this which informed practice moving forwards. For example, the need for trust and confidence in one's self, to clarifying a preferred position i.e. to interact with only one team not several teams, was a key learning point. Equally the establishment of shared understanding regarding project goals and outcomes. Different perspectives led to differing understanding of the overarching aims of the project. For example, while the overall aim of the primary researcher was to develop a tool for the public health agenda which could support individual's health and well-being, the aims of those from different disciplines varied. Computer scientists conceivably were more concerned with the creation of a system which performed accurately and functioned in line with agreed targets.

However, the integration of computer scientists in the earlier qualitative enquiry stages (chapter 4) proved insightful and engaging. The primary researcher was able to introduce topics for consideration by participants and computer scientists could share in the moment insights relating to practical, theoretical, and technological aspects of the design. Equally the use of follow-up discussions with these experts meant that mistakes or misunderstandings were highlighted early, and rapid learning was supported by the collaborative approach adopted. This open communication has been referred to as 'appreciative enquiry' (Graybill et al., 2006) and is considered critical to successful interdisciplinary working and requires willingness to learn from others, and a neutral location and physical space for research meeting

outcomes (Bracken & Oughton, 2006; Bridle et al., 2013). Their open and closed ended survey of 26 early career researchers identified several themes deemed important to cultivating successful interdisciplinary working environment including length of encounter.

These themes resonate with the experiences generated in the current thesis. The current six-year study period had several benefits and drawbacks for interdisciplinary working. A series of interaction points over time is advocated for those in the same geographical location (Graybill et al., 2006) based on what this affords for those involved i.e. the opportunity to establish relationships, build trust and develop knowledge and a shared understanding. These concepts were applied to the development phase of the current thesis (chapter 4) and were ultimately critical to its successful output. The learning during this study phase also supported the successive study phases as did time to process new knowledge and time for reflection.

#### 7.5.2 Cross organisational working

The primary research was required to work effectively across several organisations, PHW, SBUHB and Swansea University.

PHW were, in the initial stages, central to the research undertaken. However, their involvement lessened when a key individual relocated and ‘Champions for Health’ was later dropped (2019) from their agenda. This had several implications: support for the project ended at a critical stage (2019), recruitment to the RCT was not supported and finally widespread use of the updated study website and intervention across PHW was not realised, a key motivation for the primary researcher and an influential factor in several design considerations (e.g. automated delivery).

The involvement of SBUHB was also central to the work undertaken. A relationship was cultivated at study onset. Several meetings were held with managerial staff across several HBs, to establish project requirements and interest. Once SBUHB involvement was established the primary researcher developed an ongoing relationship with the ‘Well-being through work’ team. Several team members were recruited to the PD study. This relationship was invaluable, recruitment and visibility of the project during the feasibility phase

were supported as a result. The primary researcher engaged with the newly established 'Well-being Champion' scheme to support and raise awareness of the importance of staff emotional well-being. As part of this work the primary researcher had the opportunity to share the 'Champions for Health' programme with staff volunteers to who attended training (2019). The primary researcher delivered presentations, led experiential exercises and discussed well-being. Following this the primary researcher was invited to work with the IWS service (chapter 6).

Alongside this the primary researcher also identified and established a network of contacts throughout the participating HB to support recruitment at each study phase. For example, the primary researcher met with staff in the postgraduate education department to raise awareness of the study amongst clinical staff via lunch time seminars, access to the digital screens and email notifications. The communications department also supported visibility via the staff intranet. The final key relationship established was with the executive director for public health and her successor. Their support was crucial to the deployment of the feasibility study.

Working across these varied organisations, organisational cultures and academic disciplines for the duration of this thesis (2015-2021) required active navigation and new learning.

## **7.6 Implications for Research**

### **7.6.1 Implications for Research: PD**

Findings from the PD study contributed to the existing literature and provided further understanding of how users can be included in the development of web-based mental health and HRLB interventions in a workplace context.

Future research should pay strict attention to the time frame and availability of staff from this workplace setting, and ensure organisational support is in place to support full engagement in all development stages including final product

launch. Recommendations for practice include the use of welcome interviews (prior to group work) to ensure all participants understand the commitment they are making and are prepared to contribute actively to shape the output; A shared project plan should be developed early (in group work) to ensure a cohesive and collaborative environment is cultivated. This supported a participant led dynamic. Equally a strict focus during prototyping tasks and use of time-controlled tasks is advocated to ensure time-limited group workshops are effective and remain focused on quick identification of key components. This is in line with recent guidelines, published since the RCT was conducted, which advocate for the inclusion of end-users in the development of digital and mobile health interventions (NICE, 2020). The guidance (1.1.8 and 1.1.9) specifies the inclusion of diverse stakeholders throughout all design phases and the need to seek continued feedback. Thus, future studies should also seek to embed evaluation of PD methods and outcomes to ensure approaches used are effective and useful. Equally a short time lapse between development and implementation is recommended to allow evaluation of the impact of the PD approach on adherence and engagement within the wider organisation.

Finally, to ensure the above is achieved, full management/organisational level support and involvement is strongly advocated, for the duration of any project. This includes development phases and implementation. New systems/products need to be visible in the workplace and supported time made available to enable engagement.

#### **7.6.2 Implications for Research: web-delivered ACT**

Equally there is a pressing need to further understand the effectiveness of web-delivered ACT. Future studies should focus on recruiting larger populations to avoid concerns raised by small sample sizes and the resultant lack of statistical power. Studies should also seek to examine long-term effects, through the inclusion of longer follow-up periods. In addition, analysis of ACT specific outcome measures is a potential area for further exploration. Since the systematic review (chapter 3) was conducted the field has continued to grow. For example, 21 randomised, web or app based, ACT studies are listed on the

ACBS website. Of which seven were app based and seven explored treatment for a range of CMDs.

### 7.6.3 Implications for Research: Multi-faceted interventions

Findings from the feasibility study and RCT suggested that multi-faceted web-based interventions designed to support and encourage positive change in both physical and mental health, are desirable and acceptable to public sector staff.

Future research should continue to explore and evaluate the effectiveness of including a well-being intervention or indeed any intervention designed to support positive mental health within a HRLB change programme to identify whether or not there is a positive impact on health outcomes and adherence and engagement. As noted, the majority of interventions available to date have focused on either a single mental health condition or well-being, or targeted a one or two lifestyle behaviours. Thus, continued focus on multifactorial interventions which target multiple health conditions or HRLB in one holistic programme is advocated.

### 7.6.4 Implications for Interdisciplinary Working

Working across two academic disciplines with different terminology and perspectives on purpose and tasks aims was challenging. Future interdisciplinary work should consider and address different terminology, conceptual understanding and implementation of research aims and objectives to avoid costly mistakes or delays in translating therapeutic aims into functional technologies. For example, discussion and documentation of terminology could support a shared language and/or clarify understanding. Equally discussion of research methods like focus groups, which are common across fields, should be discussed prior to use, as application and/or understanding of purpose differs.

### 7.6.5 Implications for Cross Organisational Working

Future research should recognise the critical risk associated with conducting research in collaboration with external organisations. External organisations, such as NHS Wales and PHW have responsibility for the direct delivery of healthcare at national scale. As such objectives and understanding surrounding collaboration will likely differ to those of a PhD researcher and/or an academic



delivering a funded research project. Thus, consideration of both the overall desired outcomes (for each organisation) and required commitments should be explicitly reviewed and agreed in advance to avoid negative impact on final study outcomes. For example, the production of a shared collaboration agreement pertaining to desired outcomes, intended benefits and research principles, coupled with pre-agreed commitments regarding time, input and resources may support long term collaboration would be of benefit. In the current study, while significant support was obtained from each organisation, including the Head of the Medical School, and the director for Public Health (SBUHB) a lack of systemic organisational integration and ‘buy-in’ during the meant that the final RCT suffered from small sample and poor organisational visibility. NHS staff (feasibility study) indicated their uncertainty regarding access to the study website during working time. Thus, the key implication is a critical need for organisation wide integration. This will enable widespread adoption and encourage staff to access and engage with available resources.

Equally commercial collaboration is advocated for future cross organisational research. A plethora of commercial lifestyle and mental health focused interventions have been released recently. These commercial products have been developed via large scale inter-disciplinary teams and academic collaboration offers significant scope to address future research questions and enable effective evaluation. This would ensure that interventions deployed (e.g. Noom which encompasses CBT principles into a weightless programme, or ‘Every Mind Matters’ the recent NHS tool) incorporate effective and meaningful evaluation into the design process and facilitate knowledge gain. To address the pressing need for robust exploration of what works, when and for whom.

## **7.7 Implications for Policy**

Resources, such as the current web-based programme which support healthcare workers and public sector staff, emotional well-being, may be of critical importance moving forwards as the current pandemic continues to

unfold and understanding of the mental and physical health consequences for this critical workforce are further explored. Self-care and organisational level support for mental health and well-being are likely to become increasingly critical.

Early research findings have suggested that the pandemic has led to an 8% increase in poor mental health at population level (Banks & Xu 2020), likely as a result of prolonged periods of isolation and reduced, or severely restricted access to face-to-face treatments for a range of CMDs (Kang et al., 2020). A systematic review of 23 studies reported negative psychological effects including PTSD, confusion, irritability, and anger, with implications for all concerned; the isolated individual, their families, and healthcare providers (Brooks et al., 2020). A systematic review of ten studies found that healthcare staff, particularly females, commonly experienced depression, anxiety, insomnia, and distress as a consequence of the pandemic (Shaukat et al., 2020). Muller et al. (2020) reported similar findings in a systematic review of 59 studies. Their review went on to identify social support, organisational support and the need for rest, over and above psychological intervention. Equally a systematic review reported one in five healthcare staff had experienced anxiety and/or depression and insomnia (Pappa et al., 2020). While another reported 40% subthreshold mental health disturbances (measured using PHQ-9), 34% mild disturbances, 22% moderate disturbances and 6% severe disturbances, in Chinese healthcare staff. All of which was more pronounced amongst females (Kang et al., 2020). Similar findings were reported in non-medical health care staff (Tan et al., 2020) likely arising due to less first-hand experience and training on the use of critical personal protective equipment (PPE) and infection control.

Such findings are in line with earlier pandemic data which report similar consequences (and many others including Burnout and PTSD) and which highlight the long-term consequences of experiencing extended periods of isolation and/or infection (Lancee et al., 2008). For example, higher depressive symptoms in hospital staff three years post quarantine/isolation compared to those who had not quarantined (Liua et al., 2012). Thus, continued support for public sector and healthcare staff is warranted. This is particularly important as

earlier findings have suggested that during infectious disease outbreaks, organisational support plays a protective role in supporting staff mental health with particular focus on the role of managers during periods of isolation and/or quarantine (Brooks et al., 2020).

Furthermore, the need for additional provision of web-based interventions is likely to increase as a result of the current pandemic where those in quarantine/isolation are not able to access pre-existing management plans in-person, or as a result of increased demand, additional services are required. Equally web-based support for HRLBs which address changes in lifestyles arising as a result of periods of quarantine (Chopra et al., 2020) but also changes arising indirectly as a consequence of increased CMD incidence. As such diverse toolkits will be required to meet this growing need. Of which multi-faceted interventions offer potential for succinct intervention. Thus, policy should continue to be informed by research to ensure available interventions are effective at both pre-clinical levels i.e. well-being support (tier 0) clinical level.

Further research is also required to understand factors which influence use of well-being interventions within this context. This could be addressed in several ways. A qualitative study to explore reasons for non-use in this context. Alternatively, the programme could be re-designed and the well-being intervention could be made available in a variety of alternative formats; a guided intervention, different duration, email, SMS or video messaging delivery, inclusion of social interaction elements, use of different gamification features, or via delivery of the intervention prior to accessing the HRLB modules.

Future research should explore these varying possibilities to continue this line of thought and to identify whether or not the provision of mental health resources (in the form of a well-being intervention) within a HRLB change programme is effective in supporting and encouraging participants to make positive and sustained changes to their health. Finally, evidence is required to support the inclusion of multifaceted programmes such as the current one

which are increasingly been used in a commercial setting (e.g. togetherall; FitBit).

## 7.8 Future Directions

Due to the onset and continued uncertainty surrounding the pandemic, the final RCT was not run again. Access to frontline staff remained unavailable and ability to ensure a systematic and integrated approach to staff well-being remained unattainable. However, the primary researcher and first supervisor, secured a small grant to adapt and develop the emotional well-being intervention and study website for use by medical students and young persons aged 16-24. This work (initiated 1.9.2020) builds on the work outlined in this thesis. It also allowed several learning points (identified in earlier study phases) to be addressed. For example, the PD approach was adapted and a co-design approach (Ward et al., 2018) was used. Like PD, participants are actively involved. Participants reviewed the website independently then took part in a series of iterative online workshops where groups worked together to tailor the intervention directly. Examples and scenarios were co-created alongside components of the study website.

The study was undertaken in two overlapping phases, first the primary researcher undertook the review and adaptation phase with medical students, and then supervised a final year student to mirror the research stages with young persons aged 16-24. After both review and adaptation phases were completed the updates were commissioned. Twenty young persons accessed the website for three weeks. This shorter study duration was used to explore the drop in engagement between development and implementation phases. Additional updates were made based on user experience and feedback before the study website was made available to medical students (12-week duration). This phase is ongoing. Findings from the young person's data suggested that the intervention successfully increased psychological flexibility and well-being in 'high engagers' (measured by health points earned) although it remained below statistical significance. The observation that those who engaged the

most with the website and its components is promising. Future work is also planned whereby the well-being intervention will be integrated into the lifestyle modules. This is based on findings from the body of work outline here.

Furthermore, the study website remains part of the IWS service, SBUHB.

## 7.9 Final Conclusion

The current body of research finds that the implementation of a structured, three staged PD process within a public sector workplace context, can be successfully applied to engage staff from a range of professions, to co-develop an emotional well-being intervention beyond identification of simple design preferences. This research found that multi-faceted web-based interventions designed to support physical and mental health, are desirable and acceptable to public sector staff. However, the PD process, ultimately failed to cultivate positive adherence and sustained engagement to the well-being intervention when deployed within the wider 'Champions for Health' programme several years later, despite initial positive engagement during feasibility study phase.

Overall, this study finds that the implementation of an automated, 12-week, sequential ACT based emotional well-being intervention delivered simultaneously alongside multiple lifestyle behaviour change interventions in one multifaceted programme, did not have a positive impact on HRLB change, adherence and engagement, or well-being. Thus, the study hypothesis was rejected.

However, the wider context, i.e. the global COVID-19 pandemic, in which the final research stage was undertaken is likely to have contributed to the lack of research data, as the role and attention of the public sector staff included in the study, was necessarily directed towards delivery the frontline healthcare needs of NHS Wales. Therefore, further research into the application of interventions which address health in a holistic way are warranted.

## Glossary

**‘End-user’/‘user’:** Any persons which are anticipated to use the computer-based system and/or product under development i.e. individual workers and/or study participants (Christensson, 2006).

## Bibliography

- Aalbers, T., Baars, M., & Rikkert, M. O. (2011). Characteristics of effective Internet-mediated interventions to change lifestyle in people aged 50 and older: a systematic review. *Ageing research reviews*, 10(4), 487-497.
- Aardoom, J. J., Dingemans, A. E., Spinhoven, P., van Ginkel, J. R., de Rooij, M., & van Furth, E. F. (2016). Web-based fully automated self-help with different levels of therapist support for individuals with eating disorder symptoms: a randomized controlled trial. *Journal of medical Internet research*, 18(6), e159.
- ABMU. (2010). *ABM UNIVERSITY HEALTH BOARD ANNUAL REPORT 2010-2011*. <http://www.wales.nhs.uk/sitesplus/documents/863/Annual%20Report%202010-11%20Complete.pdf>
- Adams, M. A., Marshall, S. J., Dillon, L., Caparosa, S., Ramirez, E., Phillips, J., & Norman, G. J. (2009). A theory-based framework for evaluating exergames as persuasive technology. Proceedings of the 4th International Conference on Persuasive Technology,
- Aguilar. (2015). *Global-Compact Cities Programme. PARTICIPATORY DESIGN FOR PUBLIC URBAN SPACES*. . [https://citiesprogramme.org/wp-content/uploads/2019/10/participatory\\_design-report\\_web.pdf](https://citiesprogramme.org/wp-content/uploads/2019/10/participatory_design-report_web.pdf)
- Aikens, K. A., Astin, J., Pelletier, K. R., Levanovich, K., Baase, C. M., Park, Y. Y., & Bodnar, C. M. (2014). Mindfulness goes to work: impact of an online workplace intervention. *Journal of occupational and environmental medicine*, 56(7), 721-731.
- Ajzen, I., & Fishbein, M. (1970). The prediction of behavior from attitudinal and normative variables. *Journal of experimental social Psychology*, 6(4), 466-487.
- Akobeng, A. K. (2005). Understanding randomised controlled trials. *Archives of disease in childhood*, 90(8), 840-844.
- Aldenaini, N., Alqahtani, F., Orji, R., & Sampalli, S. (2020). Trends in Persuasive Technologies for Physical Activity and Sedentary Behavior: A Systematic Review [Systematic Review]. *Frontiers in Artificial Intelligence*, 3(7). <https://doi.org/10.3389/frai.2020.00007>
- Alexander, G. L., Divine, G. W., Couper, M. P., McClure, J. B., Stopponi, M. A., Fortman, K. K., Tolsma, D. D., Strecher, V. J., & Johnson, C. C. (2008). Effect of incentives and mailing features on online health program enrollment. *American journal of preventive medicine*, 34(5), 382-388.
- Allin, P., & Hand, D. J. (2017). New statistics for old?—measuring the wellbeing of the UK. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 180(1), 3-43.
- Allport, F. H. (1937). Toward a science of public opinion. *Public opinion quarterly*, 1(1), 7-23.
- Alonso-Fernández, M., López-López, A., Losada, A., González, J. L., & Wetherell, J. L. (2016). Acceptance and commitment therapy and selective optimization with compensation for institutionalized older people with chronic pain. *Pain medicine*, 17(2), 264-277.
- Amstadter, A. B., Broman-Fulks, J., Zinzow, H., Ruggiero, K. J., & Cercone, J. (2009). Internet-based interventions for traumatic stress-related mental health problems: a review and suggestion for future research. *Clinical psychology review*, 29(5), 410-420.
- Andersson, G., & Cuijpers, P. (2009). Internet-based and other computerized psychological treatments for adult depression: a meta-analysis. *Cognitive behaviour therapy*, 38(4), 196-205.
- Andersson, G., Estling, F., Jakobsson, E., Cuijpers, P., & Carlbring, P. (2011). Can the patient decide which modules to endorse? An open trial of tailored internet treatment of anxiety disorders. *Cognitive behaviour therapy*, 40(1), 57-64.
- Andrews, F. M., & McKennell, A. C. (1980). Measures of self-reported well-being: Their affective, cognitive, and other components. *Social indicators research*, 8(2), 127-155.
- Andrews, F. M., & Withey, S. B. (2005). Developing measures of perceived life quality: Results from several national surveys. In *Citation Classics from Social Indicators Research* (pp. 75-100). Springer.

- Andrews, G., Cuijpers, P., Craske, M. G., McEvoy, P., & Titov, N. (2010). Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: a meta-analysis. *PLoS one*, 5(10), e13196.
- Anthenelli, R. M., & Schuckit, M. A. (1993). Affective and anxiety disorders and alcohol and drug dependence: diagnosis and treatment. *Journal of Addictive Diseases*, 12(3), 73-87.
- Antin, J., & Churchill, E. F. (2011). Badges in social media: A social psychological perspective. CHI 2011 Gamification Workshop Proceedings,
- Arain, M., Campbell, M. J., Cooper, C. L., & Lancaster, G. A. (2010). What is a pilot or feasibility study? A review of current practice and editorial policy. *BMC medical research methodology*, 10(1), 1-7.
- Arango, C., Díaz-Caneja, C. M., McGorry, P. D., Rapoport, J., Sommer, I. E., Vorstman, J. A., McDaid, D., Marín, O., Serrano-Drozdzowskyj, E., & Freedman, R. (2018). Preventive strategies for mental health. *The Lancet Psychiatry*, 5(7), 591-604.
- Arnold, C., Villagonzalo, K.-A., Meyer, D., Farhall, J., Foley, F., Kyrios, M., & Thomas, N. (2019). Predicting engagement with an online psychosocial intervention for psychosis: exploring individual-and intervention-level predictors. *Internet interventions*, 18, 100266.
- Asay, T. P., & Lambert, M. J. (1999). The empirical case for the common factors in therapy: Quantitative findings.
- ASH. (2019). *Action on smoking on health. Fact sheet No. 12: Smoking and Mental Health*. Retrieved 22.6.21 from [https://ash.org.uk/wp-content/uploads/2019/08/ASH-Factsheet\\_Mental-Health\\_v3-2019-27-August-1.pdf](https://ash.org.uk/wp-content/uploads/2019/08/ASH-Factsheet_Mental-Health_v3-2019-27-August-1.pdf)
- Attwood, S., Penney, T. L., O'Leary, R., Klahn, C., & Kelly, B. (2020). Measuring Wellbeing in a Healthcare Setting: a Qualitative Study of Staff and Service User Perspectives. *Applied Research in Quality of Life*, 15(1), 127-145.
- Aune, D., Giovannucci, E., Boffetta, P., Fadnes, L. T., Keum, N., Norat, T., Greenwood, D. C., Riboli, E., Vatten, L. J., & Tonstad, S. (2017). Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies. *International Journal of Epidemiology*, 46(3), 1029-1056.
- Bach, P., & Hayes, S. C. (2002). The use of acceptance and commitment therapy to prevent the rehospitalization of psychotic patients: a randomized controlled trial. *Journal of consulting and clinical psychology*, 70(5), 1129.
- Baker, C. (2020). Mental health statistics for England: prevalence, services and funding.
- Bakhshi, S., Sun, F., Murrells, T., & While, A. (2015). Nurses' health behaviours and physical activity-related health-promotion practices. *British Journal of Community Nursing*, 20(6), 289-296.
- Bakhshi, S., & While, A. E. (2014). Health professionals' alcohol-related professional practices and the relationship between their personal alcohol attitudes and behavior and professional practices: a systematic review. *International journal of environmental research and public health*, 11(1), 218-248.
- Balmford, J., Borland, R., & Benda, P. (2008). Patterns of use of an automated interactive personalized coaching program for smoking cessation. *Journal of medical Internet research*, 10(5), e54.
- Baltierra, N. B., Muessig, K. E., Pike, E. C., LeGrand, S., Bull, S. S., & Hightow-Weidman, L. B. (2016). More than just tracking time: complex measures of user engagement with an internet-based health promotion intervention. *Journal of biomedical informatics*, 59, 299-307.
- Barak, A., Hen, L., Boniel-Nissim, M., & Shapira, N. a. (2008). A comprehensive review and a meta-analysis of the effectiveness of internet-based psychotherapeutic interventions. *Journal of Technology in Human services*, 26(2-4), 109-160.
- Barak, A., Klein, B., & Proudfoot, J. G. (2009). Defining internet-supported therapeutic interventions. *Annals of Behavioral Medicine*, 38(1), 4-17.
- Baranowski, T., Buday, R., Thompson, D. I., & Baranowski, J. (2008). Playing for real: video games and stories for health-related behavior change. *American journal of preventive medicine*, 34(1), 74-82. e10.



- Bargh, J. A., McKenna, K. Y., & Fitzsimons, G. M. (2002). Can you see the real me? Activation and expression of the "true self" on the Internet. *Journal of social issues, 58*(1), 33-48.
- Barnes-Holmes, S. C. H. D., & Roche, B. (2001). *Relational frame theory: A post-Skinnerian account of human language and cognition*.
- Baumeister, H., Reichler, L., Munzinger, M., & Lin, J. (2014). The impact of guidance on Internet-based mental health interventions—A systematic review. *Internet interventions, 1*(4), 205-215.
- Beattie, A., Shaw, A., Kaur, S., & Kessler, D. (2009). Primary-care patients' expectations and experiences of online cognitive behavioural therapy for depression: a qualitative study. *Health Expectations, 12*(1), 45-59.
- Beatty, L., & Binnion, C. (2016). A systematic review of predictors of, and reasons for, adherence to online psychological interventions. *International journal of behavioral medicine, 23*(6), 776-794.
- Becker, M. H. (1974). The health belief model and personal health behavior. *Health education monographs, 2*, 324-473.
- Beishuizen, C. R., Stephan, B. C., van Gool, W. A., Brayne, C., Peters, R. J., Andrieu, S., Kivipelto, M., Soinen, H., Busschers, W. B., & van Charante, E. P. M. (2016). Web-based interventions targeting cardiovascular risk factors in middle-aged and older people: a systematic review and meta-analysis. *Journal of medical Internet research, 18*(3), e55.
- Belloc, N. B. (1973). Relationship of health practices and mortality. *Preventive medicine, 2*(1), 67-81.
- Belloc, N. B., & Breslow, L. (1972). Relationship of physical health status and health practices. *Preventive medicine, 1*(3), 409-421.
- Bendtsen, M., Bendtsen, P., Henriksson, H., Henriksson, P., Müssener, U., Thomas, K., & Löf, M. (2020). The Mobile health multiple lifestyle behavior interventions across the lifespan (MoBILE) research program: protocol for development, evaluation, and implementation. *JMIR Research Protocols, 9*(4), e14894.
- Benedict, C., Hahn, A. L., Diefenbach, M. A., & Ford, J. S. (2019). Recruitment via social media: advantages and potential biases. *Digital health, 5*, 2055207619867223.
- Bennett, R., & Oliver, J. E. (2019). *Acceptance and commitment therapy: 100 key points and techniques*. Routledge.
- Benton, T., Staab, J., & Evans, D. L. (2007). Medical co-morbidity in depressive disorders. *Annals of Clinical Psychiatry, 19*(4), 289-303.
- Berg, A., & Gulden, T. (2012). Participatory design for well-being.
- Berrigan, D., Dodd, K., Troiano, R. P., Krebs-Smith, S. M., & Barbash, R. B. (2003). Patterns of health behavior in US adults. *Preventive medicine, 36*(5), 615-623.
- Bertelsen, O., & Nielsen, C. (1999). *Dynamics in wastewater treatment: a framework for understanding formal constructs in complex technical settings In: Proceedings of ECCW'99*.
- Beyer, H., & Holtzblatt, K. (1997). *Contextual Design: Defining Customer-Centered Systems*. Morgan Kaufmann Publishers Inc.
- Bhattacharya, A. (2017). Splitting the Bill: Alcohol's Impact on the Economy. *Institute for Alcohol Studies: London, UK*.
- Bhugra, D., Kar, A., & Lawton-Smith, S. (2014). Integration of Mental and Physical Health Services: Lessons. *Journal of Psychosocial Rehabilitation and Mental Health, 1*(1), 15-21.
- Biglan, A., Hayes, S. C., & Pistorello, J. (2008). Acceptance and commitment: Implications for prevention science. *Prevention science, 9*(3), 139-152.
- Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: a tool to enhance trustworthiness or merely a nod to validation? *Qualitative health research, 26*(13), 1802-1811.
- Black, C. D., & Frost, D. (2011). *Health at work-an independent review of sickness absence* (0101820526).
- Black, C. M. (2008). *Working for a healthier tomorrow: Dame Carol Black's review of the health of Britain's working age population* (0117025135).

- Black, N., Mullan, B., & Sharpe, L. (2016). Computer-delivered interventions for reducing alcohol consumption: meta-analysis and meta-regression using behaviour change techniques and theory. *Health psychology review, 10*(3), 341-357.
- Blackmon, M. H., Polson, P. G., Kitajima, M., & Lewis, C. (2002). Cognitive walkthrough for the web. Proceedings of the SIGCHI conference on human factors in computing systems,
- Blake, H., & Harrison, C. (2013). Health behaviours and attitudes towards being role models. *British Journal of Nursing, 22*(2), 86-94.
- Blake, H., & Patterson, J. (2015). Paediatric nurses' attitudes towards the promotion of healthy eating. *British Journal of Nursing, 24*(2), 108-112.
- Blomberg, J., Suchman, L., & Trigg, R. H. (1996). Reflections on a work-oriented design project. *Human-Computer Interaction, 11*(3), 237-265.
- Bloom, D., Cafiero, E., Jané-Llopis, E., Abrahams-Gessel, S., Bloom, L., Fathima, S., & Weinstein, C. (2011). The global economic burden of non-communicable diseases: A report by the World Economic Forum and the Harvard School of Public Health. Geneva, Switzerland. VWorld Economic Forum,
- Bødker, S., & Iversen, O. S. (2002). Staging a professional participatory design practice: moving PD beyond the initial fascination of user involvement. Proceedings of the second Nordic conference on Human-computer interaction,
- Bogost, I. (2013). Exploitationware. In *Rhetoric/composition/play through video games* (pp. 139-147). Springer.
- Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC public health, 13*(1), 1-20.
- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior therapy, 42*(4), 676-688.
- Bonnet, F., Irving, K., Terra, J.-L., Nony, P., Berthezène, F., & Moulin, P. (2005). Anxiety and depression are associated with unhealthy lifestyle in patients at risk of cardiovascular disease. *Atherosclerosis, 178*(2), 339-344.
- Boorman, S. (2009). NHS health and well-being: final report. *London: Department of Health.*
- Boß, L., Lehr, D., Schaub, M. P., Paz Castro, R., Riper, H., Berking, M., & Ebert, D. D. (2018). Efficacy of a web-based intervention with and without guidance for employees with risky drinking: results of a three-arm randomized controlled trial. *Addiction, 113*(4), 635-646.
- Bowen, S., McSeveny, K., Lockley, E., Wolstenholme, D., Cobb, M., & Dearden, A. (2013). How was it for you? Experiences of participatory design in the UK health service. *CoDesign, 9*(4), 230-246.
- Bracken, L. J., & Oughton, E. A. (2006). 'What do you mean?' The importance of language in developing interdisciplinary research. *Transactions of the Institute of British Geographers, 31*(3), 371-382.
- Bradburn, N. M. (1969). The structure of psychological well-being.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), 77-101.
- Brenninkmeijer, V., Lagerveld, S. E., Blonk, R. W., Schaufeli, W. B., & Wijngaards-de Meij, L. D. (2019). Predicting the effectiveness of work-focused CBT for common mental disorders: the influence of baseline self-efficacy, depression and anxiety. *Journal of occupational rehabilitation, 29*(1), 31-41.
- Brewer, G. D. (1999). The challenges of interdisciplinarity. *Policy sciences, 32*(4), 327-337.
- Bricker, J. B., Bush, T., Zbikowski, S. M., Mercer, L. D., & Heffner, J. L. (2014). Randomized trial of telephone-delivered acceptance and commitment therapy versus cognitive behavioral therapy for smoking cessation: a pilot study. *Nicotine & Tobacco Research, 16*(11), 1446-1454.

- Bricker, J. B., Mull, K. E., Kientz, J. A., Vilardaga, R., Mercer, L. D., Akioka, K. J., & Heffner, J. L. (2014). Randomized, controlled pilot trial of a smartphone app for smoking cessation using acceptance and commitment therapy. *Drug and alcohol dependence, 143*, 87-94.
- Bricker, J. B., Mull, K. E., McClure, J. B., Watson, N. L., & Heffner, J. L. (2018). Improving quit rates of web-delivered interventions for smoking cessation: full-scale randomized trial of WebQuit.org versus Smokefree.gov. *Addiction, 113*(5), 914-923.
- Brickman, P., & Campbell, D. T. . (1971). *Hedonic relativism and planning the good society*. In M. H. Appley (Ed.), *Adaptation level theory: A symposium* (pp. 287–302). . New York: Academic Press
- Bridle, H., Vrieling, A., Cardillo, M., Araya, Y., & Hinojosa, L. (2013). Preparing for an interdisciplinary future: A perspective from early-career researchers. *Futures, 53*, 22-32.
- Brindal, E., Freyne, J., Saunders, I., Berkovsky, S., Smith, G., & Noakes, M. (2012). Features predicting weight loss in overweight or obese participants in a web-based intervention: randomized trial. *Journal of medical Internet research, 14*(6), e173.
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The lancet, 395*(10227), 912-920.
- Brouwer, W., Kroeze, W., Crutzen, R., de Nooijer, J., de Vries, N. K., Brug, J., & Oenema, A. (2011). Which intervention characteristics are related to more exposure to internet-delivered healthy lifestyle promotion interventions? A systematic review. *Journal of medical Internet research, 13*(1), e2.
- Brown, M., Glendenning, A. C., Hoon, A. E., & John, A. (2016). Effectiveness of web-delivered acceptance and commitment therapy in relation to mental health and well-being: a systematic review and meta-analysis. *Journal of medical Internet research, 18*(8), e221.
- Brown, M., O'Neill, N., van Woerden, H., Eslambolchilar, P., Jones, M., & John, A. (2016). Gamification and adherence to web-based mental health interventions: a systematic review. *JMIR mental health, 3*(3), e39.
- Brown, S. A., & Schuckit, M. A. (1988). Changes in depression among abstinent alcoholics. *Journal of studies on alcohol, 49*(5), 412-417.
- Browne, S., Minozzi, S., Bellisario, C., Sweeney, M. R., & Susta, D. (2019). Effectiveness of interventions aimed at improving dietary behaviours among people at higher risk of or with chronic non-communicable diseases: an overview of systematic reviews. *European journal of clinical nutrition, 73*(1), 9-23.
- Bryant, F. B., & Veroff, J. (1982). The structure of psychological well-being: A sociohistorical analysis. *Journal of personality and social psychology, 43*(4), 653.
- Bubolz, S., Mayer, G., Gronewold, N., Hilbel, T., & Schultz, J.-H. (2020). Adherence to Established Treatment Guidelines Among Unguided Digital Interventions for Depression: Quality Evaluation of 28 Web-Based Programs and Mobile Apps. *Journal of medical Internet research, 22*(7), e16136.
- Buck, D., Baylis, A., Dougall, D., & Robertson, R. (2018). *A vision for population health: towards a healthier future*.
- Buhrman, M., Skoglund, A., Husell, J., Bergström, K., Gordh, T., Hursti, T., Bendelin, N., Furmark, T., & Andersson, G. (2013). Guided internet-delivered acceptance and commitment therapy for chronic pain patients: a randomized controlled trial. *Behaviour research and therapy, 51*(6), 307-315.
- Burckhardt, R., Manicavasagar, V., Batterham, P. J., Miller, L. M., Talbot, E., & Lum, A. (2015). A web-based adolescent positive psychology program in schools: randomized controlled trial. *Journal of medical Internet research, 17*(7), e187.
- Burton, H., Sagoo, G. S., Pharoah, P., & Zimmern, R. L. (2012). Time to revisit Geoffrey Rose: strategies for prevention in the genomic era? *Italian Journal of Public Health, 9*(4).

- Burton, R., Henn, C., Lavoie, D., O'Connor, R., Perkins, C., Sweeney, K., Greaves, F., Ferguson, B., Beynon, C., & Belloni, A. (2016). The public health burden of alcohol and the effectiveness and cost-effectiveness of alcohol control policies: an evidence review. *The public health burden of alcohol and the effectiveness and cost-effectiveness of alcohol control policies: an evidence review*.
- Butryn, M. L., Forman, E., Hoffman, K., Shaw, J., & Juarascio, A. (2011). A pilot study of acceptance and commitment therapy for promotion of physical activity. *Journal of Physical Activity and Health, 8*(4), 516-522.
- Cabarkapa, S., Nadjidai, S. E., Murgier, J., & Ng, C. H. (2020). The psychological impact of COVID-19 and other viral epidemics on frontline healthcare workers and ways to address it: A rapid systematic review. *Brain, behavior, & immunity-health, 100144*.
- Caixeta, M., Bross, J. C., Fabricio, M. M., & Tzortzopoulos, P. (2013). Value generation through user involvement in healthcare design. Proc. 21st Ann. Conf. Int'l. Group for Lean Construction (IGLC), Fortaleza, Brazil,
- Campbell, A. (1976). Subjective measures of well-being. *American psychologist, 31*(2), 117.
- Campbell, A., & Pisterman, S. (1996). A fitting approach to interactive service design: The importance of emotional needs. *Design Management Journal (Former Series), 7*(4), 10-14.
- Cano-Vindel, A., Muñoz-Navarro, R., Medrano, L. A., Ruiz-Rodríguez, P., González-Blanch, C., Gómez-Castillo, M. D., Capafons, A., Chacón, F., Santolaya, F., & Group, P. R. (2018). A computerized version of the Patient Health Questionnaire-4 as an ultra-brief screening tool to detect emotional disorders in primary care. *Journal of affective disorders, 234*, 247-255.
- Cargo, M., & Mercer, S. L. (2008). The value and challenges of participatory research: strengthening its practice. *Annu. Rev. Public Health, 29*, 325-350.
- Carlbring, P., Hägglund, M., Luthström, A., Dahlin, M., Kadowaki, Å., Vernmark, K., & Andersson, G. (2013). Internet-based behavioral activation and acceptance-based treatment for depression: a randomized controlled trial. *Journal of affective disorders, 148*(2-3), 331-337.
- Carlbring, P., Maurin, L., Törngren, C., Linna, E., Eriksson, T., Sparthan, E., Strååt, M., von Hage, C. M., Bergman-Nordgren, L., & Andersson, G. (2011). Individually-tailored, Internet-based treatment for anxiety disorders: A randomized controlled trial. *Behaviour research and therapy, 49*(1), 18-24.
- Carolan, S., Harris, P. R., & Cavanagh, K. (2017). Improving employee well-being and effectiveness: systematic review and meta-analysis of web-based psychological interventions delivered in the workplace. *Journal of medical Internet research, 19*(7), e271.
- Cavanagh, K., Strauss, C., Cicconi, F., Griffiths, N., Wyper, A., & Jones, F. (2013). A randomised controlled trial of a brief online mindfulness-based intervention. *Behaviour research and therapy, 51*(9), 573-578.
- Çelmeçe, N., & Menekay, M. (2020). The Effect of Stress, Anxiety and Burnout Levels of Healthcare Professionals Caring for COVID-19 Patients on Their Quality of Life. *Frontiers in psychology, 11*, 3329.
- Centre, H. S. C. I. (2015). *Statistics on Smoking: England 2015*. Retrieved 22.6.21 from <https://files.digital.nhs.uk/publicationimport/pub17xxx/pub17526/stat-smok-eng-2015-rep.pdf>
- Chakraborty, B., Maiti, R., & Strecher, V. J. (2018). The effectiveness of web-based tailored smoking cessation interventions on the quitting process (Project Quit): secondary analysis of a randomized controlled trial. *Journal of medical Internet research, 20*(6), e213.
- Chandola, T., Britton, A., Brunner, E., Hemingway, H., Malik, M., Kumari, M., Badrick, E., Kivimaki, M., & Marmot, M. (2008). Work stress and coronary heart disease: what are the mechanisms? *European heart journal, 29*(5), 640-648.
- Chesney, E., Goodwin, G. M., & Fazel, S. (2014). Risks of all-cause and suicide mortality in mental disorders: a meta-review. *World psychiatry, 13*(2), 153-160.

- Chevreur, K., Durand-Zaleski, I., Gouépo, A., Fery-Lemonnier, E., Hommel, M., & Woimant, F. (2013). Cost of stroke in France. *European journal of neurology*, 20(7), 1094-1100.
- Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: a quantitative review of prospective observational studies. *Psychosomatic medicine*, 70(7), 741-756.
- Chien, I., Enrique, A., Palacios, J., Regan, T., Keegan, D., Carter, D., Tschatschek, S., Nori, A., Thieme, A., & Richards, D. (2020). A machine learning approach to understanding patterns of engagement with internet-delivered mental health interventions. *JAMA network open*, 3(7), e2010791-e2010791.
- Chopra, S., Ranjan, P., Singh, V., Kumar, S., Arora, M., Hasan, M. S., Kasiraj, R., Kaur, D., Vikram, N. K., & Malhotra, A. (2020). Impact of COVID-19 on lifestyle-related behaviours—a cross-sectional audit of responses from nine hundred and ninety-five participants from India. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 14(6), 2021-2030.
- Chowdhury, M. R. (2021). *What is the Mental Health Continuum model?* . Retrieved 21.6.21 from <https://positivepsychology.com/mental-health-continuum-model/>
- Christensen, H., Griffiths, K., Mackinnon, A., & Brittliffe, K. (2006). Online randomized controlled trial of brief and full cognitive behaviour therapy for depression. *Psychological medicine*, 36(12), 1737.
- Christensen, H., Griffiths, K. M., & Farrer, L. (2009). Adherence in internet interventions for anxiety and depression: systematic review. *Journal of medical Internet research*, 11(2), e13.
- Christensen, H., Griffiths, K. M., Korten, A. E., Brittliffe, K., & Groves, C. (2004). A comparison of changes in anxiety and depression symptoms of spontaneous users and trial participants of a cognitive behavior therapy website. *Journal of medical Internet research*, 6(4), e46.
- Christensson, P. (2006). *End User Definition* . Retrieved 25.1.21 from <https://techterms.com>
- Chu, C., Breucker, G., Harris, N., Stitzel, A., Gan, X., Gu, X., & Dwyer, S. (2000). Health-promoting workplaces—international settings development. *Health promotion international*, 15(2), 155-167.
- CIPD. (2013). *Absence Management: Annual survey report 2013*. CIPD.
- Clarke, G., Eubanks, D., Reid, E., Kelleher, C., O'connor, E., DeBar, L. L., Lynch, F., Nunley, S., & Gullion, C. (2005). Overcoming Depression on the Internet (ODIN)(2): a randomized trial of a self-help depression skills program with reminders. *Journal of medical Internet research*, 7(2), e16.
- Clarke, J., Vatioti, V., Verge, C. F., Holmes-Walker, J., Campbell, L. V., Wilhelm, K., & Proudfoot, J. (2015). A mobile phone and web-based intervention for improving mental well-being in young people with type 1 diabetes: design of a randomized controlled trial. *JMIR Research Protocols*, 4(2), e50.
- Clemensen, J., Larsen, S. B., Kyng, M., & Kirkevold, M. (2007). Participatory design in health sciences: Using cooperative experimental methods in developing health services and computer technology. *Qualitative health research*, 17(1), 122-130.
- Clement, A., & Van den Besselaar, P. (1993). A retrospective look at PD projects. *Communications of the ACM*, 36(6), 29-37.
- CMO. (2019). *UK Chief Medical Officers' Physical Activity Guidelines 2019*. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf)
- Cobb, N. K., & Poirier, J. (2014). Effectiveness of a multimodal online well-being intervention: a randomized controlled trial. *American journal of preventive medicine*, 46(1), 41-48.
- CoC. (2015). *Committee on Carcinogenicity of Chemicals in Food Consumer Products and the Environment (COC). Statement 2015/S2. Statement on consumption of alcoholic beverages and risk of cancer*. Retrieved 22.6.21 from [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/490584/COC\\_2015\\_S2\\_Alcohol\\_and\\_Cancer\\_statement\\_Final\\_version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/490584/COC_2015_S2_Alcohol_and_Cancer_statement_Final_version.pdf)

- Connell, J., Brazier, J., O’Cathain, A., Lloyd-Jones, M., & Paisley, S. (2012). Quality of life of people with mental health problems: a synthesis of qualitative research. *Health and quality of life outcomes*, *10*(1), 1-16.
- Conner, M., Abraham, C., Prestwich, A., Hutter, R., Hallam, J., Sykes-Muskett, B., Morris, B., & Hurling, R. (2016). Impact of goal priority and goal conflict on the intention–health-behavior relationship: Tests on physical activity and other health behaviors. *Health Psychology*, *35*(9), 1017.
- Conner, M., & Norman, P. (2017). *Health behaviour: Current issues and challenges*. Taylor & Francis.
- Contrada, R., & Baum, A. (2010). *The handbook of stress science: Biology, psychology, and health*. Springer Publishing Company.
- Cook, R., Billings, D., Hersch, R., Back, A., & Hendrickson, A. (2007). A field test of a web-based workplace health promotion program to improve dietary practices, reduce stress, and increase physical activity: randomized controlled trial. *Journal of medical Internet research*, *9*(2), e17.
- Corno, G., Etchemendy, E., Espinoza, M., Herrero, R., Molinari, G., Carrillo, A., Drossaert, C., & Baños, R. M. (2018). Effect of a web-based positive psychology intervention on prenatal well-being: A case series study. *Women and Birth*, *31*(1), e1-e8.
- Corrigan, P. W. (1998). The impact of stigma on severe mental illness. *Cognitive and behavioral practice*, *5*(2), 201-222.
- Corrigan, P. W., Mittal, D., Reaves, C. M., Haynes, T. F., Han, X., Morris, S., & Sullivan, G. (2014). Mental health stigma and primary health care decisions. *Psychiatry research*, *218*(1-2), 35-38.
- Couper, M. P., Alexander, G. L., Maddy, N., Zhang, N., Nowak, M. A., McClure, J. B., Calvi, J. J., Rolnick, S. J., Stopponi, M. A., & Little, R. J. (2010). Engagement and retention: measuring breadth and depth of participant use of an online intervention. *Journal of medical Internet research*, *12*(4), e52.
- Coury, J., Schneider, J. L., Rivelli, J. S., Petrik, A. F., Seibel, E., D’Agostini, B., Taplin, S. H., Green, B. B., & Coronado, G. D. (2017). Applying the Plan-Do-Study-Act (PDSA) approach to a large pragmatic study involving safety net clinics. *BMC health services research*, *17*(1), 1-10.
- Coyle, D., Doherty, G., Matthews, M., & Sharry, J. (2007). Computers in talk-based mental health interventions. *Interacting with computers*, *19*(4), 545-562.
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Developing and evaluating complex interventions: the new Medical Research Council guidance. *Bmj*, *337*.
- Crawford, V., & Crome, I. (2001). *Co-existing problems of mental health and substance misuse (Dual Diagnosis): A review of relevant literature*. Royal College of Psychiatrists London.
- Crespo, I., Valassi, E., Santos, A., & Webb, S. M. (2015). Health-related quality of life in pituitary diseases. *Endocrinology and Metabolism Clinics*, *44*(1), 161-170.
- Cruwys, T., & Gunaseelan, S. (2016). “Depression is who I am”: Mental illness identity, stigma and wellbeing. *Journal of affective disorders*, *189*, 36-42.
- Cugelman, B. (2013). Gamification: what it is and why it matters to digital health behavior change developers. *JMIR serious games*, *1*(1), e3.
- Cuijpers, P., de Graaf, R., & van Dorsselaer, S. (2004). Minor depression: risk profiles, functional disability, health care use and risk of developing major depression. *Journal of affective disorders*, *79*(1-3), 71-79.
- Cuijpers, P., Donker, T., Johansson, R., Mohr, D. C., van Straten, A., & Andersson, G. (2011). Self-guided psychological treatment for depressive symptoms: a meta-analysis. *PLoS one*, *6*(6), e21274.
- Cuijpers, P., Marks, I. M., van Straten, A., Cavanagh, K., Gega, L., & Andersson, G. (2009). Computer-aided psychotherapy for anxiety disorders: A meta-analytic review. *Cognitive behaviour therapy*, *38*(2), 66-82.
- Cuijpers, P., Van Straten, A., & Andersson, G. (2008). Internet-administered cognitive behavior therapy for health problems: a systematic review. *Journal of behavioral medicine*, *31*(2), 169-177.

- Cummins, R. A., Eckersley, R., Pallant, J., Van Vugt, J., & Misajon, R. (2003). Developing a national index of subjective wellbeing: The Australian Unity Wellbeing Index. *Social indicators research*, 64(2), 159-190.
- Cyr, D., Head, M., & Larios, H. (2010). Colour appeal in website design within and across cultures: A multi-method evaluation. *International Journal of human-computer studies*, 68(1-2), 1-21.
- Daniels, K., Watson, D., & Gedikli, C. (2017). Well-being and the social environment of work: A systematic review of intervention studies. *International journal of environmental research and public health*, 14(8), 918.
- Danna, K., & Griffin, R. W. (1999). Health and well-being in the workplace: A review and synthesis of the literature. *Journal of management*, 25(3), 357-384.
- Darch, J., Baillie, L., & Gillison, F. (2017). Nurses as role models in health promotion: a concept analysis. *British Journal of Nursing*, 26(17), 982-988.
- Das, P., Naylor, C., & Majeed, A. (2016). *Bringing together physical and mental health within primary care: a new frontier for integrated care*. SAGE Publications Sage UK: London, England.
- Davies, C. A., Spence, J. C., Vandelanotte, C., Caperchione, C. M., & Mummery, W. K. (2012). Meta-analysis of internet-delivered interventions to increase physical activity levels. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 1-13.
- Davies, C. P. D. S. (2013). *Chief Medical Officer annual report 2013: public mental health*
- Davies, E. B., Morriss, R., & Glazebrook, C. (2014). Computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being of university students: a systematic review and meta-analysis. *Journal of medical Internet research*, 16(5), e130.
- Davies, S., C. (2014). *Annual Report of the Chief Medical Officer 2013: Public Mental Health Priorities: Investing in the Evidence*. . Department of Health. <https://mrc.ukri.org/documents/pdf/chief-medical-officer-annual-report-2013/>
- Day, V., McGrath, P. J., & Wojtowicz, M. (2013). Internet-based guided self-help for university students with anxiety, depression and stress: a randomized controlled clinical trial. *Behaviour research and therapy*, 51(7), 344-351.
- de Beurs, D., van Bruinessen, I., Noordman, J., Friele, R., & van Dulmen, S. (2017). Active involvement of end users when developing web-based mental health interventions. *Frontiers in psychiatry*, 8, 72.
- De Hert, M., Correll, C. U., Bobes, J., Cetkovich-Bakmas, M., Cohen, D., Asai, I., Detraux, J., Gautam, S., Möller, H.-J., & Ndeti, D. M. (2011). Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care. *World psychiatry*, 10(1), 52.
- de Jong, A., Kouprie, M., & De Bruyne, E. (2009). Effects of the workplace game: A case-study into anticipating future behavior of office workers. International Conference on Ergonomics and Health Aspects of Work with Computers,
- De Simone, S. (2014). Conceptualizing wellbeing in the workplace. *International journal of business and social science*, 5(12).
- De Vries, H., van't Riet, J., Spigt, M., Metsemakers, J., van den Akker, M., Vermunt, J. K., & Kremers, S. (2008). Clusters of lifestyle behaviors: results from the Dutch SMILE study. *Preventive medicine*, 46(3), 203-208.
- Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of happiness studies*, 9(1), 1-11.
- Dekker, M. R., & Williams, A. D. (2017). The use of user-centered participatory design in serious games for anxiety and depression. *Games for health journal*, 6(6), 327-333.
- Dekkers, O., Van der Klaauw, A., Pereira, A., Biermasz, N., Honkoop, P., Roelfsema, F., Smit, J., & Romijn, J. (2006). Quality of life is decreased after treatment for nonfunctioning pituitary macroadenoma. *The Journal of Clinical Endocrinology & Metabolism*, 91(9), 3364-3369.
- DerSimonian, R., & Laird, N. (1986). Meta-analysis in clinical trials. *Controlled clinical trials*, 7(3), 177-188.

- DeSmet, A., Thompson, D., Baranowski, T., Palmeira, A., Verloigne, M., & De Bourdeaudhuij, I. (2016). Is participatory design associated with the effectiveness of serious digital games for healthy lifestyle promotion? A meta-analysis. *Journal of medical Internet research*, 18(4), e94.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining "gamification". Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments,
- Diener. (1984). Subjective well-being. *Psychological Bulletin* 95, 542-575.
- Diener, E. (2012). New findings and future directions for subjective well-being research. *American psychologist*, 67(8), 590.
- Diener, E., & Chan, M. Y. (2011). Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-Being*, 3(1), 1-43.
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological bulletin*, 125(2), 276.
- DoH. (2010a). *Front Line Care: Report by the Prime Minister's commission on the Future of Nursing and Midwifery in England 2010*. <https://www.hrhresourcecenter.org/node/3243.html>
- DoH. (2010b). *Staff Engagement Insight*
- DoH. (2014a). 'The Relationship Between Well-being and Health' [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/295474/The\\_relationship\\_between\\_wellbeing\\_and\\_health.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/295474/The_relationship_between_wellbeing_and_health.pdf)
- DoH. (2014b). *Well-being and Longevity'* [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/277588/Wellbeing\\_and\\_Longevity.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/277588/Wellbeing_and_Longevity.pdf)
- DoH. (2014c). *Well-being and Why it Matters to Health'* [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/277566/Narrative\\_January\\_2014\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/277566/Narrative_January_2014_.pdf)
- Doherty, G., Coyle, D., & Matthews, M. (2010). Design and evaluation guidelines for mental health technologies. *Interacting with computers*, 22(4), 243-252.
- Doherty, G., Coyle, D., & Sharry, J. (2012). Engagement with online mental health interventions: an exploratory clinical study of a treatment for depression. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems,
- Doll, R., Peto, R., Boreham, J., & Sutherland, I. (2004). Mortality in relation to smoking: 50 years' observations on male British doctors. *Bmj*, 328(7455), 1519.
- Donetto, S., Pierri, P., Tsianakas, V., & Robert, G. (2015). Experience-based co-design and healthcare improvement: realizing participatory design in the public sector. *The Design Journal*, 18(2), 227-248.
- Donker, T., Blankers, M., Hedman, E., Ljotsson, B., Petrie, K., & Christensen, H. (2015). Economic evaluations of Internet interventions for mental health: a systematic review. *Psychological medicine*, 45(16), 3357.
- Donkin, L., Christensen, H., Naismith, S. L., Neal, B., Hickie, I. B., & Glozier, N. (2011). A systematic review of the impact of adherence on the effectiveness of e-therapies. *Journal of medical Internet research*, 13(3), e52.
- Donkin, L., Hickie, I. B., Christensen, H., Naismith, S. L., Neal, B., Cockayne, N. L., & Glozier, N. (2013). Rethinking the dose-response relationship between usage and outcome in an online intervention for depression: randomized controlled trial. *Journal of medical Internet research*, 15(10), e231.
- DPH. (2015). *Abertawe Bro Morgannwg University Health Board Director of Public Health Annual Report 2015*. <https://sbuhb.nhs.wales/files/plans-policies-and-reports/director-of-public-health-annual-report-2014-15/>
- Drew, R., Morgan, P., Pollock, E., & Young, M. (2019). Mental health outcomes of male-only lifestyle behaviour change interventions: A systematic review and meta-analysis. *Journal of Science and Medicine in Sport*, 22, S52-S53.



- Duan, Y. P., Liang, W., Guo, L., Wienert, J., Si, G. Y., & Lippke, S. (2018). Evaluation of a web-based intervention for multiple health behavior changes in patients with coronary heart disease in home-based rehabilitation: pilot randomized controlled trial. *Journal of medical Internet research, 20*(11), e12052.
- Duaso, M. J., McDermott, M. S., Mujika, A., Purssell, E., & While, A. (2014). Do doctors' smoking habits influence their smoking cessation practices? A systematic review and meta-analysis. *Addiction, 109*(11), 1811-1823.
- Dubois, C. (2017). *Wearables Trend Toward Becoming the New Well-Being Coach, All about circuits*. Retrieved 30.6.21 from <https://www.allaboutcircuits.com/news/wearable-devices-may-become-your-new-well-being-coach/>
- Eaton, L. H., Gordon, D. B., Wyant, S., Theodore, B. R., Meins, A. R., Rue, T., Towle, C., Tauben, D., & Doorenbos, A. Z. (2014). Development and implementation of a telehealth-enhanced intervention for pain and symptom management. *Contemporary clinical trials, 38*(2), 213-220.
- Eckersley, R. (2000). The state and fate of nations: Implications of subjective measures of personal and social quality of life. *Social indicators research, 52*(1), 3-27.
- Edney, S. M., Olds, T. S., Ryan, J. C., Vandelanotte, C., Plotnikoff, R. C., Curtis, R. G., & Maher, C. A. (2020). A social networking and Gamified app to increase physical activity: cluster RCT. *American journal of preventive medicine, 58*(2), e51-e62.
- Ehn, P. (1990). Statement for Participatory Design of Computer Systems (Panel). Empowering People: CHI'90 Conference Proceedings. Seattle WA ACM,
- Ehn, P., & Sanberg, Å. (1979). Management Control and Wage Earner Power (Foretagsstyrning och Lontagarmakt). *Falkoping: Prisma*.
- Eilenberg, T., Fink, P., Jensen, J., Rief, W., & Frosthalm, L. (2016). Acceptance and commitment group therapy (ACT-G) for health anxiety: a randomized controlled trial. *Psychological medicine, 46*(1), 103.
- Ekpu, V. U., & Brown, A. K. (2015). The economic impact of smoking and of reducing smoking prevalence: review of evidence. *Tobacco use insights, 8*, TUI. S15628.
- Eldridge, S., Kerry, S., & Torgerson, D. J. (2009). Bias in identifying and recruiting participants in cluster randomised trials: what can be done? *Bmj, 339*.
- Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *Bmj, 355*.
- Elf, M., Rystedt, H., Lundin, J., & Krevers, B. (2012). Young carers as co-designers of a web-based support system—the views of two publics. *Informatics for Health and Social Care, 37*(4), 203-216.
- Faiks, A., & Hyland, N. (2000). Gaining user insight: a case study illustrating the card sort technique. *College & research libraries, 61*(4), 349-357.
- Farvolden, P., Denisoff, E., Selby, P., Bagby, R. M., & Rudy, L. (2005). Usage and longitudinal effectiveness of a Web-based self-help cognitive behavioral therapy program for panic disorder. *Journal of medical Internet research, 7*(1), e7.
- Fat, L. N., Shelton, N., & Cable, N. (2018). Investigating the growing trend of non-drinking among young people; analysis of repeated cross-sectional surveys in England 2005–2015. *BMC public health, 18*(1), 1-10.
- Felton, J. S. (1998). Burnout as a clinical entity—its importance in health care workers. *Occupational medicine, 48*(4), 237-250.
- Fergusson, D. M., John Horwood, L., & Ridder, E. M. (2005). Show me the child at seven: the consequences of conduct problems in childhood for psychosocial functioning in adulthood. *Journal of child psychology and psychiatry, 46*(8), 837-849.
- Fiebig, J. H., Gould, E. R., Ming, S., & Watson, R. A. (2020). An Invitation to Act on the Value of Self-Care: Being a whole person in all that you do. *Behavior Analysis in Practice, 1-9*.

- Fine, J. T., Colditz, G. A., Coakley, E. H., Moseley, G., Manson, J. E., Willett, W. C., & Kawachi, I. (1999). A prospective study of weight change and health-related quality of life in women. *Jama*, *282*(22), 2136-2142.
- Flaxman, P. E., & Bond, F. W. (2010). A randomised worksite comparison of acceptance and commitment therapy and stress inoculation training. *Behaviour research and therapy*, *48*(8), 816-820.
- Fledderus, M., Bohlmeijer, E. T., Pieterse, M. E., & Schreurs, K. M. G. (2012). Acceptance and commitment therapy as guided self-help for psychological distress and positive mental health: a randomized controlled trial. *Psychological medicine*, *42*(3), 485.
- Fleming, T., Bavin, L., Lucassen, M., Stasiak, K., Hopkins, S., & Merry, S. (2018). Beyond the trial: systematic review of real-world uptake and engagement with digital self-help interventions for depression, low mood, or anxiety. *Journal of medical Internet research*, *20*(6), e9275.
- Fogg, B. J. (1998). Persuasive computers: perspectives and research directions. Proceedings of the SIGCHI conference on Human factors in computing systems,
- Fogg, B. J., Soohoo, C., Danielson, D. R., Marable, L., Stanford, J., & Tauber, E. R. (2003). How do users evaluate the credibility of Web sites? A study with over 2,500 participants. Proceedings of the 2003 conference on Designing for user experiences,
- Folk, J. B., Harrison, A., Rodriguez, C., Wallace, A., & Tolou-Shams, M. (2020). Feasibility of Social Media–Based Recruitment and Perceived Acceptability of Digital Health Interventions for Caregivers of Justice-Involved Youth: Mixed Methods Study. *Journal of medical Internet research*, *22*(4), e16370.
- Fontaine, K., & Barofsky, I. (2001). Obesity and health-related quality of life. *Obesity reviews*, *2*(3), 173-182.
- Ford. (2010). *Nurses must act as 'role models' for healthy living*. Retrieved 21.6.21 from <https://www.nursingtimes.net/archive/nurses-must-act-as-role-models-for-healthy-living-02-03-2010/>
- Ford, J., Spallek, M., & Dobson, A. (2008). Self-rated health and a healthy lifestyle are the most important predictors of survival in elderly women. *Age and ageing*, *37*(2), 194-200.
- Foroushani, P. S., Schneider, J., & Assareh, N. (2011). Meta-review of the effectiveness of computerised CBT in treating depression. *BMC psychiatry*, *11*(1), 1-6.
- Fowles, R. (2000). Symmetry in design participation in the built environment: Experiences and insights from education and practice. In *Collaborative design* (pp. 59-70). Springer.
- Freeman, D., Sheaves, B., Goodwin, G. M., Yu, L.-M., Nickless, A., Harrison, P. J., Emsley, R., Luik, A. I., Foster, R. G., & Wadekar, V. (2017). The effects of improving sleep on mental health (OASIS): a randomised controlled trial with mediation analysis. *The Lancet Psychiatry*, *4*(10), 749-758.
- Friedli, L., & Parsonage, M. (2009). Promoting mental health and preventing mental illness: the economic case for investment in Wales. *Cardiff: All Wales Mental Health Promotion Network*.
- Friedman, E. M., & Ryff, C. D. (2012). Living well with medical comorbidities: A biopsychosocial perspective. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *67*(5), 535-544.
- Galante, J., Dufour, G., Vainre, M., Wagner, A. P., Stochl, J., Benton, A., Lathia, N., Howarth, E., & Jones, P. B. (2018). A mindfulness-based intervention to increase resilience to stress in university students (the Mindful Student Study): a pragmatic randomised controlled trial. *The Lancet Public Health*, *3*(2), e72-e81.
- Gana, K., Broc, G., Saada, Y., Amieva, H., & Quintard, B. (2016). Subjective wellbeing and longevity: Findings from a 22-year cohort study. *Journal of Psychosomatic Research*, *85*, 28-34.
- Garett, R., Chiu, J., Zhang, L., & Young, S. D. (2016). A literature review: website design and user engagement. *Online journal of communication and media technologies*, *6*(3), 1.
- Gauche, C., de Beer, L. T., & Brink, L. (2017). Managing employee well-being: A qualitative study exploring job and personal resources of at-risk employees. *SA Journal of Human Resource Management*, *15*, 13.

- GDallaP, C. (2020). Global burden of 369 diseases and injuries, 1990–2019: a systematic analysis for the global burden of disease study 2019. *The lancet*, 396((10258)), 1204-1222.
- Gehrke, D., & Turban, E. (1999). Determinants of successful website design: relative importance and recommendations for effectiveness. Proceedings of the 32nd Annual Hawaii International Conference on Systems Sciences. 1999. HICSS-32. Abstracts and CD-ROM of Full Papers,
- Gelinas, L., Pierce, R., Winkler, S., Cohen, I. G., Lynch, H. F., & Bierer, B. E. (2017). Using social media as a research recruitment tool: ethical issues and recommendations. *The American Journal of Bioethics*, 17(3), 3-14.
- Geraedts, A. S., Kleiboer, A. M., Wiezer, N. M., Van Mechelen, W., & Cuijpers, P. (2013). Web-based guided self-help for employees with depressive symptoms (Happy@ Work): design of a randomized controlled trial. *BMC psychiatry*, 13(1), 1-10.
- Gifford, E. V., Kohlenberg, B. S., Hayes, S. C., Antonuccio, D. O., Piasecki, M. M., Rasmussen-Hall, M. L., & Palm, K. M. (2004). Acceptance-based treatment for smoking cessation. *Behavior therapy*, 35(4), 689-705.
- Gliddon, E., Lauder, S., Berk, L., Cosgrove, V., Grimm, D., Dodd, S., Suppes, T., & Berk, M. (2015). Evaluating discussion board engagement in the MoodSwings online self-help program for bipolar disorder: protocol for an observational prospective cohort study. *BMC psychiatry*, 15(1), 1-9.
- GMC. (2018). *Outcomes for graduates*. [https://www.gmc-uk.org/-/media/documents/dc11326-outcomes-for-graduates-2018\\_pdf-75040796.pdf](https://www.gmc-uk.org/-/media/documents/dc11326-outcomes-for-graduates-2018_pdf-75040796.pdf)
- Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Wampold, B. E., Kearney, D. J., & Simpson, T. L. (2018). Mindfulness-based interventions for psychiatric disorders: A systematic review and meta-analysis. *Clinical psychology review*, 59, 52-60.
- Goodchild, M., Nargis, N., & d'Espaignet, E. T. (2018). Global economic cost of smoking-attributable diseases. *Tobacco control*, 27(1), 58-64.
- Goodwin, R. D., Davidson, K. W., & Keyes, K. (2009). Mental disorders and cardiovascular disease among adults in the United States. *Journal of psychiatric research*, 43(3), 239-246.
- Gouin, J.-P., & Kiecolt-Glaser, J. K. (2011). The impact of psychological stress on wound healing: methods and mechanisms. *Immunology and Allergy Clinics*, 31(1), 81-93.
- Gournay, K. (1996). Setting clinical standards for care in schizophrenia. *Nursing Times*, 92(7), 36-37.
- Gov, H. (2020). *Physical activity*. Retrieved 1.7.21 from <https://www.ethnicity-facts-figures.service.gov.uk/health/diet-and-exercise/physical-activity/latest>
- Gov, U. (2007). *Foresight report Reducing obesity: future choices*. October 2007. <https://www.gov.uk/government/publications/reducing-obesity-future-choices>
- Gräfe, V., Berger, T., Hautzinger, M., Hohagen, F., Lutz, W., Meyer, B., Moritz, S., Rose, M., Schröder, J., & Späth, C. (2019). Health economic evaluation of a web-based intervention for depression: the EVIDENT-trial, a randomized controlled study. *Health economics review*, 9(1), 1-13.
- Graybill, J. K., Dooling, S., Shandas, V., Withey, J., Greve, A., & Simon, G. L. (2006). A rough guide to interdisciplinarity: Graduate student perspectives. *BioScience*, 56(9), 757-763.
- Greenbaum, J., & Loi, D. (2012). *Participation, the camel and the elephant of design: an introduction*. Taylor & Francis.
- Gregory, J. (2003). Scandinavian approaches to participatory design. *International Journal of Engineering Education*, 19(1), 62-74.
- Griffiths, F., Lindenmeyer, A., Powell, J., Lowe, P., & Thorogood, M. (2006). Why are health care interventions delivered over the internet? A systematic review of the published literature. *Journal of medical Internet research*, 8(2), e10.
- Guarino, H., Acosta, M., Marsch, L. A., Xie, H., & Aponte-Melendez, Y. (2016). A mixed-methods evaluation of the feasibility, acceptability, and preliminary efficacy of a mobile intervention for methadone maintenance clients. *Psychology of Addictive Behaviors*, 30(1), 1.
- Gulliver, A., Calfar, A. L., Sunderland, M., Kay-Lambkin, F., Farrer, L. M., Banfield, M., & Batterham, P. J. (2020). Consumer-Guided Development of an Engagement-Facilitation Intervention for

- Increasing Uptake and Adherence for Self-Guided Web-Based Mental Health Programs: Focus Groups and Online Evaluation Survey. *JMIR formative research*, 4(10), e22528.
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. *The lancet global health*, 6(10), e1077-e1086.
- Habibović, M., Cuijpers, P., Alings, M., Van Der Voort, P., Theuns, D., Bouwels, L., Herrman, J.-P., Valk, S., & Pedersen, S. (2014). Attrition and adherence in a WEB-Based Distress Management Program for Implantable Cardioverter defibrillator Patients (WEB CARE): randomized controlled trial. *Journal of medical Internet research*, 16(2), e52.
- Hadjiconstantinou, M., Byrne, J., Bodicoat, D. H., Robertson, N., Eborall, H., Khunti, K., & Davies, M. J. (2016). Do web-based interventions improve well-being in type 2 diabetes? A systematic review and meta-analysis. *Journal of medical Internet research*, 18(10), e270.
- Haga, S. M., Drozd, F., Brendryen, H., & Slinning, K. (2013). Mamma mia: a feasibility study of a web-based intervention to reduce the risk of postpartum depression and enhance subjective well-being. *JMIR Research Protocols*, 2(2), e29.
- Hageman, P. A., Mroz, J. E., Yoerger, M. A., & Pullen, C. H. (2019). User engagement associated with web-intervention features to attain clinically meaningful weight loss and weight maintenance in rural women. *Journal of obesity*, 2019.
- Hagen, P., Collin, P., Metcalf, A., Nicholas, M., Rahilly, K., & Swainston, N. (2012). Participatory design of evidence-based online youth mental health promotion, intervention and treatment.
- Hahsler, M., & Simon, B. (2000). User-centered navigation re-design for web-based information systems. *AMCIS 2000 Proceedings*, 396.
- Hall, L. H., Johnson, J., Watt, I., Tsipa, A., & O'Connor, D. B. (2016). Healthcare staff wellbeing, burnout, and patient safety: a systematic review. *PLoS one*, 11(7), e0159015.
- Hamari, J., Koivisto, J., & Pakkanen, T. (2014). Do persuasive technologies persuade?—a review of empirical studies. International conference on persuasive technology,
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work?—a literature review of empirical studies on gamification. 2014 47th Hawaii international conference on system sciences,
- Hamza Shuja, K., Aqeel, M., Jaffar, A., & Ahmed, A. (2020). COVID-19 pandemic and impending global mental health implications. *Psychiatria Danubina*, 32(1), 32-35.
- Harden, A., Peersman, G., Oliver, S., Mauthner, M., & Oakley, A. (1999). A systematic review of the effectiveness of health promotion interventions in the workplace. *Occupational medicine*, 49(8), 540-548.
- Hardy, S., & Thomas, B. (2012). Mental and physical health comorbidity: Political imperatives and practice implications. *International Journal of Mental Health Nursing*, 21(3), 289-298.
- Hassan, M., Joshi, A., Madhavan, S. S., & Amonkar, M. (2003). Obesity and health-related quality of life: a cross-sectional analysis of the US population. *International journal of obesity*, 27(10), 1227-1232.
- Hassed, C. (2008). *Know Thyself: The Stress Release Program: Easyread Super Large 24pt Edition*. ReadHowYouWant.com.
- Hayes, S. C. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavior therapy*, 35(4), 639-665.
- Hayes, S. C. (2019). *My Flexibility Scores. The Acceptance and Action Questionnaire (AAQ-2)* Retrieved 29.6.21 from <https://stevenchayes.com/wp-content/uploads/2019/08/The-Acceptance-and-Action-Questionnaire.pdf>
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2009). *Acceptance and commitment therapy*. American Psychological Association Washington, DC.
- Haynes, C. (2002). *Innovations in Interdisciplinary Teaching. American Council on Education/Oryx Press Series on Higher Education*. ERIC.

- Hedman-Lagerlöf, M., Hedman-Lagerlöf, E., & Öst, L.-G. (2018). The empirical support for mindfulness-based interventions for common psychiatric disorders: a systematic review and meta-analysis. *Psychological medicine*, 48(13), 2116-2129.
- Heffner, J. L., & Mull, K. E. (2017). Smartphone ownership among US adult cigarette smokers: 2014 Health Information National Trends Survey (HINTS) data. *Journal of medical Internet research*, 19(8), e305.
- Hefner, J., & Eisenberg, D. (2009). Social support and mental health among college students. *American Journal of Orthopsychiatry*, 79(4), 491-499.
- Hensel, J. M., Shaw, J., Ivers, N. M., Desveaux, L., Vigod, S. N., Bouck, Z., Onabajo, N., Agarwal, P., Mukerji, G., & Yang, R. (2019). Extending access to a web-based mental health intervention: who wants more, what happens to use over time, and is it helpful? Results of a concealed, randomized controlled extension study. *BMC psychiatry*, 19(1), 39.
- Heron, L., O'Neill, C., McAneney, H., Kee, F., & Tully, M. A. (2019). Direct healthcare costs of sedentary behaviour in the UK. *J Epidemiol Community Health*, 73(7), 625-629.
- Hesser, H., Gustafsson, T., Lundén, C., Henrikson, O., Fattahi, K., Johnsson, E., Westin, V. Z., Carlbring, P., Mäki-Torkko, E., & Kaldo, V. (2012). A randomized controlled trial of internet-delivered cognitive behavior therapy and acceptance and commitment therapy in the treatment of tinnitus. *Journal of consulting and clinical psychology*, 80(4), 649.
- Hicks, C. C., Fitzsimmons, C., & Polunin, N. V. (2010). Interdisciplinarity in the environmental sciences: barriers and frontiers. *Environmental Conservation*, 464-477.
- Higgins, J. P. (2008). Cochrane handbook for systematic reviews of interventions version 5.0. 1. The Cochrane Collaboration. <http://www.cochrane-handbook.org>.
- Hilvert-Bruce, Z., Rossouw, P. J., Wong, N., Sunderland, M., & Andrews, G. (2012). Adherence as a determinant of effectiveness of internet cognitive behavioural therapy for anxiety and depressive disorders. *Behaviour research and therapy*, 50(7-8), 463-468.
- Hirschheim, R. A. (1983). Assessing participative systems design: some conclusions from an exploratory study. *Information & Management*, 6(6), 317-327.
- Hisham, I. N., Townsend, G., Gillard, S., Debnath, B., & Sin, J. (2020). COVID-19: the perfect vector for a mental health epidemic. *BJPsych bulletin*, 1-7.
- HMG/DH. (2011). No Health Without Mental Health: a cross-government outcomes strategy <https://www.gov.uk/government/publications/no-health-without-mental-health-a-cross-government-outcomes-strategy>
- Ho, F. Y.-Y., Chung, K.-F., Yeung, W.-F., Ng, T. H., Kwan, K.-S., Yung, K.-P., & Cheng, S. K. (2015). Self-help cognitive-behavioral therapy for insomnia: a meta-analysis of randomized controlled trials. *Sleep medicine reviews*, 19, 17-28.
- Hoffmann, D., Rask, C. U., Hedman-Lagerlöf, E., Jensen, J. S., & Frostholm, L. (2020). Efficacy of internet-delivered acceptance and commitment therapy for severe health anxiety: results from a randomized, controlled trial. *Psychological medicine*, 1-11.
- Høifødt, R. S., Lillevoll, K. R., Griffiths, K. M., Wilsgaard, T., Eisemann, M., & Kolstrup, N. (2013). The clinical effectiveness of web-based cognitive behavioral therapy with face-to-face therapist support for depressed primary care patients: randomized controlled trial. *Journal of medical Internet research*, 15(8), e153.
- Hooper, L., Abdelhamid, A., Bunn, D., Brown, T., Summerbell, C. D., & Skeaff, C. M. (2015). Effects of total fat intake on body weight. *Cochrane database of systematic reviews*(8).
- How, T.-V., Hwang, A. S., Green, R. E., & Mihailidis, A. (2017). Envisioning future cognitive telerehabilitation technologies: a co-design process with clinicians. *Disability and Rehabilitation: Assistive Technology*, 12(3), 244-261.
- Howarth, A., Quesada, J., Silva, J., Judycki, S., & Mills, P. R. (2018). The impact of digital health interventions on health-related outcomes in the workplace: a systematic review. *Digital health*, 4, 2055207618770861.

- Howell, A. J., & Passmore, H.-A. (2019). Acceptance and commitment training (ACT) as a positive psychological intervention: A systematic review and initial meta-analysis regarding ACT's role in well-being promotion among university students. *Journal of happiness studies*, 20(6), 1995-2010.
- Hudd, S. S., Dumlao, J., Erdmann-Sager, D., Murray, D., Phan, E., Soukas, N., & Yokozuka, N. (2000). Stress at college: Effects on health habits, health status and self-esteem. *College student journal*, 34(2).
- Huta, V., & Waterman, A. S. (2014). Eudaimonia and its distinction from hedonia: Developing a classification and terminology for understanding conceptual and operational definitions. *Journal of happiness studies*, 15(6), 1425-1456.
- ILO. (2019). *Workplace well-being*. Retrieved 28.6.21 from [https://www.ilo.org/global/topics/safety-and-health-at-work/areasofwork/workplace-health-promotion-and-well-being/WCMS\\_118396/lang--en/index.htm](https://www.ilo.org/global/topics/safety-and-health-at-work/areasofwork/workplace-health-promotion-and-well-being/WCMS_118396/lang--en/index.htm)
- Imamura, K., Kawakami, N., Furukawa, T. A., Matsuyama, Y., Shimazu, A., Umanodan, R., Kawakami, S., & Kasai, K. (2014). Effects of an Internet-based cognitive behavioral therapy (iCBT) program in Manga format on improving subthreshold depressive symptoms among healthy workers: a randomized controlled trial. *PloS one*, 9(5), e97167.
- Institute of Medicine (US) Committee on Health and Behavior: Research, P., and Policy. . (2001). *Health and behavior: The interplay of biological, behavioral, and societal influences*. National Academies Press (US).
- Irvine, A. B., Gelatt, V. A., Seeley, J. R., Macfarlane, P., & Gau, J. M. (2013). Web-based intervention to promote physical activity by sedentary older adults: randomized controlled trial. *Journal of medical Internet research*, 15(2), e19.
- Irvine, A. B., Philips, L., Seeley, J., Wyant, S., Duncan, S., & Moore, R. W. (2011). Get moving: a web site that increases physical activity of sedentary employees. *American Journal of Health Promotion*, 25(3), 199-206.
- ISO-9241-11. (2018). *Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts*. <https://www.iso.org/standard/63500.html>
- ISO-13407. (1999). Human-centred design processes for interactive systems. <https://www.iso.org/standard/21197.html>
- Jacobson, A., De Groot, M., & Samson, J. (1997). The effects of psychiatric disorders and symptoms on quality of life in patients with type I and type II diabetes mellitus. *Quality of Life Research*, 6(1), 0-0.
- Jacobson, A. M., De Groot, M., & Samson, J. A. (1994). The evaluation of two measures of quality of life in patients with type I and type II diabetes. *Diabetes care*, 17(4), 267-274.
- Jagosh, J., Macaulay, A. C., Pluye, P., Salsberg, J., Bush, P. L., Henderson, J., Sirett, E., Wong, G., Cargo, M., & Herbert, C. P. (2012). Uncovering the benefits of participatory research: implications of a realist review for health research and practice. *The Milbank Quarterly*, 90(2), 311-346.
- Jahoda, M. (1958). Current concepts of positive mental health.
- Jaspers, M. W. (2009). A comparison of usability methods for testing interactive health technologies: methodological aspects and empirical evidence. *International journal of medical informatics*, 78(5), 340-353.
- Jenkins, R., Meltzer, H., Jones, P., Brugha, T., Bebbington, P., Farrell, M., Crepaz-Kay, D., & Knapp, M. (2008). Mental health: future challenges.
- Jennings, M. (2000). Theory and models for creating engaging and immersive ecommerce websites. Proceedings of the 2000 ACM SIGCPR conference on Computer personnel research,
- Jeste, D. V., Gladsjo, J. A., Lindamer, L. A., & Lacro, J. P. (1996). Medical comorbidity in schizophrenia. *Schizophrenia bulletin*, 22(3), 413-430.
- Jiménez, F. J. R. (2012). Acceptance and commitment therapy versus traditional cognitive behavioral therapy: A systematic review and meta-analysis of current empirical evidence. *International journal of psychology and psychological therapy*, 12(3), 333-358.

- Johansson, R., & Andersson, G. (2012). Internet-based psychological treatments for depression. *Expert review of neurotherapeutics*, 12(7), 861-870.
- Johansson, R., Sjöberg, E., Sjögren, M., Johnsson, E., Carlbring, P., Andersson, T., Rousseau, A., & Andersson, G. (2012). Tailored vs. standardized internet-based cognitive behavior therapy for depression and comorbid symptoms: a randomized controlled trial. *PloS one*, 7(5), e36905.
- Johnson, M. J., & May, C. R. (2015). Promoting professional behaviour change in healthcare: what interventions work, and why? A theory-led overview of systematic reviews. *BMJ open*, 5(9), e008592.
- Jones, C. (2010). Interdisciplinary approach-advantages, disadvantages, and the future benefits of interdisciplinary studies. *Essai*, 7(1), 26.
- Jones, H. A., Heffner, J. L., Mercer, L., Wyszynski, C. M., Vilardaga, R., & Bricker, J. B. (2015). Web-based acceptance and commitment therapy smoking cessation treatment for smokers with depressive symptoms. *Journal of dual diagnosis*, 11(1), 56-62.
- Jones, S., Howard, L., & Thornicroft, G. (2008). 'Diagnostic overshadowing': worse physical health care for people with mental illness.
- Jordan, T. R., Khubchandani, J., & Wiblishauser, M. (2016). The impact of perceived stress and coping adequacy on the health of nurses: A pilot investigation. *Nursing Research and Practice*, 2016.
- Juarascio, A., Shaw, J., Forman, E., Timko, C. A., Herbert, J., Butryn, M., Bunnell, D., Matteucci, A., & Lowe, M. (2013). Acceptance and commitment therapy as a novel treatment for eating disorders: an initial test of efficacy and mediation. *Behavior modification*, 37(4), 459-489.
- Julious, S. A. (2009). *Sample sizes for clinical trials*. CRC Press.
- Kaltenthaler, E., Sutcliffe, P., Parry, G., Beverley, C., Rees, A., & Ferriter, M. (2008). The acceptability to patients of computerized cognitive behaviour therapy for depression: a systematic review. *Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet]*.
- Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., Yao, L., Bai, H., Cai, Z., & Yang, B. X. (2020). Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain, behavior, and immunity*, 87, 11-17.
- Kapp, K. M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education*. John Wiley & Sons.
- Karasek Jr, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative science quarterly*, 285-308.
- Karyotaki, E., Kleiboer, A., Smit, F., Turner, D. T., Pastor, A. M., Andersson, G., Berger, T., Botella, C., Breton, J., & Carlbring, P. (2015). Predictors of treatment dropout in self-guided web-based interventions for depression: an 'individual patient data' meta-analysis. *Psychological medicine*, 45(13), 2717-2726.
- Karyotaki, E., Riper, H., Twisk, J., Hoogendoorn, A., Kleiboer, A., Mira, A., Mackinnon, A., Meyer, B., Botella, C., & Littlewood, E. (2017). Efficacy of self-guided internet-based cognitive behavioral therapy in the treatment of depressive symptoms: a meta-analysis of individual participant data. *JAMA psychiatry*, 74(4), 351-359.
- Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical psychology review*, 30(7), 865-878.
- Kazantzis, N., & Deane, F. P. (1999). Psychologists' use of homework assignments in clinical practice. *Professional Psychology: Research and Practice*, 30(6), 581.
- Kazlauskas, E., Eimontas, J., Olf, M., Zelviene, P., & Andersson, G. (2020). Adherence predictors in internet-delivered self-help intervention for life stressors-related adjustment disorder. *Frontiers in psychiatry*.
- Kelders, S. M., Bohlmeijer, E. T., & Van Gemert-Pijnen, J. E. (2013). Participants, usage, and use patterns of a web-based intervention for the prevention of depression within a randomized controlled trial. *Journal of medical Internet research*, 15(8), e172.

- Kelders, S. M., Kok, R. N., Ossebaard, H. C., & Van Gemert-Pijnen, J. E. (2012). Persuasive system design does matter: a systematic review of adherence to web-based interventions. *Journal of medical Internet research*, *14*(6), e152.
- Kelders, S. M., Pots, W. T., Oskam, M. J., Bohlmeijer, E. T., & van Gemert-Pijnen, J. E. (2013). Development of a web-based intervention for the indicated prevention of depression. *BMC medical informatics and decision making*, *13*(1), 1-11.
- Kelders, S. M., Sommers-Spijkerman, M., & Goldberg, J. (2018). Investigating the direct impact of a gamified versus nongamified well-being intervention: an exploratory experiment. *Journal of medical Internet research*, *20*(7), e247.
- Kelders, S. M., Van Gemert-Pijnen, J. E., Werkman, A., Nijland, N., & Seydel, E. R. (2011). Effectiveness of a Web-based intervention aimed at healthy dietary and physical activity behavior: a randomized controlled trial about users and usage. *Journal of medical Internet research*, *13*(2), e32.
- Kelman, A. R., Stanley, M. L., Barrera, A. Z., Cree, M., Heineberg, Y., & Gilbert, P. (2016). Comparing brief internet-based compassionate mind training and cognitive behavioral therapy for perinatal women: study protocol for a randomized controlled trial. *JMIR Research Protocols*, *5*(2), e65.
- Kelson, J., Rollin, A., Ridout, B., & Campbell, A. (2019). Internet-delivered acceptance and commitment therapy for anxiety treatment: systematic review. *Journal of medical Internet research*, *21*(1), e12530.
- Kensing, F., & Blomberg, J. (1998). Participatory design: Issues and concerns. *Computer supported cooperative work (CSCW)*, *7*(3), 167-185.
- Kessler, R. C., Crum, R. M., Warner, L. A., Nelson, C. B., Schulenberg, J., & Anthony, J. C. (1997). Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Archives of general psychiatry*, *54*(4), 313-321.
- Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of health and social behavior*, 207-222.
- Keyes, C. L., & Lopez, S. J. (2009). Toward a science of mental health. *Oxford handbook of positive psychology*, 89-95.
- Khadjesari, Z., Murray, E., Kalaitzaki, E., White, I. R., McCambridge, J., Thompson, S. G., Wallace, P., & Godfrey, C. (2011). Impact and costs of incentives to reduce attrition in online trials: two randomized controlled trials. *Journal of medical Internet research*, *13*(1), e26.
- Kim, M.-S., Kim, T., Lee, D., Yook, J.-h., Hong, Y.-C., Lee, S.-Y., Yoon, J.-H., & Kang, M.-Y. (2018). Mental disorders among workers in the healthcare industry: 2014 national health insurance data. *Annals of occupational and environmental medicine*, *30*(1), 1-8.
- King, K., Meader, N., Wright, K., Graham, H., Power, C., Petticrew, M., White, M., & Sowden, A. J. (2015). Characteristics of interventions targeting multiple lifestyle risk behaviours in adult populations: a systematic scoping review. *PloS one*, *10*(1), e0117015.
- King, L. A., & Napa, C. K. (1998). What makes a life good? *Journal of personality and social psychology*, *75*(1), 156.
- Kinzie, M. B., Cohn, W. F., Julian, M. F., & Knaus, W. A. (2002). A user-centered model for web site design: needs assessment, user interface design, and rapid prototyping. *Journal of the American Medical Informatics Association*, *9*(4), 320-330.
- Kip, H., Kelders, S. M., Bouman, Y. H., & van Gemert-Pijnen, L. J. (2019). The importance of systematically reporting and reflecting on eHealth development: Participatory development process of a virtual reality application for forensic mental health care. *Journal of medical Internet research*, *21*(8), e12972.
- Kitzinger, J. (1995). Qualitative research: introducing focus groups. *Bmj*, *311*(7000), 299-302.
- Kivi, M., Eriksson, M. C., Hange, D., Petersson, E.-L., Vernmark, K., Johansson, B., & Björkelund, C. (2014). Internet-based therapy for mild to moderate depression in Swedish primary care:



- short term results from the PRIM-NET randomized controlled trial. *Cognitive behaviour therapy*, 43(4), 289-298.
- Kjeldskov, J., & Graham, C. (2003). A review of mobile HCI research methods. International Conference on Mobile Human-Computer Interaction,
- Klein, B., Meyer, D., Austin, D. W., & Kyrios, M. (2011). Anxiety online—a virtual clinic: preliminary outcomes following completion of five fully automated treatment programs for anxiety disorders and symptoms. *Journal of medical Internet research*, 13(4), e89.
- Knaak, S., Mantler, E., & Szeto, A. (2017). Mental illness-related stigma in healthcare: Barriers to access and care and evidence-based solutions. Healthcare management forum,
- Knaevelsrud, C., & Maercker, A. (2010). Long-term effects of an internet-based treatment for posttraumatic stress. *Cognitive behaviour therapy*, 39(1), 72-77.
- Knapp, B., Bardenet, R., Bernabeu, M. O., Bordas, R., Bruna, M., Calderhead, B., Cooper, J., Fletcher, A. G., Groen, D., & Kuijper, B. (2015). Ten simple rules for a successful cross-disciplinary collaboration. *PLoS Comput Biol*, 11(4), e1004214.
- Knight, J. A. (2012). Review: Physical Inactivity: Associated Diseases and Disorders. *Annals of Clinical & Laboratory Science*, 42(3), 201.
- Kodama, S., Saito, K., Tanaka, S., Horikawa, C., Fujiwara, K., Hirasawa, R., Yachi, Y., Iida, K., Shimano, H., & Ohashi, Y. (2012). Effect of Web-based lifestyle modification on weight control: a meta-analysis. *International journal of obesity*, 36(5), 675-685.
- Kohl, L. F., Crutzen, R., & de Vries, N. K. (2013). Online prevention aimed at lifestyle behaviors: a systematic review of reviews. *Journal of medical Internet research*, 15(7), e146.
- Köhle, N., Drossaert, C. H., Schreurs, K. M., Hagedoorn, M., Verdonck-de Leeuw, I. M., & Bohlmeijer, E. T. (2015). A web-based self-help intervention for partners of cancer patients based on Acceptance and Commitment Therapy: a protocol of a randomized controlled trial. *BMC public health*, 15(1), 1-13.
- Korpela, M., Soriyan, H. A., Olufokunbi, K., Onayade, A., Davies-Adetugbo, A., & Adesanmi, D. (1998). Community participation in health informatics in Africa: An experiment in tripartite partnership in Ile-Ife, Nigeria. *Computer supported cooperative work (CSCW)*, 7(3), 339-358.
- Koydemir, S., Sökmez, A. B., & Schütz, A. (2020). A meta-analysis of the effectiveness of randomized controlled positive psychological interventions on subjective and psychological well-being. *Applied Research in Quality of Life*, 1-41.
- Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: the PHQ-4. *Psychosomatics*, 50(6), 613-621.
- Krog, N. H., Engdahl, B., & Tambs, K. (2010). The association between tinnitus and mental health in a general population sample: results from the HUNT Study. *Journal of Psychosomatic Research*, 69(3), 289-298.
- Kubovy, M. (1999). On the pleasures of the mind. *Well-being: The foundations of hedonic psychology*, 1999, 134-154.
- Kugathasan, T. A., Lecot, F., Laberge, S., Tremblay, J., & Mathieu, M.-E. (2019). Activate Your Health, a 3-year, multi-site, workplace healthy lifestyle promotion program: study design. *BMC public health*, 19(1), 1-9.
- Kuhn, S., & Muller, M. J. (1993). Participatory design. *Communications of the ACM*, 36(6), 24-29.
- Kwasnicka, D., Dombrowski, S. U., White, M., & Sniehotta, F. (2016). Theoretical explanations for maintenance of behaviour change: a systematic review of behaviour theories. *Health psychology review*, 10(3), 277-296.
- Kyle, R. G., Wills, J., Mahoney, C., Hoyle, L., Kelly, M., & Atherton, I. M. (2017). Obesity prevalence among healthcare professionals in England: a cross-sectional study using the Health Survey for England. *BMJ open*, 7(12).
- Kyng, M., & Mathiassen, L. (1979). *Systems development and trade union activities*. Computer Science Department, Aarhus University.

- Lacourt, T., Houtveen, J., Van Zanten, J. V., Bosch, J., Drayson, M., & Van Doornen, L. (2015). Negative affectivity predicts decreased pain tolerance during low-grade inflammation in healthy women. *Brain, behavior, and immunity*, *44*, 32-36.
- Lahey. (2014). *Project 99: Exploring internet based approaches to support youth mental health in Greater Glasgow & Clyde*. UK: Greater Glasgow and Clyde NHS. [http://www.wegot99.com/wp-content/uploads/2013/12/p\\_wegot99\\_codesignoutcomes1.pdf](http://www.wegot99.com/wp-content/uploads/2013/12/p_wegot99_codesignoutcomes1.pdf)
- Lambert, J. D., Greaves, C. J., Farrand, P., Price, L., Haase, A. M., & Taylor, A. H. (2018). Web-based intervention using behavioral activation and physical activity for adults with depression (the eMotion study): pilot randomized controlled trial. *Journal of medical Internet research*, *20*(7), e10112.
- Lamers, S. M., Bolier, L., Westerhof, G. J., Smit, F., & Bohlmeijer, E. T. (2012). The impact of emotional well-being on long-term recovery and survival in physical illness: a meta-analysis. *Journal of behavioral medicine*, *35*(5), 538-547.
- Lancaster, G. A. (2015). Pilot and feasibility studies come of age!
- Lancaster, G. A., Dodd, S., & Williamson, P. R. (2004). Design and analysis of pilot studies: recommendations for good practice. *Journal of evaluation in clinical practice*, *10*(2), 307-312.
- Lancee, W. J., Maunder, R. G., & Goldbloom, D. S. (2008). Prevalence of psychiatric disorders among Toronto hospital workers one to two years after the SARS outbreak. *Psychiatric services*, *59*(1), 91-95.
- Lappalainen, P., Granlund, A., Siltanen, S., Ahonen, S., Vitikainen, M., Tolvanen, A., & Lappalainen, R. (2014). ACT Internet-based vs face-to-face? A randomized controlled trial of two ways to deliver Acceptance and Commitment Therapy for depressive symptoms: An 18-month follow-up. *Behaviour research and therapy*, *61*, 43-54.
- Lappalainen, P., Kaipainen, K., Lappalainen, R., Hoffrén, H., Myllymäki, T., Kinnunen, M.-L., Mattila, E., Happonen, A. P., Rusko, H., & Korhonen, I. (2013). Feasibility of a personal health technology-based psychological intervention for men with stress and mood problems: randomized controlled pilot trial. *JMIR Research Protocols*, *2*(1), e1.
- Lappalainen, P., Langrial, S., Oinas-Kukkonen, H., Tolvanen, A., & Lappalainen, R. (2015). Web-based acceptance and commitment therapy for depressive symptoms with minimal support: a randomized controlled trial. *Behavior modification*, *39*(6), 805-834.
- Lara, J., O'Brien, N., Godfrey, A., Heaven, B., Evans, E. H., Lloyd, S., Moffatt, S., Moynihan, P. J., Meyer, T. D., & Rochester, L. (2016). Pilot randomised controlled trial of a web-based intervention to promote healthy eating, physical activity and meaningful social connections compared with usual care control in people of retirement age recruited from workplaces. *PLoS one*, *11*(7), e0159703.
- Larsen, L. T. (2021). Not merely the absence of disease: A genealogy of the WHO's positive health definition. *History of the Human Sciences*, 0952695121995355.
- Larson, S. L., Clark, M., & Eaton, W. (2004). Depressive disorder as a long-term antecedent risk factor for incident back pain: a 13-year follow-up study from the Baltimore Epidemiological Catchment Area sample. *Psychological medicine*, *34*(2), 211.
- Lash, J. (2002). *Information architecture is not usability*. Digital web magazine. Retrieved 28.6.21 from [http://www.digital-web.com/articles/information\\_architecture\\_is\\_not\\_usability/](http://www.digital-web.com/articles/information_architecture_is_not_usability/)
- Lasser, K., Boyd, J. W., Woolhandler, S., Himmelstein, D. U., McCormick, D., & Bor, D. H. (2000). Smoking and mental illness: a population-based prevalence study. *Jama*, *284*(20), 2606-2610.
- Lauder, S., Chester, A., Castle, D., Dodd, S., Berk, L., Klein, B., Austin, D., Gilbert, M., Chamberlain, J. A., & Murray, G. (2013). Development of an online intervention for bipolar disorder. [www.moodswings.net.au](http://www.moodswings.net.au). *Psychology, health & medicine*, *18*(2), 155-165.
- Lawrence, D., Considine, J., Mitrou, F., & Zubrick, S. R. (2010). Anxiety disorders and cigarette smoking: results from the Australian Survey of Mental Health and Wellbeing. *Australian & New Zealand Journal of Psychiatry*, *44*(6), 520-527.

- Lê Cook, B., Wayne, G. F., Kafali, E. N., Liu, Z., Shu, C., & Flores, M. (2014). Trends in smoking among adults with mental illness and association between mental health treatment and smoking cessation. *Jama*, *311*(2), 172-182.
- Le, L. K.-D., Sanci, L., Chatterton, M. L., Kauer, S., Buhagiar, K., & Mihalopoulos, C. (2019). The cost-effectiveness of an internet intervention to facilitate mental health help-seeking by young adults: randomized controlled trial. *Journal of medical Internet research*, *21*(7), e13065.
- Lederman, R., Wadley, G., Gleeson, J., Bendall, S., & Álvarez-Jiménez, M. (2014). Moderated online social therapy: Designing and evaluating technology for mental health. *ACM Transactions on Computer-Human Interaction (TOCHI)*, *21*(1), 1-26.
- Lee, P. (2004). IARC MONOGRAPHS ON THE EVALUATION OF CARCINOGENIC RISKS TO HUMANS VOLUME 83 (2004).
- Lenhard, F., Vigerland, S., Andersson, E., Rück, C., Mataix-Cols, D., Thulin, U., Ljotsson, B., & Serlachius, E. (2014). Internet-delivered cognitive behavior therapy for adolescents with obsessive-compulsive disorder: an open trial. *PLoS one*, *9*(6), e100773.
- Lépine, J.-P., & Briley, M. (2011). The increasing burden of depression. *Neuropsychiatric disease and treatment*, *7*(Suppl 1), 3.
- Leventhal, H., Benyamini, Y., Brownlee, S., Diefenbach, M., Leventhal, E. A., Patrick-Miller, L., & Robitaille, C. (1997). Illness representations: theoretical foundations. *Perceptions of health and illness*, *2*, 19-46.
- Levin, M. E., Hayes, S. C., Pistorello, J., & Seeley, J. R. (2016). Web-based self-help for preventing mental health problems in universities: Comparing acceptance and commitment training to mental health education. *Journal of clinical psychology*, *72*(3), 207-225.
- Levin, M. E., Pistorello, J., Seeley, J. R., & Hayes, S. C. (2014). Feasibility of a prototype web-based acceptance and commitment therapy prevention program for college students. *Journal of American College Health*, *62*(1), 20-30.
- Lewis, C., Roberts, N., Simon, N., Bethell, A., & Bisson, J. (2019). Internet-delivered cognitive behavioural therapy for post-traumatic stress disorder: systematic review and meta-analysis. *Acta Psychiatrica Scandinavica*, *140*(6), 508-521.
- Lillis, J., & Kendra, K. E. (2014). Acceptance and Commitment Therapy for weight control: Model, evidence, and future directions. *Journal of Contextual Behavioral Science*, *3*(1), 1-7.
- Lim, Y.-K., Stolterman, E., & Tenenber, J. (2008). The anatomy of prototypes: Prototypes as filters, prototypes as manifestations of design ideas. *ACM Transactions on Computer-Human Interaction (TOCHI)*, *15*(2), 1-27.
- Linardon, J., & Fuller-Tyszkiewicz, M. (2020). Attrition and adherence in smartphone-delivered interventions for mental health problems: A systematic and meta-analytic review. *Journal of consulting and clinical psychology*, *88*(1), 1.
- Lindgaard, G., & Dudek, C. (2002). High appeal versus high usability: Implications for user satisfaction. HF2002 Human Factors Conference,
- Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006). Attention web designers: You have 50 milliseconds to make a good first impression! *Behaviour & information technology*, *25*(2), 115-126.
- Lindsay, S., Brittain, K., Jackson, D., Ladha, C., Ladha, K., & Olivier, P. (2012). Empathy, participatory design and people with dementia. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems,
- Lindsay, S., Jackson, D., Schofield, G., & Olivier, P. (2012). Engaging older people using participatory design. Proceedings of the SIGCHI conference on human factors in computing systems,
- Litz, B. T., Engel, C. C., Bryant, R. A., & Papa, A. (2007). A randomized, controlled proof-of-concept trial of an Internet-based, therapist-assisted self-management treatment for posttraumatic stress disorder. *American Journal of Psychiatry*, *164*(11), 1676-1684.

- Liua, X., Kakadeb, M., Fullerb, C. J., Fanb, B., Fangc, Y., Kongc, J., Guand, Z., & Wua, P. (2012). Depression after exposure to stressful events: Lessons learned from the SARS epidemic. *Compr Psychiatry*, *53*(1), 15-23.
- Livingston, J. D., & Boyd, J. E. (2010). Correlates and consequences of internalized stigma for people living with mental illness: A systematic review and meta-analysis. *Social science & medicine*, *71*(12), 2150-2161.
- Ljungqvist, I., Topor, A., Forssell, H., Svensson, I., & Davidson, L. (2016). Money and mental illness: A study of the relationship between poverty and serious psychological problems. *Community mental health journal*, *52*(7), 842-850.
- Lobban, F., Dodd, A. L., Sawczuk, A. P., Asar, O., Dagnan, D., Diggle, P. J., Griffiths, M., Honary, M., Knowles, D., & Long, R. (2017). Assessing feasibility and acceptability of web-based enhanced relapse prevention for bipolar disorder (ERPonline): a randomized controlled trial. *Journal of medical Internet research*, *19*(3), e85.
- Lobelo, F., & de Quevedo, I. G. (2016). The evidence in support of physicians and health care providers as physical activity role models. *American journal of lifestyle medicine*, *10*(1), 36-52.
- Lokman, S., Leone, S. S., Sommers-Spijkerman, M., Van Der Poel, A., Smit, F., & Boon, B. (2017). Complaint-directed mini-interventions for depressive complaints: a randomized controlled trial of unguided web-based self-help interventions. *Journal of medical Internet research*, *19*(1), e4.
- Loughnan, S. A., Joubert, A. E., Grierson, A., Andrews, G., & Newby, J. M. (2019). Internet-Delivered psychological interventions for clinical anxiety and depression in perinatal women: a systematic review and meta-analysis. *Archives of women's mental health*, *22*(6), 737-750.
- Løventoft, P. K., Nørregaard, L. B., & Frøkjær, E. (2012). Designing daybuilder: an experimental app to support people with depression. Proceedings of the 12th Participatory Design Conference: Exploratory Papers, Workshop Descriptions, Industry Cases-Volume 2,
- Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., Schneider, A., & Brähler, E. (2010). A 4-item measure of depression and anxiety: validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of affective disorders*, *122*(1-2), 86-95.
- Luppino, F. S., de Wit, L. M., Bouvy, P. F., Stijnen, T., Cuijpers, P., Penninx, B. W., & Zitman, F. G. (2010). Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Archives of general psychiatry*, *67*(3), 220-229.
- Ly, K. H., Dahl, J., Carlbring, P., & Andersson, G. (2012). Development and initial evaluation of a smartphone application based on acceptance and commitment therapy. *SpringerPlus*, *1*(1), 1-11.
- Ma, Y., She, Z., Siu, A. F.-Y., Zeng, X., & Liu, X. (2018). Effectiveness of online mindfulness-based interventions on psychological distress and the mediating role of emotion regulation. *Frontiers in psychology*, *9*, 2090.
- Maben, J., & Bridges, J. (2020). *Covid-19: Supporting nurses' psychological and mental health* (0962-1067).
- Maguire, M. (2001). Methods to support human-centred design. *International Journal of human-computer studies*, *55*(4), 587-634.
- Maher, C. A., Lewis, L. K., Ferrar, K., Marshall, S., De Bourdeaudhuij, I., & Vandelanotte, C. (2014). Are health behavior change interventions that use online social networks effective? A systematic review. *Journal of medical Internet research*, *16*(2), e40.
- Maheswaran, H., Weich, S., Powell, J., & Stewart-Brown, S. (2012). Evaluating the responsiveness of the Warwick Edinburgh Mental Well-Being Scale (WEMWBS): Group and individual level analysis. *Health and quality of life outcomes*, *10*(1), 1-8.
- Mainsbridge, C. P., Cooley, P. D., Fraser, S. P., & Pedersen, S. J. (2014). The effect of an e-health intervention designed to reduce prolonged occupational sitting on mean arterial pressure. *Journal of occupational and environmental medicine*, *56*(11), 1189.

- Manicavasagar, V., Horswood, D., Burckhardt, R., Lum, A., Hadzi-Pavlovic, D., & Parker, G. (2014). Feasibility and effectiveness of a web-based positive psychology program for youth mental health: randomized controlled trial. *Journal of medical Internet research*, *16*(6), e140.
- Manwaring, J. L., Bryson, S. W., Goldschmidt, A. B., Winzelberg, A. J., Luce, K. H., Cuning, D., Wilfley, D. E., & Taylor, C. B. (2008). Do adherence variables predict outcome in an online program for the prevention of eating disorders? *Journal of consulting and clinical psychology*, *76*(2), 341.
- Marks, N., & Shah, H. (2004). A well-being manifesto for a flourishing society. *Journal of Public Mental Health*.
- Marrie, R., Walld, R., Bolton, J., Sareen, J., Walker, J., Patten, S., Singer, A., Lix, L., Hitchon, C., & El-Gabalawy, R. (2017). CIHR Team in Defining the Burden and Managing the Effects of Psychiatric Comorbidity in Chronic Immunoinflammatory Disease. Increased incidence of psychiatric disorders in immune-mediated inflammatory disease. *J Psychosom Res*, *101*, 17-23.
- Marsden, D., & Moriconi, S. (2009). 'The value of rude health': employees' well being, absence and workplace performance.
- Martin, A., Goryakin, Y., & Suhrcke, M. (2014). Does active commuting improve psychological wellbeing? Longitudinal evidence from eighteen waves of the British Household Panel Survey. *Preventive medicine*, *69*, 296-303.
- Mathias, S. D., Williamson, C. L., Colwell, H. H., Cisternas, M. G., Pasta, D. J., Stolshek, B. S., & Patrick, D. L. (1997). Assessing health-related quality-of-life and health state preference in persons with obesity: a validation study. *Quality of Life Research*, *6*(4), 311-322.
- Matthews, M., Doherty, G., Coyle, D., & Sharry, J. (2008). Designing mobile applications to support mental health interventions. In *Handbook of research on user interface design and evaluation for mobile technology* (pp. 635-656). IGI Global.
- McAloney, K., Graham, H., Law, C., & Platt, L. (2013). A scoping review of statistical approaches to the analysis of multiple health-related behaviours. *Preventive medicine*, *56*(6), 365-371.
- McCall, H. C., Hadjistavropoulos, H. D., & Sundström, C. R. F. (2021). Exploring the Role of Persuasive Design in Unguided Internet-Delivered Cognitive Behavioral Therapy for Depression and Anxiety Among Adults: Systematic Review, Meta-analysis, and Meta-regression. *Journal of medical Internet research*, *23*(4), e26939.
- McConachie, D. A. J., McKenzie, K., Morris, P. G., & Walley, R. M. (2014). Acceptance and mindfulness-based stress management for support staff caring for individuals with intellectual disabilities. *Research in developmental disabilities*, *35*(6), 1216-1227.
- McCrone, P., Dhanasiri, S., Patel, A., Knapp, M., & Lawton-Smith, S. (2008). Paying the price: The cost of mental health care in England to 2026. London: King's Fund.
- McEwen, B. S. (2008). Central effects of stress hormones in health and disease: Understanding the protective and damaging effects of stress and stress mediators. *European journal of pharmacology*, *583*(2-3), 174-185.
- McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. Penguin.
- McGorry, P. D., Purcell, R., Hickie, I. B., Yung, A. R., Pantelis, C., & Jackson, H. J. (2007). Clinical staging: a heuristic model for psychiatry and youth mental health. *Medical Journal of Australia*, *187*(S7), S40-S42.
- McGregor, I., & Little, B. R. (1998). Personal projects, happiness, and meaning: on doing well and being yourself. *Journal of personality and social psychology*, *74*(2), 494.
- McKenzie, S. H., & Harris, M. F. (2013). Understanding the relationship between stress, distress and healthy lifestyle behaviour: a qualitative study of patients and general practitioners. *BMC Family Practice*, *14*(1), 1-8.
- McLaren, L., McIntyre, L., & Kirkpatrick, S. (2010). Rose's population strategy of prevention need not increase social inequalities in health. *International Journal of Epidemiology*, *39*(2), 372-377.

- McManus, S., Meltzer, H., Brugha, T., Bebbington, P., & Jenkins, R. (2009). *Adult psychiatric morbidity in England: Results of a household survey*. Health and Social Care Information Centre.
- Meader, N., King, K., Moe-Byrne, T., Wright, K., Graham, H., Petticrew, M., Power, C., White, M., & Sowden, A. J. (2016). A systematic review on the clustering and co-occurrence of multiple risk behaviours. *BMC public health, 16*(1), 1-9.
- Melville, K. M., Casey, L. M., & Kavanagh, D. J. (2010). Dropout from Internet-based treatment for psychological disorders. *British Journal of Clinical Psychology, 49*(4), 455-471.
- Meyer, B., Berger, T., Caspar, F., Beevers, C., Andersson, G., & Weiss, M. (2009). Effectiveness of a novel integrative online treatment for depression (Deprexis): randomized controlled trial. *Journal of medical Internet research, 11*(2), e15.
- Mhurchu, C. N., Aston, L. M., & Jebb, S. A. (2010). Effects of worksite health promotion interventions on employee diets: a systematic review. *BMC public health, 10*(1), 1-7.
- Milne-Ives, M., Lam, C., De Cock, C., Van Velthoven, M. H., & Meinert, E. (2020). Mobile apps for health behavior change in physical activity, diet, drug and alcohol use, and mental health: Systematic review. *JMIR mHealth and uHealth, 8*(3), e17046.
- Mitchell, A. J., Malone, D., & Doebbeling, C. C. (2009). Quality of medical care for people with and without comorbid mental illness and substance misuse: systematic review of comparative studies. *The British Journal of Psychiatry, 194*(6), 491-499.
- Mitchell, J., Stanimirovic, R., Klein, B., & Vella-Brodrick, D. (2009). A randomised controlled trial of a self-guided internet intervention promoting well-being. *Computers in Human Behavior, 25*(3), 749-760.
- Moffitt, R., & Mohr, P. (2015). The efficacy of a self-managed Acceptance and Commitment Therapy intervention DVD for physical activity initiation. *British journal of health psychology, 20*(1), 115-129.
- Mohr, D., Cuijpers, P., & Lehman, K. (2011). Supportive accountability: a model for providing human support to enhance adherence to eHealth interventions. *Journal of medical Internet research, 13*(1), e30.
- Mohr, D. C., Burns, M. N., Schueller, S. M., Clarke, G., & Klinkman, M. (2013). Behavioral intervention technologies: evidence review and recommendations for future research in mental health. *General hospital psychiatry, 35*(4), 332-338.
- Mohr, D. C., Ho, J., Duffecy, J., Baron, K. G., Lehman, K. A., Jin, L., & Reifler, D. (2010). Perceived barriers to psychological treatments and their relationship to depression. *Journal of clinical psychology, 66*(4), 394-409.
- Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., & Marks, J. S. (2003). Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *Jama, 289*(1), 76-79.
- Monshat, K., Vella-Brodrick, D., Burns, J., & Herrman, H. (2012). Mental health promotion in the Internet age: a consultation with Australian young people to inform the design of an online mindfulness training programme. *Health promotion international, 27*(2), 177-186.
- Montague, A., Varcin, K., & Parker, A. (2014). Putting technology into practice: evidence and opinions on integrating technology with youth health services.
- Montague, A. E., Varcin, K. J., Simmons, M. B., & Parker, A. G. (2015). Putting technology into youth mental health practice: young people's perspectives. *Sage Open, 5*(2), 2158244015581019.
- Morrell, C. J., Sutcliffe, P., Booth, A., Stevens, J., Scope, A., Stevenson, M., Harvey, R., Bessey, A., Cantrell, A., & Dennis, C.-L. (2016). A systematic review, evidence synthesis and meta-analysis of quantitative and qualitative studies evaluating the clinical effectiveness, the cost-effectiveness, safety and acceptability of interventions to prevent postnatal depression. *Health Technology Assessment, 20*(37).
- Morris, S., Earl, K., & Neave, A. (2017). Health survey for England 2016: well-being and mental health. *London: Health*.

- Morrison, C., & Doherty, G. (2014). Analyzing engagement in a web-based intervention platform through visualizing log-data. *Journal of medical Internet research*, *16*(11), e252.
- Morrison, D., Wyke, S., Thomson, N. C., McConnachie, A., Agur, K., Saunderson, K., Chaudhuri, R., & Mair, F. S. (2014). A Randomized trial of an Asthma Internet Self-management Intervention (RAISIN): study protocol for a randomized controlled trial. *Trials*, *15*(1), 1-7.
- Mouchacca, J., Abbott, G. R., & Ball, K. (2013). Associations between psychological stress, eating, physical activity, sedentary behaviours and body weight among women: a longitudinal study. *BMC public health*, *13*(1), 1-11.
- Muller, M. J. (2007). *Participatory design: the third space in HCI*. CRC press.
- Muller, R. A. E., Stensland, R. S. Ø., & van de Velde, R. S. (2020). The mental health impact of the covid-19 pandemic on healthcare workers, and interventions to help them: A rapid systematic review. *Psychiatry research*, 113441.
- Murphy, A., Palafox, B., Walli-Attai, M., Powell-Jackson, T., Rangarajan, S., Alhabib, K. F., Calik, K. B. T., Chifamba, J., Choudhury, T., & Dagenais, G. (2020). The household economic burden of non-communicable diseases in 18 countries. *BMJ global health*, *5*(2).
- Murray, C. J., & Lopez, A. D. (1997). Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. *The lancet*, *349*(9064), 1498-1504.
- Myint, P. K., Luben, R. N., Wareham, N. J., Bingham, S. A., & Khaw, K.-T. (2009). Combined effect of health behaviours and risk of first ever stroke in 20 040 men and women over 11 years' follow-up in Norfolk cohort of European Prospective Investigation of Cancer (EPIC Norfolk): prospective population study. *Bmj*, *338*.
- Myung, S.-K., McDonnell, D. D., Kazinets, G., Seo, H. G., & Moskowitz, J. M. (2009). Effects of Web-and computer-based smoking cessation programs: meta-analysis of randomized controlled trials. *Archives of internal medicine*, *169*(10), 929-937.
- Nabi, H., Hall, M., Koskenvuo, M., Singh-Manoux, A., Oksanen, T., Suominen, S., Kivimäki, M., & Vahtera, J. (2010). Psychological and somatic symptoms of anxiety and risk of coronary heart disease: the health and social support prospective cohort study. *Biological psychiatry*, *67*(4), 378-385.
- Nabi, H., Kivimäki, M., Suominen, S., Koskenvuo, M., Singh-Manoux, A., & Vahtera, J. (2010). Does depression predict coronary heart disease and cerebrovascular disease equally well? The Health and Social Support Prospective Cohort Study. *International Journal of Epidemiology*, *39*(4), 1016-1024.
- Nabi, H., Shipley, M. J., Vahtera, J., Hall, M., Korkeila, J., Marmot, M. G., Kivimäki, M., & Singh-Manoux, A. (2010). Effects of depressive symptoms and coronary heart disease and their interactive associations on mortality in middle-aged adults: the Whitehall II cohort study. *Heart*, *96*(20), 1645-1650.
- Nanjundaswamy, M. H., Pathak, H., & Chaturvedi, S. K. (2020). Perceived stress and anxiety during COVID-19 among psychiatry trainees. *Asian Journal of Psychiatry*.
- Nasiri, A., & Kazemi-Zahrani, H. (2015). The effectiveness of group acceptance and commitment therapy on pain intensity, pain catastrophizing and pain-associated anxiety in patients with chronic pain. *Asian Social Science*, *11*(26), 112.
- Naylor, C., Parsonage, M., McDaid, D., Knapp, M., Fossey, M., & Galea, A. (2012). Long-term conditions and mental health: the cost of co-morbidities.
- Neff, R., & Fry, J. (2009). Periodic prompts and reminders in health promotion and health behavior interventions: systematic review. *Journal of medical Internet research*, *11*(2), e16.
- Neuhauser, L., & Kreps, G. L. (2003). Rethinking communication in the e-health era. *Journal of Health Psychology*, *8*(1), 7-23.
- Neve, M., Morgan, P. J., Jones, P., & Collins, C. (2010). Effectiveness of web-based interventions in achieving weight loss and weight loss maintenance in overweight and obese adults: a systematic review with meta-analysis. *Obesity reviews*, *11*(4), 306-321.

- Newell, A. F., & Gregor, P. (2000). "User sensitive inclusive design"—in search of a new paradigm. Proceedings on the 2000 conference on Universal Usability,
- Ngui, E. M., Khasakhala, L., Ndetei, D., & Roberts, L. W. (2010). Mental disorders, health inequalities and ethics: A global perspective. *International Review of Psychiatry*, 22(3), 235-244.
- NHS-Wales. (2015). *Focus On: The Age of the NHS Wales Workforce 2015*. <http://www.nwssp.wales.nhs.uk/sitesplus/documents/1178/Focus%20On%20-%20The%20Age%20of%20the%20NHS%20Wales%20Workforce%202015.pdf>
- NHS. (2016). The Five Year Forward View <https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf>
- NHS. (2017). *Patient and Public Participation policy for patients and the public, and for NHS England staff*. <https://www.england.nhs.uk/publication/patient-and-public-participation-policy/>
- NHS. (2019). *Expenditure Programme Budgets 2017-18 (2019)*. <https://gov.wales/sites/default/files/statistics-and-research/2019-04/nhs-expenditure-programme-budgets-april-2017-to-march-2018-168.pdf>
- NHSdigital. (2018). *Survey of Mental Health and Wellbeing 2018*. Retrieved 22.6.21 from <https://digital.nhs.uk/news-and-events/news-archive/2016-news-archive/survey-shows-one-in-three-adults-with-common-mental-disorders-report-using-treatment-services>
- NHSdigital. (2020). *Statistics on Obesity, Physical Activity and Diet, England, May 2020. 01 Apr 2018 to 31 Dec 2019*. Retrieved 22.6.21 from <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/england-2020>
- NICE. (2011a). *Common mental health problems: identification and pathways to care Clinical guideline* Retrieved 22.6.21 from <https://www.nice.org.uk/guidance/cg123/resources/common-mental-health-problems-identification-and-pathways-to-care-pdf-35109448223173>
- NICE. (2011b). *Getting help and support for common mental health problems Information for the public*. Retrieved 22.6.21 from <https://www.nice.org.uk/guidance/cg123/resources/getting-help-and-support-for-common-mental-health-problems-pdf-235529147077>
- NICE. (2012). *Enhancing the quality of service user involved care planning in Mental Health Services (EQUIP)*. Retrieved 28.6.21 from <https://www.nice.org.uk/sharedlearning/enhancing-the-quality-of-service-user-involved-care-planning-in-mental-health-services-equip>
- NICE. (2020). *Behaviour change: digital and mobile health interventions*. <https://www.nice.org.uk/guidance/ng183/chapter/Recommendations>
- Nielsen, J., & Landauer, T. K. (1993). A mathematical model of the finding of usability problems. Proceedings of the INTERACT'93 and CHI'93 conference on Human factors in computing systems,
- Niemiec. (2014). *Eudaimonic Well-Being*. In: Michalos A.C. (eds) *Encyclopedia of Quality of Life and Well-Being Research*. Springer, Dordrecht. [https://doi.org/https://doi.org/10.1007/978-94-007-0753-5\\_929](https://doi.org/https://doi.org/10.1007/978-94-007-0753-5_929)
- NMC. (2014). *Standards for competence for registered nurses*. <https://www.nmc.org.uk/globalassets/sitedocuments/standards/nmc-standards-for-competence-for-registered-nurses.pdf>
- Noble, N., Paul, C., Turon, H., & Oldmeadow, C. (2015). Which modifiable health risk behaviours are related? A systematic review of the clustering of Smoking, Nutrition, Alcohol and Physical activity ('SNAP') health risk factors. *Preventive medicine*, 81, 16-41.
- Noblet, A., & LaMontagne, A. D. (2006). The role of workplace health promotion in addressing job stress. *Health promotion international*, 21(4), 346-353.
- Nordin, L., & Rorsman, I. (2012). Cognitive behavioural therapy in multiple sclerosis: a randomized controlled pilot study of acceptance and commitment therapy. *Journal of rehabilitation medicine*, 44(1), 87-90.



- Norman, G. J., Zabinski, M. F., Adams, M. A., Rosenberg, D. E., Yaroch, A. L., & Atienza, A. A. (2007). A review of eHealth interventions for physical activity and dietary behavior change. *American journal of preventive medicine*, 33(4), 336-345. e316.
- Norman, P., & Brain, K. (2005). An application of an extended health belief model to the prediction of breast self-examination among women with a family history of breast cancer. *British journal of health psychology*, 10(1), 1-16.
- Nygaard, K. (1979). The iron and metal project: trade union participation. *Computers Dividing Man and Work: Recent Scandinavian Research on Planning and Computers from a Trade Union Perspective*, 98.
- Nygaard, K. (1987). *Computers and democracy: A Scandinavian challenge*. Aldershot [Hants, England]; Brookfield [Vt.], USA: Avebury.
- Oberg, E., & Frank, E. (2009). Physicians' health practices strongly influence patient health practices. *The journal of the Royal College of Physicians of Edinburgh*, 39(4), 290.
- OECD. (2007). *Istanbul Declaration* <https://www.oecd.org/newsroom/38883774.pdf>
- OECD. (2012). *Sick on the job?: myths and realities about mental health and work* (9264124527).
- OECD/EuropeanUnion. (2018). *Health at a Glance: Europe 2018: State of Health in the EU Cycle*, . OECD Publishing. Retrieved 22.6.21 from [https://doi.org/10.1787/health\\_glance\\_eur-2018-en](https://doi.org/10.1787/health_glance_eur-2018-en).
- Ogden, J. (2012). *Health psychology: A textbook: A textbook*. McGraw-Hill Education (UK).
- Oinas-Kukkonen, H., & Harjumaa, M. (2009). Persuasive systems design: Key issues, process model, and system features. *Communications of the Association for Information Systems*, 24(1), 28.
- Oliver, G., Wardle, J., & Gibson, E. L. (2000). Stress and food choice: a laboratory study. *Psychosomatic medicine*, 62(6), 853-865.
- Onken, L. S., Carroll, K. M., Shoham, V., Cuthbert, B. N., & Riddle, M. (2014). Reenvisioning clinical science: Unifying the discipline to improve the public health. *Clinical Psychological Science*, 2(1), 22-34.
- ONS. (2016). *Sickness absence in the UK labour market: 2016*. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2016>
- ONS. (2018a). *Personal Well-being in The UK. July 2017 to June 2018*. Retrieved 22.6.21 from <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/measuringnationalwellbeing/july2017tojune2018>
- ONS. (2018b). *Sickness absence in the UK labour market 2018* ONS. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2018>
- ONS. (2019a). *Adult smoking habits in the UK: 2019*. Retrieved 22.6.21 from <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2019>
- ONS. (2019b). *Personal Well-being in The UK. April 2018 to March 2019*. Retrieved 22.6.21 from <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/measuringnationalwellbeing/april2018tomarch2019>
- ONS. (2019c). *Quarter 4 Oct to Dec ONS Personal and Economic Well-being in the UK: April 2019*. Retrieved 22.6.21 from <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/personalandeconomicwellbeingintheuk/april2019>
- ONS. (2020a). *Coronavirus and the social impacts on Great Britain: 20 November 2020*. <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/bulletins/coronavirusandthesocialimpactsongreatbritain/20november2020>
- ONS. (2020b). *Internet users, UK: 2020. Internet use in the UK; annual estimates by age, sex, disability and geographical location*. <https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2020>

- ONS. (2020c). *Sickness absence in the UK labour market: 2020*  
<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2020>
- Orji, R., & Moffatt, K. (2018). Persuasive technology for health and wellness: State-of-the-art and emerging trends. *Health informatics journal*, *24*(1), 66-91.
- Orji, R., Vassileva, J., & Mandryk, R. (2012). Towards an effective health interventions design: an extension of the health belief model. *Online journal of public health informatics*, *4*(3).
- Orlowski, S. K., Lawn, S., Venning, A., Winsall, M., Jones, G. M., Wyld, K., Damarell, R. A., Antezana, G., Schrader, G., & Smith, D. (2015). Participatory research as one piece of the puzzle: a systematic review of consumer involvement in design of technology-based youth mental health and well-being interventions. *JMIR human factors*, *2*(2), e4361.
- Ortiz-Ospina, E., & Roser, M. (2013). Happiness and life satisfaction. *Our World in Data*.
- Osborne, D., Meyer, D., Moulding, R., Kyrios, M., Bailey, E., & Nedeljkovic, M. (2019). Cost-effectiveness of internet-based cognitive-behavioural therapy for obsessive-compulsive disorder. *Internet interventions*, *18*, 100277.
- Osilla, K. C., Van Busum, K., Schnyer, C., Larkin, J. W., Eibner, C., & Mattke, S. (2012). Systematic review of the impact of worksite wellness programs. *The American journal of managed care*, *18*(2), e68-81.
- Ospina-Pinillos, L., Davenport, T., Diaz, A. M., Navarro-Mancilla, A., Scott, E. M., & Hickie, I. B. (2019). Using participatory design methodologies to co-design and culturally adapt the Spanish version of the mental health eClinic: qualitative study. *Journal of medical Internet research*, *21*(8), e14127.
- Osrin, D., Azad, K., Fernandez, A., Manandhar, D. S., Mwansambo, C. W., Tripathy, P., & Costello, A. M. (2009). Ethical challenges in cluster randomized controlled trials: experiences from public health interventions in Africa and Asia. *Bulletin of the World Health Organization*, *87*, 772-779.
- Öst, L.-G. (2014). The efficacy of acceptance and commitment therapy: an updated systematic review and meta-analysis. *Behaviour research and therapy*, *61*, 105-121.
- Paganini, S., Teigelkoetter, W., Buntrock, C., & Baumeister, H. (2018). Economic evaluations of internet-and mobile-based interventions for the treatment and prevention of depression: a systematic review. *Journal of affective disorders*, *225*, 733-755.
- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsis, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, behavior, and immunity*.
- Parducci, A. (1995). *Happiness, pleasure, and judgment: The contextual theory and its applications*. Lawrence Erlbaum Associates, Inc.
- Parletta, N., Zarnowiecki, D., Cho, J., Wilson, A., Bogomolova, S., Villani, A., Itsiopoulos, C., Niyonsenga, T., Blunden, S., & Meyer, B. (2019). A Mediterranean-style dietary intervention supplemented with fish oil improves diet quality and mental health in people with depression: a randomized controlled trial (HELFIMED). *Nutritional neuroscience*, *22*(7), 474-487.
- Parthasarathi, T., McConnell, M. H., Luery, J., & Kable, J. W. (2017). The vivid present: Visualization abilities are associated with steep discounting of future rewards. *Frontiers in psychology*, *8*, 289.
- Patel, S., Ram, F., Patel, S. K., & Kumar, K. (2019). Association of behavioral risk factors with self-reported and symptom or measured chronic diseases among adult population (18–69 years) in India: evidence from SAGE study. *BMC public health*, *19*(1), 1-17.
- Patel, V., Chisholm, D., Parikh, R., Charlson, F. J., Degenhardt, L., Dua, T., Ferrari, A. J., Hyman, S., Laxminarayan, R., & Levin, C. (2016). Global priorities for addressing the burden of mental, neurological, and substance use disorders, In: *Mental, Neurological, and Substance Use Disorders: Disease Control Priorities, Third Edition (Volume 4)*. The International Bank for Reconstruction and Development / The World Bank, Washington (DC); 2016.

- Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., Chisholm, D., Collins, P. Y., Cooper, J. L., & Eaton, J. (2018). The Lancet Commission on global mental health and sustainable development. *The lancet*, 392(10157), 1553-1598.
- Patrick, K., Calfas, K. J., Norman, G. J., Rosenberg, D., Zabinski, M. F., Sallis, J. F., Rock, C. L., & Dillon, L. W. (2011). Outcomes of a 12-month web-based intervention for overweight and obese men. *Annals of Behavioral Medicine*, 42(3), 391-401.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE Publications, inc.
- Pearman, A., Hughes, M. L., Smith, E. L., & Neupert, S. D. (2020). Mental Health Challenges of United States Healthcare Professionals During COVID-19. *Frontiers in psychology*, 11, 2065.
- Pedersen, S. J., Cooley, P. D., & Mainsbridge, C. (2014). An e-health intervention designed to increase workday energy expenditure by reducing prolonged occupational sitting habits. *Work*, 49(2), 289-295.
- Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current opinion in psychiatry*, 18(2), 189-193.
- Pengnate, S., Sarathy, R., & Lee, J. (2019). The engagement of website initial aesthetic impressions: an experimental investigation. *International Journal of Human-Computer Interaction*, 35(16), 1517-1531.
- Peri, K., Kerse, N., Robinson, E., Parsons, M., Parsons, J., & Latham, N. (2008). Does functionally based activity make a difference to health status and mobility? A randomised controlled trial in residential care facilities (The Promoting Independent Living Study; PILS). *Age and ageing*, 37(1), 57-63.
- Pernice, K. (2016). UX prototypes: Low fidelity vs. high fidelity. *Nielsen Norman Group*.
- Perski, O., Blandford, A., West, R., & Michie, S. (2017). Conceptualising engagement with digital behaviour change interventions: a systematic review using principles from critical interpretive synthesis. *Translational behavioral medicine*, 7(2), 254-267.
- Pescud, M., Teal, R., Shilton, T., Slevin, T., Ledger, M., Waterworth, P., & Rosenberg, M. (2015). Employers' views on the promotion of workplace health and wellbeing: a qualitative study. *BMC public health*, 15(1), 1-10.
- PHE. (2016a). *Prevention Concordat for Better Mental Health: Prevention planning resource for local areas* (gateway number: 2017209). [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/740587/Prevention Concordat for Better Mental Health Prevention planning.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740587/Prevention_Concordat_for_Better_Mental_Health_Prevention_planning.pdf)
- PHE. (2016b). *The Public Health Burden of Alcohol and the Effectiveness and Cost-Effectiveness of Alcohol Control Policies: An Evidence Review*. (PHE publications gateway number 2016490). [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/733108/alcohol\\_public\\_health\\_burden\\_evidence\\_review\\_update\\_2018.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733108/alcohol_public_health_burden_evidence_review_update_2018.pdf)
- PHE. (2020). *Public Health Matters: Smoking and mental health*. <https://publichealthmatters.blog.gov.uk/2020/02/26/health-matters-smoking-and-mental-health/>
- Phillips, C., & Chaparro, B. (2009). Visual appeal vs. usability: which one influences user perceptions of a website more. *Usability News*, 11(2), 1-9.
- Pilemalm, S. (2018). Participatory design in emerging civic engagement initiatives in the new public sector: Applying PD concepts in resource-scarce organizations. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 25(1), 1-26.
- Pilemalm, S., & Timpka, T. (2008). Third generation participatory design in health informatics—making user participation applicable to large-scale information system projects. *Journal of biomedical informatics*, 41(2), 327-339.
- Pinto-Gouveia, J., Gregório, S., Dinis, A., & Xavier, A. (2012). Experiential avoidance in clinical and non-clinical samples: AAQ-II Portuguese version. *International journal of psychology and psychological therapy*, 12(2), 139-156.

- Piqueras, J. A., Garcia-Olcina, M., Rivera-Riquelme, M., Rodriguez-Jimenez, T., Martinez-Gonzalez, A. E., & Cuijpers, P. (2017). DetectaWeb Project: Study protocol of a web-based detection of mental health of children and adolescents. *BMJ open*, *7*(10), e017218.
- Poortinga, W. (2007). The prevalence and clustering of four major lifestyle risk factors in an English adult population. *Preventive medicine*, *44*(2), 124-128.
- Postel, M. G., de Haan, H. A., Ter Huurne, E. D., van der Palen, J., Becker, E. S., & de Jong, C. A. (2011). Attrition in web-based treatment for problem drinkers. *Journal of medical Internet research*, *13*(4), e117.
- Pots, W. T., Fledderus, M., Meulenbeek, P. A., Peter, M., Schreurs, K. M., & Bohlmeijer, E. T. (2016). Acceptance and commitment therapy as a web-based intervention for depressive symptoms: randomised controlled trial. *The British Journal of Psychiatry*, *208*(1), 69-77.
- Powell, J., Hamborg, T., Stallard, N., Burls, A., McSorley, J., Bennett, K., Griffiths, K. M., & Christensen, H. (2013). Effectiveness of a web-based cognitive-behavioral tool to improve mental well-being in the general population: randomized controlled trial. *Journal of medical Internet research*, *15*(1), e2.
- Powers, M. B., Vörding, M. B. Z. V. S., & Emmelkamp, P. M. (2009). Acceptance and commitment therapy: A meta-analytic review. *Psychotherapy and psychosomatics*, *78*(2), 73-80.
- Prasek, A. (2015). *Randomized controlled trial to evaluate a self-guided, web-based mindfulness program for stress reduction and wellbeing promotion*
- Pratt, M., Macera, C. A., & Wang, G. (2000). Higher direct medical costs associated with physical inactivity. *The Physician and sportsmedicine*, *28*(10), 63-70.
- Pratt, M., Norris, J., Lobelo, F., Roux, L., & Wang, G. (2014). The cost of physical inactivity: moving into the 21st century. *British journal of sports medicine*, *48*(3), 171-173.
- Preece, J., Rogers, Y., & Sharp, H. (2002). *Interaction design: beyond human-computer interaction* (1st ed. ed.). John Wiley & Sons.
- Pressman, S. D., Jenkins, B. N., & Moskowitz, J. T. (2019). Positive affect and health: What do we know and where next should we go? *Annual Review of Psychology*, *70*, 627-650.
- PricewaterhouseCoopers, L. (2008). *Building the case for wellness*, London: PWC.
- Primack, B. A., Carroll, M. V., McNamara, M., Klem, M. L., King, B., Rich, M., Chan, C. W., & Nayak, S. (2012). Role of video games in improving health-related outcomes: a systematic review. *American journal of preventive medicine*, *42*(6), 630-638.
- Prince, M., Patel, V., Saxena, S., Maj, M., Maselko, J., Phillips, M. R., & Rahman, A. (2007). No health without mental health. *The lancet*, *370*(9590), 859-877.
- Prochaska, J. J., & Prochaska, J. O. (2011). A review of multiple health behavior change interventions for primary prevention. *American journal of lifestyle medicine*, *5*(3), 208-221.
- Prochaska, J. O., & DiClemente, C. C. (1982). Transtheoretical therapy: toward a more integrative model of change. *Psychotherapy: theory, research & practice*, *19*(3), 276.
- Progovac, A. M., Chang, Y.-F., Chang, C.-C. H., Matthews, K. A., Donohue, J. M., Scheier, M. F., Habermann, E. B., Kuller, L. H., Goveas, J. S., & Chapman, B. P. (2017). Are optimism and cynical hostility associated with smoking cessation in older women? *Annals of Behavioral Medicine*, *51*(4), 500-510.
- Progovac, A. M., Donohue, J. M., Matthews, K. A., Chang, C.-C. H., Habermann, E. B., Kuller, L. H., Saquib, J., LaMonte, M. J., Salmoirago-Blotcher, E., & Zaslavsky, O. (2017). Optimism predicts sustained vigorous physical activity in postmenopausal women. *Preventive medicine reports*, *8*, 286-293.
- Räsänen, P., Lappalainen, P., Muotka, J., Tolvanen, A., & Lappalainen, R. (2016). An online guided ACT intervention for enhancing the psychological wellbeing of university students: A randomized controlled clinical trial. *Behaviour research and therapy*, *78*, 30-42.
- Rathbone, A. L., Clarry, L., & Prescott, J. (2017). Assessing the efficacy of mobile health apps using the basic principles of cognitive behavioral therapy: systematic review. *Journal of medical Internet research*, *19*(11), e399.

- RevMan. (2020). *Review Manager. Version 5.3. The Cochrane Collaboration, 2020*. In
- Rhoades, L., & Eisenberger, R. (2002). Perceived organizational support: a review of the literature. *Journal of applied psychology, 87*(4), 698.
- Rhodes, R. E., Janssen, I., Bredin, S. S., Warburton, D. E., & Bauman, A. (2017). Physical activity: Health impact, prevalence, correlates and interventions. *Psychology & health, 32*(8), 942-975.
- Rice, D. P., & Miller, L. S. . (1998). Health economics and cost implications of anxiety and other mental disorders in the United States. . *The British journal of psychiatry. Supplement, 34*, 4-9.
- Richards, D., Richardson, T., Timulak, L., & McElvaney, J. (2015). The efficacy of internet-delivered treatment for generalized anxiety disorder: A systematic review and meta-analysis. *Internet interventions, 2*(3), 272-282.
- Richardson, T., & Richards, D. (2012). Computer-based psychological interventions for depression treatment: a systematic review and meta-analysis. *Clinical psychology review, 32*(4), 329-342.
- Ricks, D. F., & Wessman, A. E. (1966). Winn: a case study of a happy man. *Journal of Humanistic Psychology, 6*(1), 2-16.
- Riegel, B., Dunbar, S. B., Fitzsimons, D., Freedland, K. E., Lee, C. S., Middleton, S., Stromberg, A., Vellone, E., Webber, D. E., & Jaarsma, T. (2019). Self-care research: Where are we now? Where are we going? *International journal of nursing studies, 103*402.
- Robbins, L. P., Esposito, L., Kretz, C., & Aloj, M. (2007). What a user wants: Redesigning a library's web site based on a card-sort analysis. *Journal of Web Librarianship, 1*(4), 3-27.
- Roberts, L. W., & Dyer, A. R. (2004). *Concise guide to ethics in mental health care*. American Psychiatric Publishing, Inc.
- Röhr, S., Müller, F., Jung, F., Apfelbacher, C., Seidler, A., & Riedel-Heller, S. G. (2020). Psychosocial impact of quarantine measures during serious coronavirus outbreaks: a rapid review. *Psychiatrische Praxis, 47*(4), 179-189.
- Rongen, A., Robroek, S. J., van Lenthe, F. J., & Burdorf, A. (2013). Workplace health promotion: a meta-analysis of effectiveness. *American journal of preventive medicine, 44*(4), 406-415.
- Rooke, S., Thorsteinsson, E., Karpin, A., Copeland, J., & Allsop, D. (2010). Computer-delivered interventions for alcohol and tobacco use: a meta-analysis. *Addiction, 105*(8), 1381-1390.
- Rose, G. (1985). Sick individuals and sick populations *Int J Epidemiol 14* (1): 32–38. *Find this article online*.
- Rose, R. D., Buckley Jr, J. C., Zbozinek, T. D., Motivala, S. J., Glenn, D. E., Cartreine, J. A., & Craske, M. G. (2013). A randomized controlled trial of a self-guided, multimedia, stress management and resilience training program. *Behaviour research and therapy, 51*(2), 106-112.
- Rosenblad, A. (2009). *Introduction to Meta-Analysis by Michael Borenstein, Larry V. Hedges, Julian PT Higgins, Hannah R. Rothstein*. Wiley Online Library.
- Rothert, K., Strecher, V. J., Doyle, L. A., Caplan, W. M., Joyce, J. S., Jimison, H. B., Karm, L. M., Mims, A. D., & Roth, M. A. (2006). Web-based weight management programs in an integrated health care setting: a randomized, controlled trial. *Obesity, 14*(2), 266-272.
- Rothmann, M. J., Danbjørg, D. B., Jensen, C. M., & Clemensen, J. (2016). Participatory design in health care: participation, power and knowledge. Proceedings of the 14th Participatory Design Conference: Short Papers, Interactive Exhibitions, Workshops-Volume 2,
- Ruiz, F. J., Suárez-Falcón, J. C., Cárdenas-Sierra, S., Durán, Y., Guerrero, K., & Riaño-Hernández, D. (2016). Psychometric properties of the Acceptance and Action Questionnaire–II in Colombia. *The Psychological Record, 66*(3), 429-437.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist, 55*(1), 68.
- Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of personality, 65*(3), 529-565.
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of personality and social psychology, 57*(6), 1069.

- Ryff, C. D., & Singer, B. (1998). The contours of positive human health. *Psychological inquiry*, 9(1), 1-28.
- Ryff, C. D., & Singer, B. (2000). Interpersonal flourishing: A positive health agenda for the new millennium. *Personality and social psychology review*, 4(1), 30-44.
- Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of happiness studies*, 9(1), 13-39.
- Sadler, M. E., Miller, C. J., Christensen, K., & McGue, M. (2011). Subjective wellbeing and longevity: a co-twin control study. *Twin Research and Human Genetics*, 14(3), 249-256.
- Sainsbury-Centre-for-Mental-Health. (2003). *Policy Paper 3: The Economic and Social Costs of Mental Illness*.
- Saleh, D., Camart, N., Sbeira, F., & Romo, L. (2017). Internet-Based Stress Management Intervention: Feasibility Study. *EC Psychol PSYCHIATRYShort*, 4(1), 27-33.
- Salgado, M., & Galanakis, M. (2014). "... so what?" limitations of participatory design on decision-making in urban planning. Proceedings of the 13th Participatory Design Conference: Short Papers, Industry Cases, Workshop Descriptions, Doctoral Consortium papers, and Keynote abstracts-Volume 2,
- Sandberg, Å. (1979). *Computers dividing man and work: Recent Scandinavian research on planning and computers from a trade union perspective*. Arbetslivcentrum.
- Sanders, E. B.-N. (2002). From user-centered to participatory design approaches. In *Design and the social sciences* (pp. 18-25). CRC Press.
- Sanders, E. B.-N., Brandt, E., & Binder, T. (2010). A framework for organizing the tools and techniques of participatory design. Proceedings of the 11th biennial participatory design conference,
- Sanders, M. R., Baker, S., & Turner, K. M. (2012). A randomized controlled trial evaluating the efficacy of Triple P Online with parents of children with early-onset conduct problems. *Behaviour research and therapy*, 50(11), 675-684.
- Sarris, J., O'Neil, A., Coulson, C. E., Schweitzer, I., & Berk, M. (2014). Lifestyle medicine for depression. *BMC psychiatry*, 14(1), 1-13.
- Saxena, S., Jané-Llopis, E., & Hosman, C. (2006). Prevention of mental and behavioural disorders: implications for policy and practice. *World psychiatry*, 5(1), 5.
- Schmidt, E. E. (2009). *Engaging youth in community change: A reflection of the youth participatory project, Youth Voices for Change*. University of California, Davis.
- Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: psychological, behavioral, and biological determinants. *Annual review of clinical psychology*, 1.
- Schröer, S., Haupt, J., & Pieper, C. (2014). Evidence-based lifestyle interventions in the workplace—an overview. *Occupational medicine*, 64(1), 8-12.
- Schubart, J. R., Stuckey, H. L., GANESHAMOORTHY, M. A., & Sciamanna, C. N. (2011). Chronic health conditions and internet behavioral interventions: a review of factors to enhance user engagement. *Computers, informatics, nursing: CIN*, 29(2), 81.
- Schuckit, M. A., & Hesselbrock, V. (2004). Alcohol dependence and anxiety disorders: what is the relationship? *Focus*, 151(3), 1723-1453.
- Schuit, A. J., van Loon, A. J. M., Tijhuis, M., & Ocké, M. C. (2002). Clustering of lifestyle risk factors in a general adult population. *Preventive medicine*, 35(3), 219-224.
- Schulz, D. N., Kremers, S. P., & De Vries, H. (2015). Tailored eHealth lifestyle promotion: which behavioral modules do users prefer? *Journal of health communication*, 20(6), 663-672.
- Schulz, D. N., Kremers, S. P., Vandelanotte, C., Van Adrichem, M. J., Schneider, F., Candel, M. J., & de Vries, H. (2014). Effects of a web-based tailored multiple-lifestyle intervention for adults: a two-year randomized controlled trial comparing sequential and simultaneous delivery modes. *Journal of medical Internet research*, 16(1), e26.
- Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of human-computer studies*, 74, 14-31.

- Self, A., Thomas, J., & Randall, C. (2012). *Measuring national well-being: Life in the UK*. Office for National Statistics.
- Sevilla-Llewellyn-Jones, J., Santesteban-Echarri, O., Pryor, I., McGorry, P., & Alvarez-Jimenez, M. (2018). Web-based mindfulness interventions for mental health treatment: systematic review and meta-analysis. *JMIR mental health*, 5(3), e10278.
- Shanafelt, T., Ripp, J., & Trockel, M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *Jama*, 323(21), 2133-2134.
- Shandley, K., Austin, D., Klein, B., & Kyrios, M. (2010). An evaluation of 'Reach Out Central': an online gaming program for supporting the mental health of young people. *Health education research*, 25(4), 563-574.
- Shari, N. I., Zainal, N. Z., Guan, N. C., Ahmad Sabki, Z., & Yahaya, N. A. (2019). Psychometric properties of the acceptance and action questionnaire (AAQ II) Malay version in cancer patients. *PLoS one*, 14(2), e0212788.
- Sharp, K. (2012). A review of acceptance and commitment therapy with anxiety disorders. *International journal of psychology and psychological therapy*, 12(3), 359-372.
- Sharry, J., Davidson, R., McLoughlin, O., & Doherty, G. (2013). A service-based evaluation of a therapist-supported online cognitive behavioral therapy program for depression. *Journal of medical Internet research*, 15(6), e121.
- Shaukat, N., Ali, D. M., & Razzak, J. (2020). Physical and mental health impacts of COVID-19 on healthcare workers: A scoping review. *International Journal of Emergency Medicine*, 13(1), 1-8.
- Sheeber, L. B., Seeley, J. R., Feil, E. G., Davis, B., Sorensen, E., Kosty, D. B., & Lewinsohn, P. M. (2012). Development and pilot evaluation of an Internet-facilitated cognitive-behavioral intervention for maternal depression. *Journal of consulting and clinical psychology*, 80(5), 739.
- Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: the self-concordance model. *Journal of personality and social psychology*, 76(3), 482.
- Shevlin, M., McBride, O., Murphy, J., Miller, J. G., Hartman, T. K., Levita, L., Mason, L., Martinez, A. P., McKay, R., & Stocks, T. V. (2020). Anxiety, depression, traumatic stress and COVID-19-related anxiety in the UK general population during the COVID-19 pandemic. *BJPsych open*, 6(6).
- Shitkova, M., Holler, J., Heide, T., Clever, N., & Becker, J. (2015). Towards Usability Guidelines for Mobile Websites and Applications. *Wirtschaftsinformatik*.
- Shivani, R., Goldsmith, R. J., & Anthenelli, R. M. (2002). Alcoholism and psychiatric disorders: Diagnostic challenges. *Alcohol Research & Health*, 26(2), 90.
- Siddiqui, I., Aurelio, M., Gupta, A., Blythe, J., & Khanji, M. Y. (2021). COVID-19: causes of anxiety and wellbeing support needs of healthcare professionals in the UK: a cross-sectional survey. *Clinical Medicine*, 21(1), 66.
- Sijbrandij, M., Kunovski, I., & Cuijpers, P. (2016). Effectiveness of internet-delivered cognitive behavioral therapy for posttraumatic stress disorder: A systematic review and meta-analysis. *Depression and anxiety*, 33(9), 783-791.
- Silfvernagel, K., Carlbring, P., Kabo, J., Edström, S., Eriksson, J., Månson, L., & Andersson, G. (2012). Individually tailored internet-based treatment for young adults and adults with panic attacks: randomized controlled trial. *Journal of medical Internet research*, 14(3), e65.
- Sillence, E., Briggs, P., Fishwick, L., & Harris, P. (2004). Trust and mistrust of online health sites. Proceedings of the SIGCHI conference on Human factors in computing systems.
- Silva, F., Analide, C., Rosa, L., Felgueiras, G., & Pimenta, C. (2013). Social networks gamification for sustainability recommendation systems. In *Distributed Computing and Artificial Intelligence* (pp. 307-315). Springer.
- Simsarian, K. T. (2003). Take it to the next stage: the roles of role playing in the design process. CHI'03 extended abstracts on Human factors in computing systems.
- Sin, J., Henderson, C., Cornelius, V., Chen, T., Elkes, J., Woodham, L. A., Hernández, A. S., Spence-Polin, D., Batchelor, R., & Gillard, S. (2020). COPE-support-a multi-component digital intervention

- for family carers for people affected by psychosis: study protocol for a randomized controlled trial. *BMC psychiatry*, 20(1), 1-14.
- Sin, J., Henderson, C., Woodham, L. A., Hernández, A. S., & Gillard, S. (2019). A multicomponent eHealth intervention for family carers for people affected by psychosis: a coproduced design and build study. *Journal of medical Internet research*, 21(8), e14374.
- Sin, N. L. (2016). The protective role of positive well-being in cardiovascular disease: review of current evidence, mechanisms, and clinical implications. *Current cardiology reports*, 18(11), 1-10.
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of clinical psychology*, 65(5), 467-487.
- Slade, T., Johnston, A., Oakley Browne, M. A., Andrews, G., & Whiteford, H. (2009). 2007 National Survey of Mental Health and Wellbeing: methods and key findings. *Australian & New Zealand Journal of Psychiatry*, 43(7), 594-605.
- Smail, D., Elison, S., Dubrow-Marshall, L., & Thompson, C. (2017). A mixed-methods study using a nonclinical sample to measure feasibility of ostrich community: a web-based cognitive behavioral therapy program for individuals with debt and associated stress. *JMIR mental health*, 4(2), e12.
- Smit, H., Cuijpers, P., Oostenbrink, J., Batelaan, N., de Graaf, R., & Beekman, A. (2006). Costs of nine common mental disorders: implications for curative and preventive psychiatry. *The journal of mental health policy and economics*, 9(4), 193-200.
- Smith, M. S., Lawrence, V., Sadler, E., & Easter, A. (2019). Barriers to accessing mental health services for women with perinatal mental illness: systematic review and meta-synthesis of qualitative studies in the UK. *BMJ open*, 9(1), e024803.
- Smout, M. F., Hayes, L., Atkins, P. W., Klausen, J., & Duguid, J. E. (2012). The empirically supported status of acceptance and commitment therapy: An update. *Clinical Psychologist*, 16(3), 97-109.
- Sniderman, A. D., Thanassoulis, G., Wilkins, J. T., Furberg, C. D., & Pencina, M. (2018). Sick individuals and sick populations by Geoffrey Rose: cardiovascular prevention updated. *Journal of the American Heart Association*, 7(19), e010049.
- Soh, H. L., Ho, R. C., Ho, C. S., & Tam, W. W. (2020). Efficacy of digital cognitive behavioural therapy for insomnia: a meta-analysis of randomised controlled trials. *Sleep Medicine*, 75, 315-325.
- Sorensen, G., Stoddard, A. M., LaMontagne, A. D., Emmons, K., Hunt, M. K., Youngstrom, R., McLellan, D., & Christiani, D. C. (2002). A comprehensive worksite cancer prevention intervention: behavior change results from a randomized controlled trial (United States). *Cancer Causes & Control*, 13(6), 493-502.
- Sparud-Lundin, C., Josefsson, U., Berg, M., Hellstrom, A.-L., Koinberg, I., Nolbris, M. J., Ranerup, A., & Skarsater, I. (2013). Use of participatory design in the development of person-centred web-based support for persons with long-term illness. *European Journal for Person Centered Healthcare*, 1(2), 369-380.
- Spek, V., Cuijpers, P., Nyklíček, I., Riper, H., Keyzer, J., & Pop, V. (2007). Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: a meta-analysis. *Psychological medicine*, 37(3), 319-328.
- Spencer, D., & Warfel, T. (2004). Card sorting: a definitive guide. *Boxes and arrows*, 2(2004), 1-23.
- Spijkerman, M., Pots, W. T. M., & Bohlmeijer, E. T. (2016). Effectiveness of online mindfulness-based interventions in improving mental health: A review and meta-analysis of randomised controlled trials. *Clinical psychology review*, 45, 102-114.
- Spijkerman, M., Rüter, M., Conijn, B., Kramer, J., Boon, B., & van der Poel, A. (2014). Zijn klachtgerichte mini-interventies voor slapen, stress en piekeren een aanwinst voor depressiepreventie? *Tijdschrift voor gezondheidswetenschappen*, 92(3), 111-118.
- Spinuzzi, C. (2005). The methodology of participatory design. *Technical communication*, 52(2), 163-174.



- St. John, P. D., Mackenzie, C., & Menec, V. (2015). Does life satisfaction predict five-year mortality in community-living older adults? *Aging & Mental Health, 19*(4), 363-370.
- Stanhope, J. (2016). Patient Health Questionnaire-4. *Occupational medicine, 66*(9), 760-761.
- Steadman, K., Wood, M., & Silvester, H. (2015). *Health and wellbeing at work: a survey of employees, 2014* (1910219762).
- Steel, Z., Marnane, C., Iranpour, C., Chey, T., Jackson, J. W., Patel, V., & Silove, D. (2014). The global prevalence of common mental disorders: a systematic review and meta-analysis 1980–2013. *International Journal of Epidemiology, 43*(2), 476-493.
- Steen, M., Manschot, M., & De Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design, 5*(2).
- Stein, D. J., Benjet, C., Gureje, O., Lund, C., Scott, K. M., Poznyak, V., & van Ommeren, M. (2019). Integrating mental health with other non-communicable diseases. *Bmj, 364*.
- Stephens, T. (1988). Physical activity and mental health in the United States and Canada: evidence from four population surveys. *Preventive medicine, 17*(1), 35-47.
- Step toe, A. (2019). Happiness and health. *Annual review of public health, 40*, 339-359.
- Stewart, A. L., & Brook, R. H. (1983). Effects of being overweight. *American journal of public health, 73*(2), 171-178.
- Stewart, S., Riecken, T., Scott, T., Tanaka, M., & Riecken, J. (2008). Expanding health literacy: Indigenous youth creating videos. *Journal of Health Psychology, 13*(2), 180-189.
- Stjernswärd, S., & Hansson, L. (2017). Outcome of a web-based mindfulness intervention for families living with mental illness—A feasibility study. *Informatics for Health and Social Care, 42*(1), 97-108.
- Storm, V., Dörenkämper, J., Reinwand, D. A., Wienert, J., De Vries, H., & Lippke, S. (2016). Effectiveness of a web-based computer-tailored multiple-lifestyle intervention for people interested in reducing their cardiovascular risk: a randomized controlled trial. *Journal of medical Internet research, 18*(4), e78.
- Stranges, S., Samaraweera, P. C., Taggart, F., Kandala, N.-B., & Stewart-Brown, S. (2014). Major health-related behaviours and mental well-being in the general population: the Health Survey for England. *BMJ open, 4*(9).
- Strecher, V., McClure, J., Alexander, G., Chakraborty, B., Nair, V., Konkell, J., Greene, S., Couper, M., Carlier, C., & Wiese, C. (2008). The role of engagement in a tailored web-based smoking cessation program: randomized controlled trial. *Journal of medical Internet research, 10*(5), e36.
- Strecher, V. J. (2008). The Internet: Just another smoking cessation tool?
- Stults-Kolehmainen, M. A., & Sinha, R. (2014). The effects of stress on physical activity and exercise. *Sports medicine, 44*(1), 81-121.
- Surtees, P., Wainwright, N., Luben, R., Wareham, N., Bingham, S., & Khaw, K.-T. (2008). Psychological distress, major depressive disorder, and risk of stroke. *Neurology, 70*(10), 788-794.
- Svanaes, D., & Seland, G. (2004). *Putting the users center stage: role playing and low-fi prototyping enable end users to design mobile systems* Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Vienna, Austria. <https://doi.org/10.1145/985692.985753>
- Swift, J. K., & Greenberg, R. P. (2012). Premature discontinuation in adult psychotherapy: a meta-analysis. *Journal of consulting and clinical psychology, 80*(4), 547.
- Szabó, K., Czeglédi, E., Babusa, B., Szumska, I., Túry, F., Sándor, I., & Bauer, S. (2015). The European Initiative ProYouth for the Promotion of Mental Health and the Prevention of Eating Disorders\* Screening Results in Hungary. *European Eating Disorders Review, 23*(2), 139-146.
- Szatkowski, L., & McNeill, A. (2015). Diverging trends in smoking behaviors according to mental health status. *Nicotine & Tobacco Research, 17*(3), 356-360.
- Tan, B. Y., Chew, N. W., Lee, G. K., Jing, M., Goh, Y., Yeo, L. L., Zhang, K., Chin, H.-K., Ahmad, A., & Khan, F. A. (2020). Psychological impact of the COVID-19 pandemic on health care workers in Singapore. *Annals of internal medicine, 173*(4), 317-320.

- Taylor, C. B., Sallis, J. F., & Needle, R. (1985). The relation of physical activity and exercise to mental health. *Public health reports*, 100(2), 195.
- Taylor, D., Bury, M., Campling, N., Carter, S., Garfied, S., Newbould, J., & Rennie, T. (2006). A Review of the use of the Health Belief Model (HBM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Trans-Theoretical Model (TTM) to study and predict health related behaviour change. London, UK: National Institute for Health and Clinical Excellence, 1-215.
- Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., & Stewart-Brown, S. (2007). The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health and quality of life outcomes*, 5(1), 1-13.
- Thabane, L., Ma, J., Chu, R., Cheng, J., Ismaila, A., Rios, L. P., Robson, R., Thabane, M., Giangregorio, L., & Goldsmith, C. H. (2010). A tutorial on pilot studies: the what, why and how. *BMC medical research methodology*, 10(1), 1-10.
- Thinyane, M., Bhat, K., Goldkind, L., & Cannanure, V. K. (2018). Critical participatory design: reflections on engagement and empowerment in a case of a community based organization. Proceedings of the 15th Participatory Design Conference: Full Papers-Volume 1,
- Thornicroft, G. (2008). Stigma and discrimination limit access to mental health care. *Epidemiology and Psychiatric Sciences*, 17(1), 14-19.
- Thornicroft, G., Rose, D., & Kassam, A. (2007). Discrimination in health care against people with mental illness. *International Review of Psychiatry*, 19(2), 113-122.
- Tickle-Degnen, L. (2013). Nuts and bolts of conducting feasibility studies. *American Journal of Occupational Therapy*, 67(2), 171-176.
- Titov, N., Andrews, G., Davies, M., McIntyre, K., Robinson, E., & Solley, K. (2010). Internet treatment for depression: a randomized controlled trial comparing clinician vs. technician assistance. *PloS one*, 5(6), e10939.
- Titov, N., Andrews, G., Schwencke, G., Robinson, E., Peters, L., & Spence, J. (2010). Randomized controlled trial of Internet cognitive behavioural treatment for social phobia with and without motivational enhancement strategies. *Australian & New Zealand Journal of Psychiatry*, 44(10), 938-945.
- Tollmar, K. (2001). *Towards CSCW design in the Scandinavian tradition*. Stockholm University.
- Torrance, H. (2012). Triangulation, respondent validation, and democratic participation in mixed methods research. *Journal of mixed methods research*, 6(2), 111-123.
- Tractinsky, N., Katz, A. S., & Ikar, D. (2000). What is beautiful is usable. *Interacting with computers*, 13(2), 127-145.
- Trautmann, S., Rehm, J., & Wittchen, H. U. (2016). The economic costs of mental disorders: Do our societies react appropriately to the burden of mental disorders? *EMBO reports*, 17(9), 1245-1249.
- Tregaskis, O., Daniels, K., Glover, L., Butler, P., & Meyer, M. (2013). High performance work practices and firm performance: A longitudinal case study. *British Journal of Management*, 24(2), 225-244.
- Trends, T. (2012). Elevate IT for digital business. Sydney, Australia: Deloitte Australia.
- Trigg, R. H. (2000). From Sandbox to "Fundbox": Weaving participatory design into the fabric of a busy non-profit. PDC,
- Trompetter, H. R., Bohlmeijer, E. T., Veehof, M. M., & Schreurs, K. M. (2015). Internet-based guided self-help intervention for chronic pain based on Acceptance and Commitment Therapy: a randomized controlled trial. *Journal of behavioral medicine*, 38(1), 66-80.
- Trudel-Fitzgerald, C., James, P., Kim, E. S., Zevon, E. S., Grodstein, F., & Kubzansky, L. D. (2019). Prospective associations of happiness and optimism with lifestyle over up to two decades. *Preventive medicine*, 126, 105754.

- Trudel-Fitzgerald, C., Millstein, R. A., von Hippel, C., Howe, C. J., Tomasso, L. P., Wagner, G. R., & VanderWeele, T. J. (2019). Psychological well-being as part of the public health debate? Insight into dimensions, interventions, and policy. *BMC public health*, *19*(1), 1-11.
- Tullis, T., & Wood, L. (2005). How can you do a card-sorting study with LOTS of cards. Poster presented at the Annual Meeting of the Usability Professionals Association, June,
- Twomey, C., O'Reilly, G., Byrne, M., Bury, M., White, A., Kissane, S., McMahon, A., & Clancy, N. (2014). A randomized controlled trial of the computerized CBT programme, MoodGYM, for public mental health service users waiting for interventions. *British Journal of Clinical Psychology*, *53*(4), 433-450.
- Twomey, C., & O'Reilly, G. (2016). Meta-analysis looks at effectiveness of MoodGYM programme in computerised cognitive behavioural therapy. *Bmj*, *354*.
- Tyndall, I., Waldeck, D., Pancani, L., Whelan, R., Roche, B., & Dawson, D. L. (2019). The Acceptance and Action Questionnaire-II (AAQ-II) as a measure of experiential avoidance: Concerns over discriminant validity. *Journal of Contextual Behavioral Science*, *12*, 278-284.
- Unadkat, S., & Farquhar, M. (2020). Doctors' wellbeing: self-care during the covid-19 pandemic. *Bmj*, *368*.
- Usher-Smith, J. A., Winther, L. R., Shefer, G. S., Silarova, B., Payne, R. A., & Griffin, S. J. (2017). Factors associated with engagement with a web-based lifestyle intervention following provision of coronary heart disease risk: mixed methods study. *Journal of medical Internet research*, *19*(10), e351.
- Valaitis, R., O'Mara, L., & Bezaire, S. (2007). Tailoring online health promotion: a toolkit for communities. *University School of Nursing: Produced by Huron County Health Unit and McMaster*.
- Valencia, P. D. (2019). Does the Acceptance and Action Questionnaire II Really Measure Experiential Avoidance? *Revista Evaluar*, *19*(3), 42-54.
- Van Ballegooijen, W., Cuijpers, P., Van Straten, A., Karyotaki, E., Andersson, G., Smit, J. H., & Riper, H. (2014). Adherence to Internet-based and face-to-face cognitive behavioural therapy for depression: a meta-analysis. *PLoS one*, *9*(7), e100674.
- van Bruinessen, I. R., van Weel-Baumgarten, E. M., Snippe, H. W., Gouw, H., Zijlstra, J. M., & van Dulmen, S. (2014). Active patient participation in the development of an online intervention. *JMIR Research Protocols*, *3*(4), e59.
- Van Cappellen, P., Rice, E. L., Catalino, L. I., & Fredrickson, B. L. (2018). Positive affective processes underlie positive health behaviour change. *Psychology & health*, *33*(1), 77-97.
- Van Den Berg, S., Shapiro, D., Bickerstaffe, D., & Cavanagh, K. (2004). Computerized cognitive-behaviour therapy for anxiety and depression: a practical solution to the shortage of trained therapists. *Journal of Psychiatric and Mental Health Nursing*, *11*(5), 508-513.
- van den Berk-Clark, C., Secrest, S., Walls, J., Hallberg, E., Lustman, P. J., Schneider, F. D., & Scherrer, J. F. (2018). Association between posttraumatic stress disorder and lack of exercise, poor diet, obesity, and co-occurring smoking: A systematic review and meta-analysis. *Health Psychology*, *37*(5), 407.
- van Gemert-Pijnen, J. E., Nijland, N., van Limburg, M., Ossebaard, H. C., Kelders, S. M., Eysenbach, G., & Seydel, E. R. (2011). A holistic framework to improve the uptake and impact of eHealth technologies. *Journal of medical Internet research*, *13*(4), e111.
- van Gemert-Pijnen, L., Kelders, S. M., Kip, H., & Sanderman, R. (2018). *eHealth research, theory and development: a multi-disciplinary approach*. Routledge.
- Van Kessel, G., Kavanagh, M., & Maher, C. (2016). A qualitative study to examine feasibility and design of an online social networking intervention to increase physical activity in teenage girls. *PLoS one*, *11*(3), e0150817.
- van Kuijk, J., van Driel, L., & van Eijk, D. (2015). Usability in product development practice; an exploratory case study comparing four markets. *Applied ergonomics*, *47*, 308-323.
- Van Teijlingen, E. R., & Hundley, V. (2001). The importance of pilot studies.

- Vandekerckhove, P., de Mul, M., Bramer, W. M., & de Bont, A. A. (2020). Generative Participatory Design Methodology to Develop Electronic Health Interventions: Systematic Literature Review. *Journal of medical Internet research*, 22(4), e13780.
- Vandelanotte, C., Spathonis, K. M., Eakin, E. G., & Owen, N. (2007). Website-delivered physical activity interventions: A review of the literature. *American journal of preventive medicine*, 33(1), 54-64.
- Vecchio, P. d., Fricks, L., & Johnson, J. R. (2000). Issues of daily living for persons with mental illness. *Psychiatric Rehabilitation Skills*, 4(3), 410-423.
- Velten, J., Lavallee, K. L., Scholten, S., Meyer, A. H., Zhang, X.-C., Schneider, S., & Margraf, J. (2014). Lifestyle choices and mental health: a representative population survey. *BMC psychology*, 2(1), 1-11.
- Vickers, K. S., Kircher, K. J., Smith, M. D., Petersen, L. R., & Rasmussen, N. H. (2007). Health behavior counseling in primary care: provider-reported rate and confidence. *FAMILY MEDICINE-KANSAS CITY-*, 39(10), 730.
- VITIELLO, M. V. (1997). Sleep, alcohol and alcohol abuse. *Addiction Biology*, 2(2), 151-158.
- Vogel, D. L., Wester, S. R., & Larson, L. M. (2007). Avoidance of counseling: Psychological factors that inhibit seeking help. *Journal of counseling & development*, 85(4), 410-422.
- Wadley, G., Lederman, R., Gleeson, J., & Alvarez-Jimenez, M. (2013). Participatory design of an online therapy for youth mental health. Proceedings of the 25th Australian Computer-Human Interaction Conference: Augmentation, Application, Innovation, Collaboration,
- WAG. (2009). *Our Healthy Future*. Retrieved 26.6.21 from <http://www.wales.nhs.uk/document/176451/info/>
- WAG. (2010). 'Thinking Positively: Emotional Health and Well-being in Schools and Early Years settings' (No: 089/2010). <https://gov.wales/sites/default/files/publications/2018-03/thinking-positively-emotional-health-and-well-being-in-schools-and-early-years-settings.pdf>
- WAG. (2011). 'the Health Social Care and Well-being Strategy' <https://gov.wales/sites/default/files/publications/2019-07/health-social-care-and-well-being-strategies-guidance-wales-2007-20007-no-18-guidance.pdf>
- WAG. (2012). *Together for Mental Health: Delivery Plan 2012-2016*. <https://www.wales.nhs.uk/document/202564>
- WAG. (2014). *Well-being statement for people who need care and support and carers who need support*. Retrieved 6.5.21 from <https://gov.wales/sites/default/files/publications/2019-05/well-being-statement-for-people-who-need-care-and-support-and-carers-who-need-support.pdf>
- WAG. (2016). 'Together for Mental Health' Delivery Plan: 2016-19 (WG29764 ). <https://gov.wales/sites/default/files/publications/2018-12/mental-health-delivery-plan-2016-to-2019.pdf>
- WAG. (2017). *Prosperity for All' : economic action plan* <https://gov.wales/sites/default/files/publications/2019-02/prosperity-for-all-economic-action-plan.pdf>
- WAG. (2019). *Sickness absence in the NHS in Wales, quarter ended 30 June 2019*. <https://gov.wales/sites/default/files/statistics-and-research/2019-11/sickness-absence-nhs-april-june-2019-439.pdf>
- Walker, E. R., McGee, R. E., & Druss, B. G. (2015). Mortality in mental disorders and global disease burden implications: a systematic review and meta-analysis. *JAMA psychiatry*, 72(4), 334-341.
- Walker, H. (2006). Computer-based education for patients with psychosis. *Nursing standard*, 20(30).
- Walker, M., Takayama, L., & Landay, J. A. (2002). High-fidelity or low-fidelity, paper or computer? Choosing attributes when testing web prototypes. Proceedings of the human factors and ergonomics society annual meeting,

- Waller, R., & Gilbody, S. (2009). Barriers to the uptake of computerized cognitive behavioural therapy: a systematic review of the quantitative and qualitative evidence. *Psychological medicine*, 39(5), 705.
- Wang, X., Zhang, D., & Wang, J. (2011). Dual-factor model of mental health: Surpass the traditional mental health model. *Psychology*, 2(08), 767.
- Wangberg, S. C., Bergmo, T. S., & Johnsen, J.-A. K. (2008). Adherence in Internet-based interventions. *Patient preference and adherence*, 2, 57.
- Wantland, D. J., Portillo, C. J., Holzemer, W. L., Slaughter, R., & McGhee, E. M. (2004). The effectiveness of Web-based vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes. *Journal of medical Internet research*, 6(4), e40.
- Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Health benefits of physical activity: the evidence. *Cmaj*, 174(6), 801-809.
- Ward, M. E., De Brún, A., Beirne, D., Conway, C., Cunningham, U., English, A., Fitzsimons, J., Furlong, E., Kane, Y., & Kelly, A. (2018). Using co-design to develop a collective leadership intervention for healthcare teams to improve safety culture. *International journal of environmental research and public health*, 15(6), 1182.
- Waterman, A. S. (2008). Reconsidering happiness: A eudaimonist's perspective. *The Journal of Positive Psychology*, 3(4), 234-252.
- Watson, H., Whyte, R., Schartau, E., & Jamieson, E. (2006). Survey of student nurses and midwives: smoking and alcohol use. *British Journal of Nursing*, 15(22), 1212-1216.
- Watts, S., Mackenzie, A., Thomas, C., Griskaitis, A., Mewton, L., Williams, A., & Andrews, G. (2013). CBT for depression: a pilot RCT comparing mobile phone vs. computer. *BMC psychiatry*, 13(1), 1-9.
- Webb, T., Joseph, J., Yardley, L., & Michie, S. (2010). Using the internet to promote health behavior change: a systematic review and meta-analysis of the impact of theoretical basis, use of behavior change techniques, and mode of delivery on efficacy. *Journal of medical Internet research*, 12(1), e1376.
- Weiss, L. A., Westerhof, G. J., & Bohlmeijer, E. T. (2016). Can we increase psychological well-being? The effects of interventions on psychological well-being: A meta-analysis of randomized controlled trials. *PLoS one*, 11(6), e0158092.
- Werbach, K., & Hunter, D. (2012). *For the win: How game thinking can revolutionize your business*. Wharton digital press.
- West, M., & Dawson, J. (2012). *Employee engagement and NHS performance*. King's Fund London.
- WGLA. (2014). *All-Wales Local Authority Sickness Absence Benchmarking Research Project Report on Findings*. <https://democratic.bridgend.gov.uk/documents/s9508/Appendix%20A%20-%20WGLA%20report.pdf>
- Wharton, C., Bradford, J., Jeffries, R., & Franzke, M. (1992). Applying cognitive walkthroughs to more complex user interfaces: Experiences, issues, and recommendations. Proceedings of the SIGCHI conference on Human factors in computing systems,
- White, R. G., & Van Der Boor, C. (2020). Impact of the COVID-19 pandemic and initial period of lockdown on the mental health and well-being of adults in the UK. *BJPsych open*, 6(5).
- Whitton, A. E., Proudfoot, J., Clarke, J., Birch, M.-R., Parker, G., Manicavasagar, V., & Hadzi-Pavlovic, D. (2015). Breaking open the black box: isolating the most potent features of a web and mobile phone-based intervention for depression, anxiety, and stress. *JMIR mental health*, 2(1), e3573.
- WHO. (2000). *Global Report on Trends in Prevalence of Tobacco Use 2000–2025*. <https://www.who.int/publications-detail/who-global-report-on-trends-in-prevalence-of-tobacco-use-2000-2025-third-edition>
- WHO. (2003). *The world health report 2003: shaping the future* (9241562439).

- WHO. (2009). *Global health risks: mortality and burden of disease attributable to selected major risks* (978 92 4 156387 1). [https://www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks\\_report\\_full.pdf](https://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf)
- WHO. (2010). *Global status report on noncommunicable diseases 2010* (ISBN 978 92 4 156422 9 ). [https://www.who.int/nmh/publications/ncd\\_report\\_full\\_en.pdf](https://www.who.int/nmh/publications/ncd_report_full_en.pdf)
- WHO. (2011). *Information sheet: Global recommendations on physical activity for health 18 - 64 years old.* . <https://www.who.int/dietphysicalactivity/physical-activity-recommendations-18-64years.pdf?ua=1>
- WHO. (2012). *Measurement of and target-setting for well-being: an initiative by the WHO Regional Office for Europe Second meeting of the expert group Paris, France, 25–26 June 2012.* . [https://www.euro.who.int/\\_data/assets/pdf\\_file/0003/180048/E96732.pdf](https://www.euro.who.int/_data/assets/pdf_file/0003/180048/E96732.pdf)
- WHO. (2013a). *Global action plan for the prevention and control of noncommunicable diseases 2013-2020.* (ISBN 978 92 4 150623 6. ). <https://www.who.int/publications/i/item/9789241506236>
- WHO. (2013b). *Mental Health Action Plan (2013-2020)* <https://www.who.int/publications/i/item/9789241506021>
- WHO. (2014). *Global Status Report on Alcohol and Health 2014.* [http://apps.who.int/iris/bitstream/10665/112736/1/9789240692763\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/112736/1/9789240692763_eng.pdf?ua=1)
- WHO. (2016). *Sustainable Development Agenda. Target 3.5* [https://www.who.int/substance\\_abuse/activities/gad/en/](https://www.who.int/substance_abuse/activities/gad/en/)
- WHO. (2018a). *Fact sheet Healthy Diet.* Retrieved 22.6.21 from <https://www.who.int/en/news-room/fact-sheets/detail/healthy-diet>
- WHO. (2018b). *Global Health Estimates 2018: Life expectancy, 2000–2016.* Geneva: World Health Organization; 2018. WHO. Retrieved 4.5.21 from [https://www.who.int/gho/mortality\\_burden\\_disease/life\\_tables/en](https://www.who.int/gho/mortality_burden_disease/life_tables/en)
- WHO. (2018c). *Global Status Report on Alcohol and Health 2018.* <https://www.who.int/publications-detail/global-status-report-on-alcohol-and-health-2018>
- WHO. (2018d). *Mental health: strengthening our response.* <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>
- WHO. (2018e). *Tobacco and Oral Health Fact Sheet 2018.* [http://www.euro.who.int/\\_data/assets/pdf\\_file/0005/369653/Fact-Sheet-on-Tobacco-and-Oral-Health-2018-eng.pdf?ua=1](http://www.euro.who.int/_data/assets/pdf_file/0005/369653/Fact-Sheet-on-Tobacco-and-Oral-Health-2018-eng.pdf?ua=1)
- WHO. (2019a). *e-Library of Evidence for Nutrition Actions (eLENA)* [https://www.who.int/elena/titles/fruit\\_vegetables\\_ncds/en/](https://www.who.int/elena/titles/fruit_vegetables_ncds/en/)
- WHO. (2019b). *Novel Coronavirus (2019-nCoV): situation report, 10.* <https://apps.who.int/iris/handle/10665/330775>
- WHO. (2019c). *Tobacco Fact Sheet.* Retrieved 4.5.21 from <https://www.who.int/news-room/fact-sheets/detail/tobacco>
- WHO. (2020a). *Chronic diseases and health promotion.* Retrieved 22.6.21 from [https://www.who.int/health-topics/noncommunicable-diseases#tab=tab\\_1](https://www.who.int/health-topics/noncommunicable-diseases#tab=tab_1)
- WHO. (2020b). *Chronic diseases and health promotion.* Retrieved 1.5.21 from [https://www.who.int/chp/about/integrated\\_cd/en/](https://www.who.int/chp/about/integrated_cd/en/)
- WHO. (2020c). *Physical Activity Fact Sheet.* Retrieved 20.11.2020 from <https://www.who.int/news-room/fact-sheets/detail/physical-activity>
- WHO. (2020d). *Self care during COVID-19.* Retrieved 30.6.21 from <https://www.who.int/news-room/photo-story/photo-story-detail/self-care-during-covid-19>
- WHO. (2020e). *World Health Statistics 2020.* Retrieved 22.6.21 from <https://www.who.int/data/gho/publications/world-health-statistics>
- WHO. (2021). *Factsheet 2018 Obesity and Overweight.* . Retrieved 22.6.21 from <https://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight>

- Wicksell, R., Kemani, M., Jensen, K., Kosek, E., Kadetoff, D., Sorjonen, K., Ingvar, M., & Olsson, G. (2013). Acceptance and commitment therapy for fibromyalgia: a randomized controlled trial. *European journal of pain, 17*(4), 599-611.
- Wiest, M., Schüz, B., Webster, N., & Wurm, S. (2011). Subjective well-being and mortality revisited: Differential effects of cognitive and emotional facets of well-being on mortality. *Health Psychology, 30*(6), 728.
- Wilkinson, C. R., & De Angeli, A. (2014). Applying user centred and participatory design approaches to commercial product development. *Design Studies, 35*(6), 614-631.
- Williams, M. E., Latta, J., & Conversano, P. (2008). Eliminating the wait for mental health services. *The journal of behavioral health services & research, 35*(1), 107-114.
- Williams, V., Brown, N., Becks, A., Pekmezi, D., & Demark-Wahnefried, W. (2020). Narrative Review of Web-based Healthy Lifestyle Interventions for Cancer Survivors. *Annals of reviews and research, 5*(4).
- Wills, C. E., & Holmes-Rovner, M. (2006). Integrating decision making and mental health interventions research: research directions. *Clinical Psychology: Science and Practice, 13*(1), 9-25.
- Wilson, K., Senay, I., Durantini, M., Sánchez, F., Hennessy, M., Spring, B., & Albarracín, D. (2015). When it comes to lifestyle recommendations, more is sometimes less: a meta-analysis of theoretical assumptions underlying the effectiveness of interventions promoting multiple behavior domain change. *Psychological bulletin, 141*(2), 474.
- WOD. (2017). *Workforce & Organisational Development Committee report 2017*. <http://www.wales.nhs.uk/sitesplus/documents/863/9.%20Staff%20Experience%20Strategy.pdf>
- Wolgast, M. (2014). What does the Acceptance and Action Questionnaire (AAQ-II) really measure? *Behavior therapy, 45*(6), 831-839.
- Wood, A. M., Kaptoge, S., Butterworth, A. S., Willeit, P., Warnakula, S., Bolton, T., Paige, E., Paul, D. S., Sweeting, M., & Burgess, S. (2018). Risk thresholds for alcohol consumption: combined analysis of individual-participant data for 599 912 current drinkers in 83 prospective studies. *The lancet, 391*(10129), 1513-1523.
- Wood, J. R., & Wood, L. E. (2008). Card sorting: current practices and beyond. *Journal of Usability Studies, 4*(1), 1-6.
- Woodford, J., Wikman, A., Cernvall, M., Ljungman, G., Romppala, A., Grönqvist, H., & von Essen, L. (2018). Study protocol for a feasibility study of an internet-administered, guided, CBT-based, self-help intervention (ENGAGE) for parents of children previously treated for cancer. *BMJ open, 8*(6).
- Woodworth, R. J., O'Brien-Malone, A., Diamond, M. R., & Schüz, B. (2017). Web-based positive psychology interventions: A reexamination of effectiveness. *Journal of clinical psychology, 73*(3), 218-232.
- Wörfel, F., Gusy, B., Lohmann, K., Töpitz, K., & Kleiber, D. (2016). Mental health problems among university students and the impact of structural conditions. *Journal of Public Health, 24*(2), 125-133.
- Xu, J., & Roberts, R. E. (2010). The power of positive emotions: It's a matter of life or death—Subjective well-being and longevity over 28 years in a general population. *Health Psychology, 29*(1), 9.
- Yadollahi, A., Shahraki, A. G., & Zaiane, O. R. (2017). Current state of text sentiment analysis from opinion to emotion mining. *ACM Computing Surveys (CSUR), 50*(2), 1-33.
- Yardley, L., Spring, B. J., Riper, H., Morrison, L. G., Crane, D. H., Curtis, K., Merchant, G. C., Naughton, F., & Blandford, A. (2016). Understanding and promoting effective engagement with digital behavior change interventions. *American journal of preventive medicine, 51*(5), 833-842.
- Yildirim, Y., Kilic, S. P., & Akyol, A. D. (2013). Relationship between life satisfaction and quality of life in Turkish nursing school students. *Nursing & health sciences, 15*(4), 415-422.

- Yuan, Q., Liu, S., Tang, S., & Zhang, D. (2014). Happy@ Work: protocol for a web-based randomized controlled trial to improve mental well-being among an Asian working population. *BMC public health, 14*(1), 1-9.
- Zeldman, J. (2001). Taking your talent to the web. *A Guide for the Transitioning Designer. Indianapolis, Indiana: New Riders.*
- Zhang, C.-Q., Leeming, E., Smith, P., Chung, P.-K., Hagger, M. S., & Hayes, S. C. (2018). Acceptance and commitment therapy for health behavior change: a contextually-driven approach. *Frontiers in psychology, 8*, 2350.
- Zhang, H., Jiang, Y., Nguyen, H. D., Poo, D. C. C., & Wang, W. (2017). The effect of a smartphone-based coronary heart disease prevention (SBCHDP) programme on awareness and knowledge of CHD, stress, and cardiac-related lifestyle behaviours among the working population in Singapore: a pilot randomised controlled trial. *Health and quality of life outcomes, 15*(1), 1-13.
- Zhang, P., & Von Dran, G. M. (2000). Satisfiers and dissatisfiers: A two-factor model for website design and evaluation. *Journal of the American society for information science, 51*(14), 1253-1268.
- Zhao, M., Adib, F., & Katabi, D. (2016). Emotion recognition using wireless signals. Proceedings of the 22nd Annual International Conference on Mobile Computing and Networking,
- Zhu, D., Norman, I., & While, A. (2011). The relationship between doctors' and nurses' own weight status and their weight management practices: a systematic review. *Obesity reviews, 12*(6), 459-469.
- Zhu, D., Norman, I., & While, A. (2011). The relationship between health professionals' weight status and attitudes towards weight management: a systematic review. *Obesity reviews, 12*(5), e324-e337.

## Appendix

### Appendix 1: MEDLINE Search strategy (EBSCO interface) (SR1)

Search date, database inception to March 17<sup>th</sup>

<b>Key</b>
<i>S1 = search number</i>
<i>MH=Mesh headings</i>
<i>TI= Title</i>
<i>AB= Abstract</i>
<i>N2= near within two words</i>
<i>PT= proximity search</i>

S1 (MH "Internet") OR (MH "Computer-Assisted Instruction")

S2 TI (internet OR online OR smart-phone\* OR "mobile phone\*" OR ipad\* OR web-based OR web-delivered OR web OR computer\*) OR AB (internet OR online OR smart-phone\* OR "mobile phone\*" OR ipad\* OR web-based OR web-delivered OR web OR computer\*)

S3 S1 OR S2



S4 (MH "Cognitive Therapy") OR (MH "Behaviour Therapy")

S5 TI (therap\* OR treatment\* OR intervention\* OR CBT OR iCBT OR CCBT OR ACT OR Mindfulness OR programme OR coach) OR AB ( therap\* OR treatment\* OR intervention\* OR CBT OR iCBT OR CCBT OR ACT OR Mindfulness OR programme OR coach )

S6 S4 OR S5

S7 S3 AND S6

S8 TI (e-therap\* OR etherap\* OR e-treatment\* OR cyber-therapy OR cybertherapy OR e-Health OR eHealth OR e-Interventions OR e-mental health) OR AB (e-therap\* OR etherap\* OR e-treatment\* OR cyber-therapy OR cybertherapy OR e-Health OR eHealth OR e-Interventions OR e-mental health) OR (MH "Therapy, Computer Assisted")

S9 S7 OR S8

S10 (MH "Anxiety") OR (MH "Anxiety Disorders") OR (MH "Mood Disorders") OR (MH "Depressive Disorder") OR (MH "Stress, Psychological")

S11 TI (stress OR burnout OR anxiety OR depression OR well-being OR well-being OR mental health OR self-help OR behavio\*) OR AB (stress OR Burnout OR anxiety OR depression OR well-being OR well-being OR mental health OR self-help OR behavio\*)

S12 S10 OR S11

S13 S9 AND S12

S14 AB (minim\* OR prevent\* OR lessen\* OR decreas\* OR reduc\*) N2 (attrition OR dropout\* OR drop\*-out\* OR disengag\* OR non-complet\*) OR (promot\* OR foster\* OR encourag\* OR motivat\* OR incentiv\* OR enhanc\* OR improv\* OR increas\* OR maxim\*) N2 (complet\* OR adheren\* OR involvement OR usage OR engagement OR retention OR persist\* OR Compliance) OR TI (minim\* OR prevent\* OR lessen\* OR decreas\* OR reduc\*) N2 (attrition OR dropout\* OR drop\*-out\* OR disengag\* OR non-complet\*) OR ( promot\* OR foster\* OR enhanc\* OR encourag\* OR motivat\* OR incentiv\* OR improv\* OR increas\* OR maxim\*) N2 (complet\* OR adheren\* OR involvement OR usage OR engagement OR retention OR persist\* OR compliance) OR TI (drop\*-out\* OR dropout\* OR non-complet\* OR uncomplet\* OR engaging OR engagement OR retention OR attrition OR maintain\* OR maintenance OR completion rate\* OR completing OR usage OR adheren\* OR persist\* OR disengagement ) OR AB (drop\*-out\* OR dropout\* OR non-complet\* OR uncomplet\* OR engaging OR engagement OR retention OR attrition OR maintain\* OR maintenance OR completion rate\* OR completing OR usage OR adheren\* OR persist\* OR disengagement )

S15 S13 AND S14

S16 PT randomized controlled trial OR PT controlled clinical trial

S17 TI (groups OR trial OR randomized OR randomly) OR AB (groups OR trial OR randomized OR randomly)

S18 S16 OR S17

S19 S15 AND S18

S19 S15 AND S18 Limiters – all adult

**Search limits:**

- Involved human adult subjects aged 18 years plus.

## Appendix 2: Data extraction (SR1)

- *Identification*: study ID, review author ID, citation.
- *Eligibility*: confirm reason for inclusion.
- *Study characteristics*: design, duration, method of randomisation, allocation sequence concealment, blinding, other concerns over bias, outcome measures.
- *Participant characteristics*: number of study participants, recruitment setting, use of diagnostic interview, total number randomised to intervention, sample size, gender, and age.
- *Intervention characteristics*: intervention name, number of trial arms, primary condition, therapeutic approach, intended duration (weeks), modules to be completed, automated or guided delivery, format of delivery.
- *Interactive elements of intervention*: automated email reminders, interactive quizzes, social networking (community forum), homework, or diary tasks.
- *Gamification features*: a record of the feature(s) used in the intervention design.
- *Adherence*: to study protocol, completion rate, and term used to refer to adherence.
- *Miscellaneous*: Key conclusions of study authors, comments by reviewers, adverse effects, other information.

## **Background**

Positive mental health and well-being are of increasing interest globally (The World Health Organisation WHO; European pact for mental health and well-being 2008) and have fast become a priority issue on the UK public health agenda (ref policy docs for Wales and UK) and elsewhere (ref).

Poor mental health is associated with an increased risk for the development of a range of physical health conditions (refs). Common mental disorders including depression and anxiety are also commonly associated with the adoption of poor lifestyle behaviours including: smoking; increased alcohol consumption (above recommended limits); limited physical exercise and obesity. As a result, poor mental health and well-being carry a heavy burden in terms of individual human suffering and high financial cost to society, spread across many organisations: Health services; Education; Social care agencies; and commercial employers through absenteeism and lost productivity (WHO 2001; Kapp 2003). The economic cost of depression is estimated to be £9 billion per year in the UK alone (Thomas and Morris 2003).

Effective treatments and resources which support individuals to improve their mental health and well-being or to adopt and maintain a healthy lifestyle are of interest to government agencies, health services and commercial enterprises interested in health promotion. Not to mention individuals in need of support. Public health and public policy agendas (health promotion campaigns) are increasingly encouraging and slowly shifting responsibility for psychological health, well-being and lifestyle behaviours across to the feet of individual citizens. One way in which this guided shift, towards personal responsibility, is being aided is through commercial and technological advancement including increased availability and affordability of resources which aid healthy lifestyle choices (Neuhauser and eeps 2003). Web-based resources and mobile applications are being increasingly accessed and utilised for health information (Escoffery, Miner, Adame, Butler, McCormick, Mendell 2010); Health promotion (ref); and treatment, well known and well established treatment programmes for CMDs include: MoodGYM, Fear Fighter and Beating the Blues, all of which employ Cognitive Behaviour Therapy to address distorted/unhelpful patterns of thinking. Thus, the search for effective and valued treatments and interventions is of critical value.

Acceptance and commitment therapy (ACT) has enjoyed a steady rise in interest as a therapeutic intervention for the treatment of a wide range of conditions; psychiatric disorders; common mental disorders; well-being and lifestyle behaviours. Evidenced by the growing number of randomised control trials; review studies; and meta-analysis which have been published alongside the high regard and support expressed for this approach from psychological associations which have promoted and endorsed its effectiveness and reach (Association for Contextual Behavioural Science).

ACT is considered a third wave Cognitive Behaviour Therapy, philosophically rooted in Functional Contextualism and Relational Frame Theory (Hayes 1993; Ruiz 2012). ACT differs from traditional CBT in a number of ways, most notably in that it does not consider thoughts and

beliefs as correct or incorrect. ACT is based on the principles of self-acceptance and a commitment to one's personal values and encourages the adoption of behaviours which are in agreement with those personal values. The underlying principle and outcome is to encourage individuals towards, 1. Acceptance of difficult and unwelcome thoughts or emotions and, 2. Promotion and simultaneous adoption of actions and behaviours into daily practice, which are in line with these individual core values and principal beliefs. The way in which this shift towards behaviours in line with core values is advocated is through consideration and implementation of six inter-related core processes designed to increase and enable psychological flexibility; cognitive defusion; acceptance; contact with the present moment; self as context; values; and committed action. Techniques which are aligned with the promotion of psychological flexibility are incorporated in the delivery of ACT. Improvements or alterations of negative thought processes or emotions are seen as a by-product of increased psychological flexibility, not as the sole and intentional goal of the therapy.

A number of important reviews and meta-analysis studies have been conducted which have provided support for its effectiveness. Most notably Ost (2014) conducted an update of an earlier (Ost 2008) systematic review and meta-analysis. The thorough and detailed review reported, amongst other findings, that the pooled effect size in 2014 had seen a reduction since 2008 (from 0.42 to 0.68). Ost concluded that "ACT is not yet well established for any disorder" (page 14). However, went on to state support for ACT in the treatment of chronic pain and tinnitus with additional possible efficacy for depression, psychotic symptoms, drug abuse and stress at work. Ending on a positive note, future studies were considered likely to evaluate ACT as, an evidence based treatment. Prior to this, Ruiz (2012) compared the effectiveness of ACT versus traditional cognitive behaviour therapy interventions (CBT) and reported a significant mean effect size in support of ACT, over and above CBT, while suggesting a trend towards ACT for depression and quality of life but not anxiety. Sharp (2012) reviewed ACT in the context of anxiety and reported that the research base, while small, suggested ACT to be an appropriate model which effectively provided treatment for a range of anxiety disorders. Powers (2009) reported a "clear effect and overall advantage of ACT compared to control conditions" (page 1) however found no evidence to suggest it was more effective than established treatments. Others have reported the effectiveness of ACT, across a range of conditions including OCD; chronic pain; anxiety disorders (Smout 2012); and smoking cessation (Gifford, Kohlebnberg, hayes etal 2004). Thus, support for its effectiveness has been reported from a range of sources.

These prior reviews provide valuable evaluation of ACT and its effectiveness as a therapeutic approach. The current review aims to add to this evidence base and provide additional understanding of the effectiveness of ACT through the systematic review and meta-analysis of ACT interventions designed to treat CMD's and well-being via a web-based delivery format. No previous review has focused exclusively on ACT as implemented via a web-based delivery format. Although Ost included in his updated review three studies which implemented ACT via this deliver format. A review of the Association for Contextual Behavioural Sciences website ([contextualscience.org](http://contextualscience.org)) identified a list of nine computerised versions of ACT since 2013 and thus a review which focused solely on this application of ACT was considered important as healthcare delivery continues to expand and utilise technology in new and unprecedented ways.

The recent and continued explosion of web-based health interventions, spanning diverse conditions across mental and physical health arenas and well-being and expanding into the realm of lifestyle behaviour change, has given rise to this additional review of ACT. Prior reviews have focused on face-to-face delivery format of ACT and considering the move towards digital health

innovations and applications it was deemed important to consider the evidence base in the emerging field.

### **Aim**

Thus, the aim of the current review is to examine the published, peer reviewed evidence pertaining to the effectiveness of Acceptance and Commitment Therapy in the treatment of common mental disorders and well-being in a web-based delivery format.

Specific objectives include:

1. To identify peer reviewed randomised control trials (RCTs) of web-based interventions which have employed ACT, as the main therapeutic approach, for the treatment of a CMD or for the improvement of well-being.
2. To review the evidence on the effectiveness of such studies (review effect size).
3. To identify reported rates of adherence to the treatment programmes.

### **Method**

#### **PICO**

##### **Participant:**

Participants who have been referred to or have self-referred into a web-based RCT designed to improve one or more common mental health disorder (CMD) or well-being.

##### **Intervention**

Web-based delivery of ACT.

##### **Comparator or control**

WLC, TAU, Placebo, CBT or any other active intervention arm.

##### **Outcome**

Measure of effectiveness (and effect size) of the intervention on an appropriate T1 to T2 assessment outcome measure for a CMD.

##### **Inclusion criteria**

1. Published in a peer reviewed, English language journal.
2. RCTs design (random allocation of participants into either intervention and control; or intervention and active treatment arm).
3. The study is web-based (online).
4. The intervention is designed to be accessed on more than one occasion.
5. The intervention is designed to treat common mental disorders and improve well-being.
6. The study must report a measure of effectiveness of the intervention (i.e., pre and post outcome measure) and an effect size.

##### **Exclusion criteria**

1. The intervention is not web-based i.e., exclude if the intervention is delivered via paper; face-to-face; CD-ROM or other non web-based methods of delivery.
2. Participants are under the age of 18.
3. Re-analysis of data from a subsample of a previously published RCT.

## **Search methods**

### Electronic searches

In order to identify relevant studies for review, a systemic search of two electronic databases will be conducted: Medline complete (EBSCO interface); PsychINFO (EBSCO interface). Search dates between (database inception) and February 10<sup>th</sup> 2016.

In addition, the list of RCTs published on the website of the Association of Contextual Behavioural Science by May 2013 will be reviewed. Reference lists of identified studies will be examined for additional articles.

### **Search terms**

The following search terms will be used to identify studies meeting inclusion criteria. Standardised subject terms will be utilised in each electronic database. Search strategies will be customised for each database to allow for the different subject headings and index terms to be utilised. Database thesauri will be explored to identify and include 'exploded' terms in the search to ensure all relevant articles are retrieved. A wide range of free text terms will be included to broaden the search as much as possible while maintaining appropriate sensitivity to search aims.

### **Search strategy:**

See MEDLINE Strategy (EBSCO interface)-appendix 1

See key word search table - appendix 2

## **Data collection and analysis**

Identified studies will be exported electronically into EndNote x7 electronic and hand searching of duplicate records will be performed, through examination of title and author names. Duplicate records will be removed. References will be exported electronically to Excel. Each article will be assigned a unique identification number. Two copies of this spread sheet will be made.

## **Review process**

Two reviewers (MB, AJ) will independently review each title and abstract. Each reviewer will record a decision: include/exclude. Once all articles have been reviewed by the two reviewers their decisions will be saved in one central spreadsheet for comparison. Articles will be included for full text review where one reviewer is not absolutely sure that it should be excluded.

Measures of agreement will be calculated and recorded.

- Kappa statistic

(fair agreement is considered 0.4 - 0.59; good agreement 0.6 - 0.74; and good agreement >0.75 Orwin 1994 page 155 Cochrane). Reasons for disagreement need to be explored and criteria redefined if necessary.

### **Stage two review: Full text review**

Two reviewers will independently examine the full text article of all studies included following stage one review (MB and AJ) The reviewers will record a decision in the spreadsheet and identify a reason why the paper is excluded at this stage (inclusion criteria will inform this). Where a decision is not clear the full text article will be discussed in order to reach a final decision.

Studies identified will be assessed for inclusion against the eligibility criteria outlined above. Studies will be assessed in order of these criteria and excluded when they do not meet a single criterion. The first instance where they do not meet eligibility will be recorded as the reason for exclusion and the study will not be assessed for other inclusion criteria in this instance (page 154 Cochrane recommendations).

### **Data extraction**

See data extraction spread sheet-

- Study ID
- Citation reference (authors, title and date).
- *RCT characteristics* (RCT design (including cluster/cross-over etc), trial arms, comparator, method of randomisation, allocation sequence concealment, blinding, Total number of intervention groups, Sample size.
- *Participant characteristics*: Total number, setting, diagnostic criteria, age, gender, country, co-morbidity.
- *Intervention characteristics*: guided, automated, activities undertaken, specific intervention, details (name of the intervention, self-selected or referred to programme therapy used, intended duration, frequency, modular and sequential or freely accessed). Must collect data on contents of intervention, who delivered it and what was used? E.g., theoretical underpinning. Condition intervention targeting e.g depression or PTSD etc.
- *Effectiveness of intervention*: primary outcome measure.
- *Risk of bias*; Cochrane score.

The data extraction form will be piloted with a number of included studies and altered if required to ensure consistency and accuracy.

### **Assessment of risk and bias in included studies**

All articles identified for inclusion in the review will be assessed for risk and bias. The Cochrane collaboration tool for assessing risk of bias will be used to determine a level of bias for each study through conducting a domain-based evaluation. The tool enables assessment of bias score at three levels to be determined: low; high and undetermined level of bias.

The risk of bias allows an estimate of effect to be made.



The risk assessment form will be piloted with a number of included studies and altered if required to ensure consistency and accuracy- Cochrane recommend 3-6 articles (1-2 at each level: low; moderate; high).

## Data analysis plan

Data will be

1. Entered into SPSS v22 and Review Manager 5.3.
2. Cleaned and checked for missing values and errors.
3. Screened for outliers (Ost 2014 defined as  $M \pm 2SD$ ).
4. Use Winsorising so that outliers data don't have to be excluded from the pooled ES. Conduct before making combined ES.
5. Correct for small sample sizes using: Hedges g.
6. Perform descriptive statistics / frequencies on included studies.
7. Calculate the effect size
  - a. Separately for post and follow up data (if its available).
  - b. For each study the primary outcome measure will be used.
  - c. Combine post and follow up ES to make an average ES for each study.
  - d. Apply Cohens 'rule of thumb' classification for ES: 0.20-0.49 is considered small; 0.50-0.79 moderate and  $>0.80$  is large.
  - e. Calculate a pooled mean ES (ES of all studies combined to make a mean score).
  - f. Use random effects model as cannot assume ES will come from the same population as a range of conditions will be included.
  - g. Assess hetrogenity of ES using Q-statistic and I-square statistic
8. Meta analysis of effect sizes...

## Results

Produce a **Methodology description**: written descriptive summary of the overall characteristics of included RCTs

- a. Designs of trials (table showing how many compared against what and how many arms etc) how many intervention arms did studies have; what was the comparator?
- b. Lack of statistical power (if appropriate).
- c. Diagnosis of participants.
- d. Number of therapists.
- e. Adherence ratings.
- f. What Condition was the intervention designed to treat.
- g. Self-referred or clinician referred.
- h. Primary outcome measure used.
- i. Use data presented in the study: this may be ITT or completer data.
- j. Duration.
- k. Usage data.

Produce a written descriptive summary of main characteristics of ACT interventions

- l. What did the interventions do?
- m. How many typical characteristics of ACT methodology did they employ?
- n. What did they have in common/ where did they differ?
- o.

Present the Risk of bias score -Cochrane method

Present Meta-analysis results

### **Discussion**

1. Present Meta-analysis results:
  - a. Report ES at post treatment as overall.
  - b. ES for each type of RCT design (placebo/TAU/ WLC/ active treatments).
  - c. Follow up ES.
2. Discuss evidence base of ACT:
  - a. Overall.
  - b. By conditions (CMD/Well-being/lifestyle).
  - c. Summary.
3. Limitations of review.
4. Implications for practice.
5. Further research.
6. Conclusion.

## Appendix 4: MEDLINE Search strategy (SR2)

### Key:

AB	Abstract
TI	Title
MH	Mesh headings
PT	Publication Type
N2	near, within two words.

### Search strategy:

S1 (MH "Internet") OR (MH "Computer-Assisted Instruction")

S2 TI (internet OR online OR web-based OR web-delivered OR web OR computer\* OR OR e-therap\* OR etherap\* OR e-treatment\* OR cyber-therapy OR cybertherapy OR e-Interventions OR e-mental health OR e-health) OR AB (internet OR online OR web-based OR web-delivered OR web OR computer\* OR OR e-therap\* OR etherap\* OR e-treatment\* OR cyber-therapy OR cybertherapy OR e-Interventions OR e-mental health OR e-health)

S3 S1 OR S2

S4 (MH "Acceptance and Commitment Therapy")

S5 TX (acceptance N2 commitment N2 (therap\* OR treatment\* OR training OR intervention\* OR program\*))

S6 (S4 OR S5)

S7 (S3 AND S6)

S8 (MH "Anxiety") OR (MH "Anxiety Disorders") OR (MH "Mood Disorders") OR (MH "Depressive Disorder") OR (MH "Stress, Psychological")

S9 TI ( stress OR burnout OR anxiety OR depression OR well-being OR well-being OR mental health OR self-help OR GAD OR generalised anxiety disorder OR obsessive-compulsive disorder OR OCD OR post-traumatic stress disorder OR PTSD OR social anxiety disorder OR Mood disorders) OR AB (stress OR burnout OR anxiety OR depression OR well-being OR well-being OR mental health OR self-help OR GAD OR generalised anxiety disorder OR obsessive-compulsive disorder OR OCD OR post-traumatic stress disorder OR PTSD OR social anxiety disorder OR Mood disorders)

S10 (S8 OR S9)

S11 (S7 AND S10)

S12 PT randomized controlled trial OR PT controlled clinical trial

S13 TI (groups OR trial OR randomized OR randomly) OR AB (groups OR trial OR randomized OR randomly)

S14 (S12 OR S13)

S15 (S11 AND S14)

No Limits =

Limit = Eng Lang. =45

## Appendix 5: Data extraction (SR2)

- Citation reference (authors, title and date, country).
- RCT characteristics: RCT design, total number of trial arms, type of comparator/control, method of randomisation, allocation sequence concealment, blinding, and sample size and total number allocated to each trial arm.
- Participant characteristics: setting (recruited from), condition, co-morbidity, diagnostic criteria, age, gender, self-referred or clinician referred.
- Intervention characteristics: name of ACT intervention, specific elements of ACT included, guided / automated delivery, type of guide, type of communication with guide, additional support, intended duration and modules included, format of delivery (sequential or free navigation), features of the system (reminders, personalisation).
- Effectiveness of intervention: primary and secondary outcome measures; effect size at post assessment and follow up where available.
- Adherence: calculated as a percentage of those randomised to the intervention and completed post assessment.

## Appendix 6: Design questionnaire

You will be shown a number of different designs for the website, each for 7 seconds. Once you have had a look please complete the corresponding questions below.

For each question please indicate a response from 1-5 for each question.

HOME PAGE DESIGN					
	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the layout?					
Do you like the colour scheme?					
Does it look like a website you would want to use again?					

LOGIN / REGISTRATION					
	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the layout?					
Do you like the colour scheme?					
Would it put you off registering?					

WELL-BEING HOME PAGE					
	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the layout?					
Do you like the colour scheme?					
Do the resources look helpful?					

DASHBOARD					
	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the layout?					
Do you like the colour scheme?					

Does it make sense?




### NATURE PAGE

	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the layout?					
Does it look like a resource you would find useful?					

### SLEEP PAGE

	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the layout?					
Does it look like a resource you would find useful?					

### RELAXATION PAGE

	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the layout?					
Does it look like a resource you would find useful?					

### LOGOS

	1 very good	2 good	3 neutral	4 poor	5 very poor
Do you like it?					
Is it appropriate for a health and well-being website?					
Do you like the colour scheme?					

You will now be shown a second version of the logos

Please circle the logo design you preferred

Version 1

Version 2

Any comments on any of the designs you have been shown today?

**Do you have any ideas or suggestions for resources that you might find helpful in the context of an online well-being module?**

**What does well-being mean to you?**

**Thank you**



## You are invited to take part in the 'Champions for Health' Well-being Challenge 2019!

Are you looking to boost your health and well-being this year? Do you need some help sticking to those new year resolutions? Want to feel healthier and have positive well-being? If so register [here](#) to take part in the staff health and well-being challenge 2019. Researchers at Swansea University in collaboration with Public Health Wales have added a NEW 12 week well-being plan to the Champions programme

You are offered **12 weeks free access** all you need to do is [visit the website](#) and **register** for an account

Copy and paste this address into your browser or click on the link

<https://champions-for-health.swansea.ac.uk/>



What is Champions for Health?

'Champions for Health' is an online health promotion programme developed by Public Health Wales. Choose from 5 health challenges;

1. Get active
2. Eat well
3. Weight optimisation
4. Alcohol reduction
5. Quit smoking

**Earn points and trophies and track your progress!**

### What is NEW?

A new 12-week emotional well-being plan has been added to the website to help staff boost their well-being alongside their physical health. This plan has been designed with experts and in collaboration with ABMU staff to ensure it is reflective of staff need. Choose from:

1. Quick fire stress busting and Relaxation tips
2. A 12 week plan to with 6 techniques to try
3. Mental health films produced by PocketMedic

4. Green space ideas
5. Sleep support

**If you want to take part visit the [website](#) today and register** or if you would like more information please email Mrs Menna Brown [\[REDACTED\]](#) or Dr Ann John [A \[REDACTED\]](#)

Best wishes

Menna Brown

---

Lecturer

Swansea University Medical School (SUMS)

PHD student, Population, Psychiatry, Suicide and Informatics

email: [\[REDACTED\]](#)

**CHAMPIONS FOR HEALTH STAFF CHALLENGE 2019**

**REGISTER ONLINE TODAY**

**<https://champions-for-health.swansea.ac.uk/>**

**Choose from 5 physical health challenges**

**PLUS**

**BOOST your WELLBEING with our new 12 week emotional wellbeing plan**



**Register online and choose your own personal health challenge.**

**Take part by yourself or with colleagues/friends!**

**Track your progress and earn health trophies. Tell us how your getting on...**

**<https://champions-for-health.swansea.ac.uk/>**

## Appendix 9: Registration form, feasibility study website

### *Welcome*

Before you begin your journey, we need to ask a few questions about you. This information will enable us to tailor the resources to your individual needs and will allow you to track any changes in your health and well-being over time.

- **Username** (selected by the user and how they will be addressed - No two identical user names can exist) (*explanatory statement: what shall we call you?*)
- **E-mail address**
- **Password** set by user (*guidance provided on complexity of password e.g. number of letters and number?*)
- **Trust employed at**  
Options to include
  - ABMUHB
- **Main hospital location.** (*We would like to know the area where you work to help us to send you information on services and events in your area*)  
Options to include
  - Singleton hospital
  - Moriston hospital
  - Neath port Talbot hospital
  - Princess of wales hospital
  - Garn Goch hospital
  - Fairwood hospital
  - Hill house
  - Bon-y-maen
  - Phillips parade
  - Gellunudd
  - Other please specifyAdd in options for second site
- **Age band** (*We would like to know this information to help identify the different age ranges taking part in the project*)  
Options to include (can only select 1)
  - 18-25
  - 26-35
  - 36-45
  - 46-55
  - 56-65
  - 65+
- **Sex** (*We would like this information as healthy behaviour guidelines vary between sexes*)  
Options to include (can only select 1)
  - Male
  - Female
  - Other

- Prefer not to say

### **Over-arching statement regarding the use of the data for the evaluation section**

*As part of the evaluation of this website, we would like to ask some brief questions about you, your general health and well-being, and your work. This is to help us understand more about who has used the website and whether using the website has an effect on health and well-being. Your answers will be completely confidential.*

### **Question 1 – general health**

- Q: In general, would you say your health is;
- A: 5 options: excellent, very good, good, fair, poor (only select 1)

### **Question 1 – mental health and well-being**

#### **WEMBWS**

The Warwick-Edinburgh Mental Well-being scale is a validated measure of mental well-being. It has been used nationally, regionally and locally. It has been used in other workplace health campaigns.

It includes 14 statements about your thoughts and feelings, you should consider your answer for the past two weeks.

It is used to measure the effect on an intervention over time. It is not used to diagnose well-being in individual people.

If you are worried about your mental health please see your GP, use this resource or seek additional support elsewhere for example:

NHS Choices –[www.nhs.uk/LiveWell/mental-well-being](http://www.nhs.uk/LiveWell/mental-well-being)

## The Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts.

Please tick the box that best describes your experience of each over the last 2 weeks

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)  
© NHS Health Scotland, University of Warwick and University of Edinburgh,  
2006, all rights reserved.

### PHQ-4:

PHQ-4				
Over the last 2 weeks, how often have you been bothered by the following problems? <i>(Use "✓" to indicate your answer)</i>	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Little interest or pleasure in doing things	0	1	2	3
4. Feeling down, depressed, or hopeless	0	1	2	3

*(For office coding: Total Score T\_\_\_\_\_ = \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_)*

### Question 3 – supervisor status – socio-economic cross-reference

- Q: 'Do (did) you supervise any other employees?' (A supervisor or foreman is responsible for overseeing the work of other employees on a day-to-day basis)
- A: 2 options: yes, no (only select 1)

### Question 4 – Occupation – socio-economic cross-reference

- Q: Please tick one box/select one option which best describes the sort of work you do.
- A: Options below (select only 1)

***Professional occupation***

Teacher, nurse, physiotherapist, social worker, welfare officer, software designer, accountant, solicitor, medical practitioner, scientist

***Clerical and intermediate occupations***

Secretary, personal assistant, clerical worker, office clerk, call centre agent, nursing auxiliary, nursery nurse

***Senior managers or administrators*** (usually responsible for planning, organising and coordinating work; and for finance)

Finance manager, chief executive

***Middle or junior managers***

Office manager, retail manager, bank manager, restaurant manager, warehouse manager

***Technical and craft occupations***

Inspector, plumber, printer, electrician, gardener, tool maker

***Routine manual and service occupations***

Postal worker, security guard, caretaker, catering assistant, receptionist, sales assistant, HGV/van driver, cleaner, porter, messenger

**Functionality**

Job types including sub-group examples could be displayed by text and users tick box single box only. Alternatively, drop down menus could be used to house job types and sub-groups.

**Question 5: Days of sickness absence**

- Q: In the last 6 months, how many days were you off work for health reasons?
- A: Enter number across numerical range of 0 to 183 (0-6 months)

**Question 6: Spells of sickness absence**

- Q: In the last 6 months, how many spells of sickness absence lasting a week or more have you experienced?
- A: Enter a number across a numerical range 0 to 26 (0-6 months)

**Question 7: Self-rated work performance**

- Q: Generally, over the past 30 days, how would you rate your performance at work?
- A: Select a score from a range below

**Psychological flexibility questionnaire**

**AAQ-2**

Below you will find a list of statements. Please rate how true each statement is for you by selecting a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

- |    |   |   |   |   |   |   |   |   |
|----|---|---|---|---|---|---|---|---|
| 1. | My painful experiences and memories make it difficult for me to live a life that I would value. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | I'm afraid of my feelings.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | I worry about not being able to control my worries and feelings.                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | My painful memories prevent me from having a fulfilling life.                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | Emotions cause problems in my life.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | It seems like most people are handling their lives better than I am.                            | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | Worries get in the way of my success.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

---

Steven C. Hayes

Resource for A Liberated Mind

*Message to be displayed to signal that registration is completed and they are ready to start using the website*

Congratulations you are ready to go! Welcome to the champions challenge 2019!



## Appendix 10: Intervention content used in the feasibility study

### **Week 1: What is Acceptance & Commitment Therapy?**

Acceptance and Commitment Therapy (pronounced as the word ACT) is an evidence based psychological therapy. It has been clinically proven to be successful for many psychological problems including depression, anxiety and workplace stress.

ACT is an active therapy. You will actively learn new skills to improve your emotional well-being. It is a behavioral therapy that uses metaphors, paradoxes and behavioural interventions.

ACT is effective at maintaining long term behavioural change and fits well within the Champions for Health programme.

#### **ACT in a nutshell**

ACT assumes we are not naturally 'happy'.

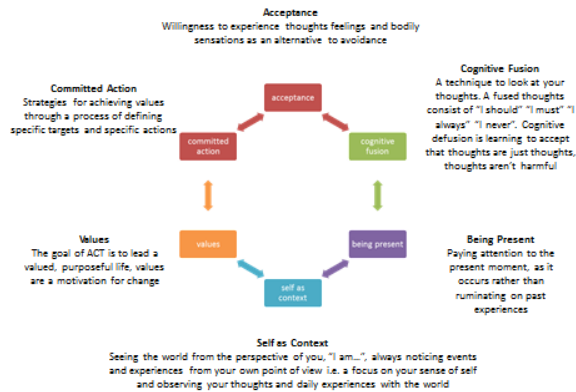
ACT acknowledges that life can be difficult and suggests we EMBRACE difficult thoughts and feelings rather than try to AVOID them by learning new skills to take action to pursue the things we love and value.

It focuses on acceptance of psychological pain and willingness to live with that pain. Through these processes the impact on your life is lessened.

#### **Taking action**

ACT offers six techniques to help you alter the way unwanted thoughts, emotions, sensations and memories influence you and the actions you take in response to them. The techniques will help you identify your personal values and set goals according to what's most important to you while supporting you through the barriers you face.

The six techniques are introduced one each week and revisited throughout the programme. Practicing the techniques will help boost your well-being.



## Acceptance

Willingness to experience thoughts feelings and bodily sensations as an alternative to avoidance.

## Cognitive Fusion

A technique to look at your thoughts. Fused thoughts tend to consist of “I should” “I must” “I always” “I never”. Cognitive defusion is learning to accept that thoughts are just thoughts, thoughts aren’t harmful.

## Being Present

Paying attention to the present moment, as it occurs rather than ruminating on past experiences.

## Self as Context

Seeing the world from the perspective of you, “I am...”, always noticing events and experiences from your own point of view i.e. a focus on your sense of self and observing your thoughts and daily experiences with the world.

## Values

The goal of ACT is to lead a valued, purposeful life, values are a motivation for change.

## Committed Action

Strategies for achieving values through a process of defining specific targets and specific actions

*“You will learn to look at your pain rather than seeing the world from the vantage point of your pain” (Hayes 2005. Get out of your mind and into your life).*

### Try now (AAQ-II questionnaire)

The website [www.actmindfully.com.au](http://www.actmindfully.com.au) explains ACT as “a type of therapy that aims to help patients accept what is out of their control and commit to actions that can improve and enrich their lives” (Harris, 2013).



#### *The Cold Shower metaphor*

Imagine two scenarios: You are thinking of taking a shower but you discover there is no hot water:

1. If you had the choice to have a cold shower...or not to, you might choose not to because it's cold, uncomfortable! You could not shower, 'I will be cold afterwards', 'I'm not that smelly' or 'I'll wait until the morning' etc. You might not shower because there's no point in putting up with that much discomfort for no good reason.
2. But if a close relative or friend was getting married that day, you might want to be clean and fresh. If you stopped for a few minutes and you thought about the person getting married and how much you care about them, and the enjoyment you would get sharing their special day, would you put up with a few minutes of discomfort in the cold shower, because it was important to you? Might you be able to put aside your feelings of discomfort, because you wanted to be fresh and clean for the great day ahead?

In this instance, we can be prepared to make room for the un-comfortableness of the cold. We can choose discomfort in the service of nourishing relationships with people we care about.

In both scenarios, the water is the same unpleasant temperature.

*(Reference - Sarah McCormack 2015, ACBS website)*

### **Take a moment to consider, which of the 2 scenarios would bring greater fulfillment? And why?**

When we increase our willingness to make room for un-comfortableness it can increase our ability to take on experiences we might previously have avoided. For example, in the second scenario, we made room for the un-comfortableness of the cold shower because it was important. In the first scenario, we only focused on the uncomfortable feelings and preferred to avoid the shower altogether.

Finding out what's important to us in life can really help to provide us with direction when uncomfortable thoughts and feelings take us away from what is important

So imagine someone was socially anxious, yet they wanted to go to a gathering. They could choose to make room for some discomfort (uncertainty, awkwardness) because they value connecting with people. This is about being willing to experience discomfort.

This technique can also be applied to other unwanted internal experiences for example workplace stress can build up and become chronic stress which has serious health consequences. Being willing to experience and accept difficult emotions and feelings may enable you to approach a colleague or someone you trust to start a conversation about your well-being needs.

**Now take a few minutes to consider something you find uncomfortable?**

**What is it? Why is it uncomfortable?**

*For example Vivienne\* finds large team meetings difficult and uncomfortable, she experiences a physical reaction, her breathing shallows, her heart rate increases and she sweats (autonomic nervous system). She has thoughts that 'I am not going to be able to get my point across', 'I am not very good with lots of people' and in response she often avoids the meetings and often withdraws from team events. This is having a detrimental effect on her career.*

*For example David\* is under increasing amounts of work related stress, the demands on his role have risen and he is under pressure and beginning to question whether he can continue to work at this level. He has thoughts that 'he can't keep up with the work load', 'he is going to let his team down' and he starts to feel angry that he is no longer able to control the work load, he has noticed he is becoming snappy with colleagues and has withdrawn from social activities at lunch time in order to work longer. This is having a detrimental effect on his well-being.*

**Identify current coping techniques**

Think about what you do to cope with it?

Consider what do you do to make yourself feel better when you have an unwanted thought, image, or experience?

**Are any of these familiar?** Tick all that apply.

- drinking alcohol
- comfort eating
- being a 'good listener' (asking lots of questions, but sharing little of yourself)
- arriving late
- leaving early
- avoiding social events altogether
- deep breathing
- relaxation techniques
- using positive affirmations

- disputing negative thoughts
- analysing childhood
- blaming parents or others
- telling yourself to 'get over it'
- self-hypnosis
- sacrificing personal time
- keeping busy with tasks
- avoiding time alone
- \_\_\_\_\_ (others)



How helpful are these coping strategies in the *short term*?

Unhelpful

Helpful

1    2    3    4    5



Did they help reduce your unwanted feeling? Or did they add to them?

---

---

---



What about the *long-term*?

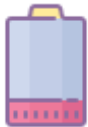
Unhelpful

Helpful

1    2    3    4    5



What do they cost you in terms of energy/time?



Lots



Little

5    4    3    2    1



If the problem was resolved what things would you start stop continue doing?

---

---



What direction would you like to take your life in?

---

---

---



What activities do you find fulfilling?

This includes all areas of life, work, health, social, fitness, relationships, family, culture, finances etc

---

---

---



What is standing in your way?

---

---

---

## Try at home

A key part of this process will involve you learning and practicing these skills in your daily life. This doesn't have to be time consuming. A few minutes each day can make a big difference.

This week keep thinking about the strategies you use or have used and consider how helpful they have been. You can record them using this [exercise sheet](#) if it helps.

### Personal struggle



Start by thinking about what you are currently struggling with and what you currently do to manage it? How long have you been struggling with it? (week / month / year) Deep worries are rarely new.

What else are you struggling with? How long have you been struggling with this? (week / month / year)

Write a list of all your struggles, all the things that cause you suffering. Then go back and consider how long have you been struggling with it? Next rank your struggles in terms of the impact they have on your life (most to least). Finally draw arrows to show which issues are linked to others. Reorganize your list as you need to.

Painful / difficult issues I experience	How long has this been the case	Rank them

*Examples- bear in mind these may be very different to yours.*

Self-criticism

Depression

Feeling I am not listened to by others

Anxiety in social situations 'I've got nothing to say', 'they won't like me'

Feelings of sadness

Loss 'I will never get over this'

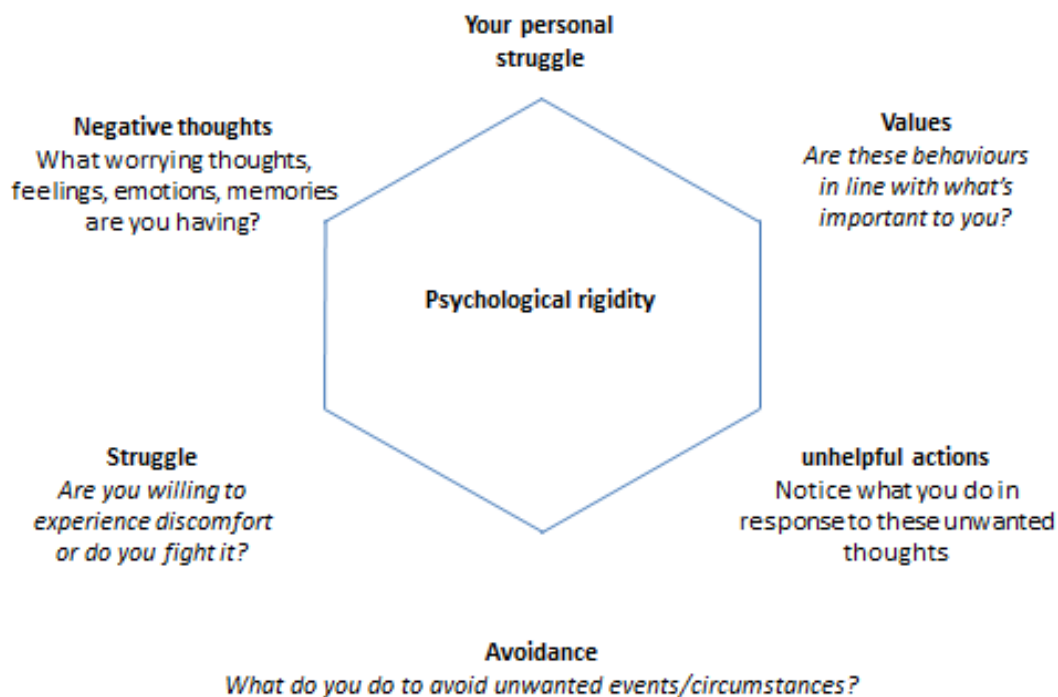
Not good enough

Unlovable

Feelings of frustration and boredom ' *I can't take this anymore*', ' *I need more*'

This is your personal list and the focus of the following sessions.

You can learn ways to approach these struggles. Suffering is normal and we all experience it. It is part of the human condition. Learning to live with it and accept its presence is one way to lessen its impact on your life.



## Try at home

### Thought suppression exercise

**Adapted** From: Steven C. Hayes (2005) *Get out of your mind and into your life*.

This exercise is an example of how trying to avoid something, a thought, feeling, behaviour is not easy and in fact trying not to think about it makes it more likely that you will think about it over time

### Picture a big red bus



Ask yourself how many times have you thought about a big red bus this week?

Next spend five minutes not thinking about or picturing a big red bus.

How many times did you picture a big red bus, even briefly?

Next spend five minutes thinking about something else, anything.

How many times did you picture a big red bus, even briefly





## Watch

You might find it useful to watch a few quick YouTube clips. Metaphors like passengers on a bus help explain ACT concepts and ideas visually.

### Passengers on a bus (4:51)

<https://www.youtube.com/watch?v=Z29ptSuoWRc>

### The Happiness Trap: Evolution of the Human Mind (3:37)

<https://www.youtube.com/watch?v=kv6HkipQcfA>

### 3 minute stress and relaxation guide (3:43)

<https://www.youtube.com/watch?v=EYQsRBNYdPk>

The passengers on a bus metaphor illustrates the way in which our internal thoughts, feelings and emotions can exert control over our lives (in the clip they control the direction of the bus) however when we come to accept their presence we can take back control (of the bus).

The bus represents our mind and the passengers represent our internal thoughts feelings and emotions. The driver represents you (each of us). In the clip the driver learns to separate himself from the passengers, he knows they are there and can hear them but understands that what they are saying isn't necessarily true and this enables him to take control and to drive in the direction he wants to go (in the clip it's the race course rather than going round the same old route repeatedly).

The happiness trap provides a visual explanation of language and its role in psychological suffering in the modern world.

The stress and relaxation clip provides a brief description and a guided breathing practice. This is a useful technique to help manage any stress and anxiety in your life.

## Lesson summary

Happiness is a myth! ACT offers six techniques to pursue the things we love and value and the skills to accept the difficulties we experience.

*“The goal of ACT is to create a rich and meaningful life, while accepting the pain that inevitably goes with it” (Russ Harris)*

ACT helps you work out what's really important and meaningful to you and to develop goals according to what's most important, and then work through the barriers that get in the way of achieving these goals.

A key part of this programme is testing out the techniques every day.



## References

Steven C. Hayes and Spencer Smith (2005) *Get out of your mind and into your life. The new acceptance and commitment therapy.* New Harbinger Publications Inc. USA.

Thought suppression exercise. Adapted from Steven C. Hayes and Spencer Smith (2005) *Get out of your mind and into your life. The new acceptance and commitment therapy.* New Harbinger Publications Inc. USA.

Metaphors in ACT understanding how they work, using them, creating your own.

Special issue no 2. ACT digest. Echo's from acceptance and commitment therapy

Association for Contextual Behavioural Science website (ACBS) <https://contextualscience.org/>

Getting unstuck in ACT: A clinician's guide to overcoming common obstacles in acceptance and commitment therapy. Russ Harris 2013. New Harbinger Publications Inc. USA.

The Cold Shower - Willingness/Making room for discomfort. Sarah McCormack <https://contextualscience.org/>

## Week 2

### Personal relevance: noticing thoughts and feelings

Stress, anxiety and depression are commonly experienced in the UK particularly in complex, busy workplace environments.

By being open to and accepting of the difficult thoughts and unwanted feelings we can reduce their impact on us.

ACT suggests that stress, anxiety and depression are not problems in and of themselves, but that they become problematic when we try not to have them i.e. we often do things that are not in line with our values in order not to feel something. By being open to and accepting of the difficult thoughts and unwanted feelings we can reduce their impact on us.

Whatever the source of stress, be it changes in the work place, work pressures, family or financial concerns, stress based mindfulness techniques offer tools to regain contact with the present moment when difficult thoughts and feelings dominate your attention'.

Often we spend hours in our minds thinking about the past, reliving feelings, memories and thoughts of past situations. But our mind is not always our friend and we build stories around these situations that limit us. For example following the loss of someone we love we might tell ourselves not to get close to others as it was too painful to risk going through again.

But we can build new stories and learn to respond in new ways.



### *Bad weather metaphor:*

Imagine you are on your way somewhere important to you (home/work/social event etc) when suddenly, the weather changes and you can no longer see the road ahead. There is heavy rain and sleet and the road isn't visible. It is now very difficult to continue your journey.

You could decide to stop and wait for the rain to clear up or lessen. But how long would it take? An hour? A day? Longer? If you decide to stop, you're going to stay in the car but you're also going to abandon the pursuit of your valued actions (your destination).

You think about it, driving in heavy rain is very dangerous, and you will need to slow down. But you will reach your destination eventually. Maybe you'll pass through this storm (to make that possible, you need to go ahead). Or maybe not, but you won't mind, you will have arrived.

What really matters to you is that you arrive at (home, work, social event), not that you stop the storm.

### **Try now**

#### **Present moment**

Stop for a moment and observe what is happening right now. Listen to the sounds around you, smell the air, look at what surrounds you and consider that this is a relatively good moment right now.

What did you notice? (enter in data here to earn points)

#### **Questions to answer;**

What do you want to achieve from taking part in Champions for health?

Why does your emotional well-being matter to you?

For example, do you have a goal in mind? Do you want to clarify your personal values or work towards a healthier life? Do you want to reduce the stress in your life?

How much time can you put aside for yourself each week to practice the exercises? Be kind to yourself.

e.g 5 minutes / 10 minutes / 30 minutes / What is realistic?

### **Try at home**



### **Feeding the Hungry Tiger metaphor**

(From: “Get out of your mind and into your life” Steven C. Hayes 2005)

Imagine you wake up one morning and just outside your front door you find an adorable tiger kitten meowing. Of course you bring the cuddly little thing inside to keep it as a pet. After playing with him for a while, you notice he is still meowing, nonstop, and you realise that he must be hungry.

You feed him a bit of bloody, red mince meat knowing that’s what tigers like to eat. You do this every day, and every day your pet tiger grows a bit bigger. Over the course of two years, your tiger’s daily meals change from hamburger scraps to prime ribs, to entire sides of beef. Soon your little pet no longer meows when hungry. Instead, he growls ferociously at you whenever he thinks it is meal time. Your cute little pet has turned into an uncontrollable, savage beast that will tear you apart if he doesn’t get what he wants.

Your struggle with your painful thoughts & feelings can be compared to this imaginary pet tiger. Every time you empower your pain by feeding it red meat of experiential avoidance (i.e. anything you do that helps you avoid upsetting thoughts and feelings), you help your pain grow larger and a little bit stronger. Feeding it in this manner seems like the prudent thing to do. The pain-tiger growls ferociously telling you to feed it whatever it wants or it will eat you. Yet, every time you feed it, you help the pain to become stronger, more intimidating, and more controlling of your life.

So what now?



**I am willing to accept that my current coping strategies are not working. But that’s ok.**



**I am going to be kind to myself. Everyone struggles**



**I am....** (fill in your own kindness idea here)

**Try at home**



**Well-being writing exercise**

## Week 3

### What are Values?

In ACT *values* refer to a chosen life direction that is meaningful and important to you. It is not an end destination that you reach nor is it something you *have* to achieve. Values are uplifting not a chore to add to a 'to-do list'.



A popular way of thinking about this is the 'compass metaphor'. The value you want to move towards is (north, south, east or west) and goals are the check points along the way that help you stay on track (they are reached/obtained). Goals are specific actions you set out to achieve.

Values and goals are something to explore and consider. It may take some time to pin them down.

Beware often we act impulsively to situations or to thoughts and feelings, these responses are not always consistent with as our values (and lead us in another direction) and so we find ourselves doing things that we don't actually want to be doing; eating cake when we want to live a healthier life, or avoiding a networking or social event that would help us connect with others.



*Wrong train metaphor:*

"Imagine you are going on a journey. Somewhere really special, where you really want to go, somewhere you've wanted to go your whole life. When you get to the train station you see two trains, one is a bit odd looking and strange, some of the seats look a bit hard and overall it looks a bit shabby and uncomfortable. On the next platform, there is a different train; it's a super train. It looks familiar, safe and reliable. The sign says it has air conditioning, a cinema, and a fancy all you can eat buffet that is free. You think, wow! I just have to take this train. I couldn't possibly make my journey on that other one! So you wait for this 'great' train to get ready to board and the odd looking train goes on its way. And you wait for the safe train some more and another odd train leaves the station, and another. All the while you are waiting for a chance to board this great reliable train so you can take your journey, as yet another odd looking one leaves. But here is the thing. What if the safe train can't ever board, what if it won't ever leave the station. What if you are waiting for the wrong train?"

(Adapted from Aidan Hart 2006 ACBS website.)

Consider the following: (need to be interactive questions for the week)

1. You know where you want to go in life, what are you prepared to have/experience to get there?
2. If we can't ever have discomfort, where does that leave us?
3. How does waiting for the good old predictable train work in terms of actually moving towards our values and goals?



**Try now**

**Popular values**

Exploring your values; Consider what is important to you, how you would like to spend your time, what sort of person you would like to be.

How many stars would you give each? (Less important 1-5 more important and meaningful to you). Make notes. Leave blank if not relevant. Create your own.

Popular values	★	★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★ ★
Work / career					
Education / training					
Romantic Relationships					
Children / parents					
Personal growth					
Friends / social activities					
Fitness / Health					
Creative activities / hobbies					
Finances					
Spirituality					



## Try at home

### Values exercise

Take a few minutes to add the following values into one of the three columns:

Warm, responsible, accepting, honest, Resourceful, Tolerant, generous, successful, kind, friendly, passionate, loyal, understanding, clever, educated, fit, good listener, strong, brave, trusting, positive, cheerful, helpful, determined, loving, confident, inspiring, patient, persistent, calm, focused....add your own too

These are values that you want for yourself.

If it helps think of celebrities you like or dislike. What is it about them that you like? Are these qualities you want to see in yourself?

Very important to me	Important to me	Not important



### Ask yourself

Which ones did you put in the ‘very important column’? Can you narrow this down to three?

Consider these values as your primary values. The values that are in the ‘important to me’ column are your supporting values that help you.

## Try at home

These are exercises that you can try at home or when you have a bit more time to think about your values. You can return to these exercises any time and try them again. They are designed to be used over time. Pick and choose the ones that appeal to you. Everyone is different.



*Values exploration: 80<sup>th</sup> birthday party*

## Rationale

This is an exercise that’s designed to help you picture what you want your life to be about, what is important and meaningful to you? It’s a way of exploring what you would like to treat as important and how you want to be with yourself or with others. If you’re willing to give it a try, read the following text and just notice what comes up for you. There are no right or wrong answers in this exercise – it’s all about noticing what comes up.

## **Exercise**

Take a moment to get centered by noticing your breath and noticing how your body feels. If you find yourself getting distracted or notice your mind wandering, that's OK. Just notice that and gently bring your attention back to this exercise. Now, imagine moving forward through time. Imagine yourself aging and growing older as you move through life. Imagine now that you are turning 80 years old, and your friends, family, and co-workers have gathered to celebrate your 80th birthday.

Imagine what you will look like on your 80th birthday (or whatever age you want). And, I invite you to imagine not who you think would likely be there, but imagine who you would most want to be at your 80th birthday party – even if that means they would be very old. There could even be people you haven't met yet. Try to really picture who would be there. Now the time has come in the party where people are starting to give speeches. They are taking turns standing up and speaking about what you have meant to them. They are speaking about what you have stood for as a person, and the impact you have had. Again, I'm not asking you to imagine what they would likely say. I'm inviting you to imagine, if you were to be bold in this moment, what you would most want them to say. Deep down in your heart, imagine what you would most want others to say about what you've meant.

Imagine the first person standing up to speak. Imagine it's someone very close to you. Take a moment now and imagine what you would most want them to say about the impact you've had. Try to really hear them saying that.

Now, imagine the next person standing up to speak. This could be someone from a different part of your life – perhaps a co-worker or neighbour. And for them too, imagine what you would most want for them to say about what you have stood for in your life.

Now thank your mind for this experience, and gently bring your attention back to the present moment. Take a moment to get centered here, noticing your breath and how your body feels. And when you're ready, you can open your eyes.

## **Week 4**

### **Welcome back: Review of values**

What do you care about the most? What do you want your life to be about? Values are long term aims that we hope to work towards in our daily life. Goals are the achievable check points along the way. They can help encourage and motivate movement towards our values and reduce the likelihood of behaving in ways which take us in the opposite direction even though they might feel easier in the short term. This understanding alongside acceptance of negative thoughts can help you live a valued life and boost your well-being.

### **Acceptance of difficult thoughts and feelings**

Acceptance involves being willing to have *all* thoughts, both positive and negative and learning to make room for them without putting too much focus and attention on them and without trying to change them. This is used as an alternative to avoiding unwanted thoughts or trying to alter thoughts which often consume our time and energy and do not necessarily resolve the issue.

Willingness is a skill you can learn and with practice this skill will reduce the impact of unwanted thoughts on you and increase the likelihood of you doing things you want to i.e. acting in line with your values. Notice you are having a thought, make room for it and accept it for what it is, i.e. a thought you are having.

Remember the cold shower metaphor? This was about willingness to accept difficult feelings and willingness to experience something unpleasant in order to move you closer to something you value.

### **The Quicksand**

*Adapted from Steven C Hayes (2005). 'Get Out of Your Mind and into Your Life '. New Harbinger. Oakland*

What do you know about quicksand?

Imagine you find yourself in quicksand one day. What do you do? Most of us might try to get out as quickly as possible? You might struggle and fight against it trying to step out of it. But now you are sinking deeper. Your weight is now only on one foot. You are scared, you shout for help and you try again to walk, run, step, hop, or jump out of trouble. You sink again.

You soon realise that your struggle to escape has made you sink deeper into the quicksand. You stop and pause for a time and you begin to see the quicksand around you and remember that you need to lie flat and maximise contact with the quicksand and from here you can roll to safety.

Life can be like this, when we encounter something sticky and difficult we often fight against it in an effort to escape it or avoid it but often we actually sink deeper as a result. Instead being willing to accept what's happening and accept the discomfort it can bring we can begin to see it for what it is and from here we can move forward.

### **Try now**



***Butterfly metaphor*** (audio available)

(adapted from Nick Turner (2010) accessed from ACBS website)

Begin by taking three slow breaths (eyes closed).

Picture yourself sitting in a field on a warm summer day (three more slow breaths). There is a slight breeze and you can feel the warmth of the sun on your face.

(Take a few moments to picture this). As you relax into your experience, your thoughts start to wander and a steady stream of butterflies begins to fly past you. There are a wide variety of butterflies in the stream...Some are familiar, comforting and attractive, while others are unappealing and make you feel uneasy.

You feel compelled to reach out and hold onto the familiar butterflies, while pushing away the ugly and unappealing ones.

Now take your right hand and hold it to you tightly as if you are embracing the comforting butterflies. Now take your left hand and begin swatting away the unappealing ones. Notice how this feels, notice your thoughts and sensations in your body as you are doing this (Take a few moments to do so).

As you continue to struggle, you slowly begin to realize that those you had been trying to push away now outnumber those you were fighting so hard to hold on to.

Thoughts can be like the butterflies in this exercise. If you hold onto them too tightly or attempt to push them away, they will overwhelm you or remain lifeless in your hands. However, if you are willing to begin observing thoughts (regardless of how they make you feel) as if they are butterflies landing in the palm of your hand, they will eventually fly away, making room for other thoughts and experiences to present themselves.

How was it for you? Make notes here

### Try at home



#### Acceptance exercise

Imagine an unwanted thought, feeling, physical sensation or memory. It might be a challenge or conflict at work. It just pops into your head. You didn't ask it to but it did. Imagine it, picture it in a physical form. Interact with it, observe it with curiosity, welcome it like an invited guest, make space for it, soften it, hold it lightly, breathe into it, put your arms around it, carry it with you as you move forwards in life. Open up to it. This is acceptance.

Create space and allow what is present

What shape would it be?

What colour would it be? How heavy is it?

Ask yourself to describe it and name it.

**NAME technique-** Noticing, Acknowledging, Making room for, Expanding to work with difficult internal barriers.



#### *Physical exercise: Acceptance and willingness*

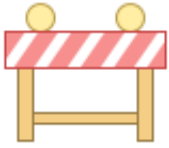
You will need a pen and some small pieces of paper. You can do this alone or with a trusted friend. It's up to you.

**Purpose:** This physical metaphor is designed to help you distinguish between the different ways that we can respond to certain thoughts, memories, feelings, sensations that come up.

- a) We can try to fight them and take active measures to control these thoughts, feelings, sensations etc. when they show up.
- b) We can try to ignore, dissociate, distract, or numb and not be in touch with what's going on.
- c) Or we can be open and willing to experience whatever is there for however long it wants to stick around for. Without holding onto it or pushing it away.

Reflect and think about on something that is causing you difficulty. Give yourself time to do this. It might help to write this down and then come back to the rest of the activity

2. When dealing with this what's the first thing that shows up? Write this down on a piece of paper (i.e. Thoughts?, Feelings?, Bodily Sensations?, Images that come to mind?, Memories that show up?, Urges?) e.g Anxiety: I feel faint, my heart beats faster, trouble breathing. E.g stress: anger, feel rush of adrenaline, can't think straight.
3. What thought goes through your head? Write this down on a piece of paper
4. And what shows up next? Write this down on a piece of paper
5. And what shows up next? Write this down on a piece of paper
6. If doing this with someone else have them sit opposite you and slowly throw the pieces of paper across to you. If by yourself hold them above your head and let them go one at a time.
7. You need to try and bat them away from you so they don't touch you.
8. How did you find this?
9. Ask yourself, would have been able to do something that was important to you at the same time? For example could you have done your work whilst batting them away? Could you have gone to the gym? Or spent time with your family?
10. Gather the paper up.
11. Now cover your eyes with your hands and try to distract yourself however you can. You are not going actively fight with these things but I want you to not to look at them, not to try to notice what's going on, and just try to distract yourself as much as you can
12. Repeat process of gently throwing cards over yourself.
13. Now what was that experience like for you this time?
14. Ask yourself, would have been able to do something that was important to you at the same time? For example could you have done your work whilst batting them away? Could you have gone to the gym? Or spent time with your family?
15. Gather them up again, repeat but this time open your arms to accept them
16. Now what was that experience like for you this time?
17. Ask yourself, would have been able to do something that was important to you at the same time? For example could you have done your work whilst batting them away? Could you have gone to the gym? Or spent time with your family?



## **Barriers**

But what about those barriers that stop you, those thoughts that pop up and get in the way? Often we get in our own way. Having an idea of what your own barriers are is useful as you can notice them and head them off!

Here are some example barriers;

### **Emotions**

Emotions are natural barriers, 'I'm scared to try this', 'I might fail' - Fear to try something new and anxiety about the outcome act as barriers. 'I can't do this' 'it's too hard', 'I don't deserve this'. These emotions are natural and our mind creates these thoughts which get in the way.

### **Expectations**

Often we expect too much of ourselves especially when making healthy life changes. Setting too many goals is unrealistic and can actually reduce motivation. For example if you wrote yourself a long 'to do' list it can stop you doing anything at all as it looks like so much to take on! Be kind to yourself. Don't expect too much.



### **'The Walk of Life'**



"When we are walking along the footpath, we tend to look just ahead of us most of the time, with occasional glances behind us and far ahead. We look behind as we need to know of anything approaching from behind or to see where we have come from, and look far ahead to make sure we are heading in the right direction to get to where we want to go. Most of the time though, we need to know where we are putting our feet.

If we were constantly looking behind us, then we would be walking into obstacles or tripping over. If we were constantly focused on the far distance, we would slip and trip over obstacles beneath us. (It can be fun to act this out!)

So it is with life. Sometimes we are so focused on our past, that we neglect the present, and wonder why we keep falling flat on our faces. Or perhaps we are so attentive to anticipating dangers up ahead, that again, we trip and stumble our way through life".

(Carol Vivyan 2012)

**The six ACT techniques can be used to overcome the barriers we all experience.**

## **Experiential avoidance**

This ACT term means the process of avoiding your own experiences i.e. you own thoughts, feelings, memories and behaviours.

Take another look at your coping strategies exercise that you completed in week 1. Ask yourself if they involved avoiding an experience?

Did you think they worked in the short term? Probably they did. What about in the long term? Were they effective in the long term? Did they fix your problem? Probably they were not so helpful.

## **Watch**

The acceptance clip is a quick visual representation of what it means to accept and let go of the thoughts, feelings and emotions you might be struggling with.

### **Acceptance (1:46)**

<https://www.youtube.com/watch?v=jrmKtaMqOh4>

**The unwanted party guest (metaphor 4:20)** is a clever, narrated metaphor to help understand the impact of unwanted internal thoughts, feelings and emotions and the role acceptance can play.

<https://www.youtube.com/watch?v=VYht-guymF4>

This is the third guided Mindfulness exercise to try:

### **Mindfulness Meditation (15:05)**

<https://www.youtube.com/watch?v=YW-TDOgstSE>

**or if time is limited try the quick version instead (2:14)**

[https://www.youtube.com/watch?v=dthmKu\\_lIPY](https://www.youtube.com/watch?v=dthmKu_lIPY)

## **Lesson summary**

Finding different ways to distract yourself or numb your response in the present moment, as a way of dealing with stress or difficult situations, can become problematic. Frequent use of distraction and avoidance will lead you further away from your values and from the pursuit of your meaningful goals.

If you practice willingness a little bit every day you will build up your ability to accept such unwanted responses and you can learn to dedicate less time and energy to them. This will help you direct more time to the things you really want to pursue instead.

## **References**

The Jigsaw Piece adapted from Pachester (2012) Accessed from Association for contextual behavioural science website (ACBS) <https://contextualscience.org/>

Feeding the hungry tiger. From: Steven C. Hayes and spencer smith (2005) Get out of your mind and into your life. The new acceptance and commitment therapy. New harbinger publications inc. USA.

## Week 5

### Review of acceptance

By being willing to accept difficult thoughts and feelings you can move towards the things you care about. Acceptance means being willing to try something other than avoidance. Learning this ACT technique can help you find a new way to interact with your thoughts and feelings to reduce their impact.

### Cognitive defusion

This technique focuses on the key human skills we employ everyday -Evaluations, judgments and problem solving. Language enables us to evaluate situations, judge appropriate courses of action and to problem solve. So it is easy to see how we could start believing thoughts we have to be truths and to respond to them as they were a real event.

However, this can be problematic. Imagine that you are going for a job interview. You might think to yourself '*this is going to be really stressful*' and as a result you may avoid the interview. Cognitive defusion aims to help us untangle and step away from such thoughts so that we can assess them not based on how true they are (the interview probably will be stressful) but how helpful they are in moving us towards our values (work/career is a popular value and not going to the interview might stop you moving towards something you value).

How to use this technique to create space between yourself and your thoughts; in your mind take a step back, then observe and recognise thoughts for what they are, just words about an event and not an event itself.

For example observe your thought (I am having a thought that....) recognise it as just a thought. This simple technique can lessen the impact that difficult or unwanted thoughts can have.

### Try now



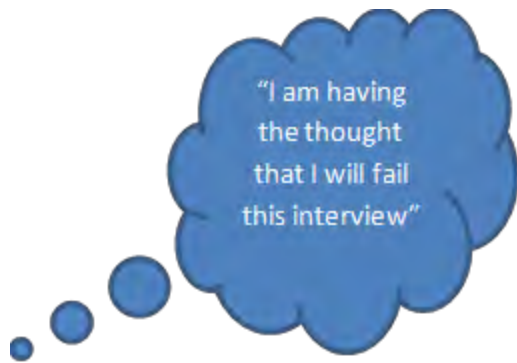
### Reoccurring thoughts

First think about a reoccurring thought that you have about yourself that is unhelpful. It might be a self-judgement that isn't kind like '*I am stupid*' / '*I am boring*' / '*I am a failure*'. Think about this self-judgement for 10 seconds, repeat it in your mind. How do you feel?

Now, take the same thought but say it to yourself like this '**I am having a thought that**'. Say it like that again. How do you feel now?

### For example





Person close to thought bubble

Person far away



You can also try picturing the thought as a runner wearing a t-shirt with the word you selected written on it, you can stand there and watch as they jog past you away into the distance (or as a cloud, you can observe it in the sky and watch from far below as the wind takes it away, across the sky).

Alternatively say the thought (in your head) in the voice of a silly or distinctive film/TV character, repeatedly. How does that word feel now?

In these examples you did not need to put in any effort to get rid of the thought. Instead you have noticed that the thought existed, taken a step back and observed it, nothing more than that. Rather than taking the thought to be a fact that is real.

**Remember** This is a skill to learn and practice. Words are often automatic, they have power. Defusion is a skill you can practice that will help you learn that just because you had a thought or feeling doesn't mean you have to respond to it. You are not your thoughts. The idea is to change the way you perceive these thoughts rather than alter the nature of them or the frequency of them.

### Try at home

Try out these defusion techniques during the week, a couple of minutes a day. Write down how you felt afterwards.



### Cognitive defusion exercise

(From Russ Harris (2005) 'Get out of your mind and into your life')

What thoughts and feelings are you struggling with? Practice stepping away from them using these techniques. Notice how you feel after them. The purpose of these exercises is to see thoughts for *what* they are (thoughts), not as what they *say* they are.

- Thank your mind for the thought, appreciate it and move on
- Sing your difficult thoughts
- Say your difficult thought in a funny voice or say them very, very slowly



Treat your scary private event/thought as a monster on a bus you are driving



Picture the thought as a bus and watch it drive around the corner

**Ask yourself** afterwards, were you able to see your thought as just that? A thought? Keep practicing, a little each day, until the answer is yes. Page Break

### **Cognitive defusion practice sheet**

In the blank thought bubble try writing down the thoughts that have bothered you this week.

In the second thought bubble write the same sentence again after the phrase 'I am having the thought that...'

Take a moment to read this second one again. How do you feel?





### Watch

This is a short clip produced by the veterans health administration to visually explain the technique of defusion

### Defusion (2:43)

<https://www.youtube.com/watch?v=BXAzdXJGMeE>

This clip offers a straight forward explanation and guided 'cognitive defusion' exercise to embed your learning of this technique. There are lots of versions of this available. This one is suggested as it is clear and simple.

### Cognitive defusion- leaves on a stream (11:17)

<https://www.youtube.com/watch?v=00AbNXNLUUs>

**This guided Mindfulness clip 4 (5:28) is focused on reducing unwanted emotions and helps reduce stress**

<https://www.youtube.com/watch?v=MR57rug8NsM>

### Lesson summary

The **purpose** of these exercises is to see thoughts as what they are, not as what they say they are. Take a step back from negative thoughts and begin to watch your thinking. You can do this by

taking an observer's perspective towards your own thoughts. Observe the power of language and then weaken its control. This will give you more flexibility and choice in your responses to negative thoughts.

Practice a little bit every day.

## References

Association for contextual behavioural science website (ACBS) <https://contextualscience.org/>

Steven C. Hayes and Spencer Smith (2005) *Get out of your mind and into your life. The new acceptance and commitment therapy.* New Harbinger Publications Inc. USA.

## Week 6

### Review: of cognitive defusion

Cognitive defusion helps you see thoughts for what they are; words and language, not an event itself. By changing your perspective on thoughts you can learn to create distance between yourself and your negative thoughts and thereby lessen the impact and influence they have.

### Being present

Perhaps you have a go-to list of reasons that you use to cope with the (often/sometimes) relentless repetition of thoughts: *'I'm not good enough, 'I can't cope any more', or 'what's wrong with me'*. Perhaps you have become an expert in avoiding them: drink too much, avoid social situations, keep to yourself or so forth. But ask yourself, does it work? Does it really work? Often these coping methods are quite effective immediately, but over the long term do they really work?

There is nothing wrong with these habitual responses and often we learn them over time but if you think you want to try another way of coping then this is an alternative.

Being present is about connecting with the moment and accepting thoughts and feelings for what they are, making that space for them (slotting them into the jigsaw) and connecting with the moment. Through practice you can help yourself to break the habitual cycle of responding impulsively to unwanted thoughts or feelings and instead act on your values and long term goals.

### Try now

#### Present moment exercise

This is quick exercise to help you use language as a tool to exert more control over your actions, a tool to note what is happening, to describe events and process the context in which the event occurs in.

## Week 7

### Review of Being Present

Be present in the moment in a non-judgemental manner – be kind to yourself with regards to the thoughts and feelings that pop up. Experience the moment directly and consider valued actions and attempt to ensure behaviour and actions are more consistent with these values.

## **The observing self**

We often tell ourselves stories about who we are. Observing yourself and your thoughts / feelings is key part to learning and incorporating the ACT techniques into your daily life. By becoming the observer (of your own thoughts) you can develop an awareness of your own experiences without attachment to them and this can help you make decisions that are based on your values.

In this metaphor the sky represents the stable sense of 'I'. 'I' is independent of your unwanted thoughts, feelings and stories (these are represented by the clouds and weather). The sky holds the clouds but is independent of them. It is the stable and on-going sense of self that is always there.

## **Sky & weather metaphor**

Adapted from Russ Harris 2007 Acceptance and Commitment Therapy (ACT) Introductory Workshop Hand-out

Think of a crystal clear, blue sky. Imagine its expansiveness. Look at its pure beauty. Now picture a cluster of small soft white clouds slowly appearing in the distance, these clouds grow bigger and darker and they roll in and begin to cover the sky so that you can no longer see its crystal clear blue beauty. What if you took a hot air balloon ride or an aeroplane and you rose above those clouds, you would see the blue sky clearly again. The sky was always there it just wasn't visible to you.

The clouds or storms represent your passing thoughts, feelings, memories and sensations. They roll in and block the view but the sky is always there, it doesn't go away and it doesn't change (up past those clouds). The clouds will pass and the sky will be visible again.

### **Try now**

#### **The observing self**

When you find that you're having an unwanted thought or feeling try the following: Take a deep breath and find 10 seconds of kindness, say "The story I'm telling myself is..." and finish with the unwanted worry or a fear you were having.

Then take a step back from your story, take a deep breath and be willing to accept that you had an unwanted thought. Observe yourself having the thought and accept it for just that, a thought you had. Let the thought go. Observe who is telling the story (you) and remind yourself you are not the story.

Write it down or say it out loud whatever suits you.

#### **For example**

The story I'm telling myself is "*I am too stressed out to take on another thing, I am not going to get through this*".

#### **Take three deep breaths**

I can be kind to myself

The story I am telling myself is that this is all too much for me to take on and I can't do it.

Really I am just having the thought that this is too much. I am willing to accept that I have had this thought with the understanding that it is just a thought. It is not all of me.

Accept the thought and imagine it passing you by (like the runner or the cloud earlier)

### **Take three deep breaths**

Remember there is nothing inherently wrong with these stories. They can help reinforce positive behaviours however they can also limit the way we respond to events and situations and restrict our ability to live in a way that is consistent with our values.

### **Observing self**

Ask yourself this, have you ever found yourself watching TV / reading a book or magazine / chatting to someone, when all of a sudden you have realised that you haven't seen what just happened / or taken in anything you just read at all / you don't know the other person said to you? You missed it.

This is the part of you, we can call it your 'observing self', that is able to notice when you have been wrapped in your own thoughts and memories and that brings you back to your focus.

This week spend some time noticing. Notice your body, notice your breathing, your thoughts, your actions. Notice what you are doing, the situations you find difficult, the people who are important, the things with meaning...

*For example*

Notice when you are eating;                      an apple / a cake / cereal...                      notice yourself noticing

### **Your Mind is the World's Greatest Documentary Maker**

Try to observe your thoughts, feelings and emotions through a 'story telling' lens. Spend 3-5 minutes thinking about the different stories you tell yourself. Often we tell ourselves the same stories, repeatedly for years. But is there another story you could tell yourself instead?

1.        Observe that there is a narrator (you) notice the things you are telling yourself about yourself?
2.        Evaluate the story you are telling yourself, do you believe the narrator? Is it true? Do you have to believe it? How do you see the story? Good or bad or neither?
3.        How many times have you told this story? Did anything change after you told it?
4.        Now write another story....

It is common to have not noticed these unhelpful stories. Remember the way we perceive the story is just as important as the story itself. You can accept the story for what it is, a story, and make room for it and take back the power and lessen its influence over you. You are not the story.

Robert\* told himself that he was not good at public speaking and he believed this story such that when he was expected to make a presentation at work he experienced symptoms of stress, he felt faint, his heart beat faster and he had sweaty palms just thinking about it. He responded to these symptoms and had a thought that 'I'm not good enough', 'I can't do this' and he became more anxious and wasn't able to give the presentation.

However, the next time he had to speak publically he managed to step back a little and observe his thoughts and feelings (stories about himself) as passing experiences and connect to what was important to him in the moment'. Having labelled his thought as a thought he remembered he valued his job and decided to spend time learning his presentation and practiced a breathing technique to help him relax. He decided not to avoid the situation by not thinking about it before hand and to accept that he may still experience the same physical symptoms (increased heart rate, sweating, feel faint) but he will accept them for what they are, a natural physical response.

### **Watch**

This is another quick visual representation of this week's technique

#### **Self as context (1:46)**

<https://www.youtube.com/watch?v=kl5cyCXelZc>

Dr Russ Harris offers a narrated clip which explains the concept of the choice point and the way in which unwanted thoughts, feelings and emotions can stop us from making the choices we want to be making.

#### **The choice point (3mins) map for a meaningful life**

<https://www.youtube.com/watch?v=OV15x8LvAQ>

**Mindfulness 6: This 5 minute guided deep breathing exercise:** Short breathing exercises can be helpful in developing self-observation skills, try this 5 minute guided audio/video clip if you want to or just take 3 minutes to breathe slowly.

<https://www.youtube.com/watch?v=awc8MLSpjIQ>

### **Lesson summary**

ACT encourages us to act as our own self-observer in order to notice that while the feelings, sensations, and emotions we experience, can change and vary across situations, the observer does not change. The observer (you) remains the same.

Practice a little bit every day.

Ask yourself to observe what's happening and also to notice who is doing the observing.

## References

Association for contextual behavioural science website (ACBS) <https://contextualscience.org/>

Sky & weather metaphor Adapted from Russ Harris 2007 The happiness trap Stop Struggling, Start Living constable and robinson ltd

View from a window. Adapted from Steven C. Hayes and spencer smith (2005) Get out of your mind and into your life. The new acceptance and commitment therapy. New harbinger publications inc. USA.

AVOIDANCE & SUFFERING DIARY. Russ Harris 2007. The happiness trap Stop Struggling, Start Living constable and robinson ltd

## Week 8

### Review self as context

You are the observer of your own thoughts, feelings, emotions, memories and sensations. You can notice what is happening and also who is doing the noticing (you). As you become better at noticing the many different feelings that occur you will learn to spot ‘road-signs’ or identify ‘warning signs’ which lead to habitual responses. Through observing your feelings and thoughts (including the stories we tell ourselves) you can begin to *accept* them for what they are and make room for them. From here you can move towards doing the things you want to do (*valued* actions) rather than repeating impulsive behaviours that you no longer want to do (whatever they are).

### Committed action

Committed action is the sixth technique and refers to the decision to commit yourself to your goals (behaviours).

You will encounter many ‘choice points’ where you will have the choice to act in a way which is consistent with your values or to act in a way that isn’t. Remember the train metaphor? This choice moment might be during a difficult or unpleasant situation. You will have thoughts, feelings and emotions about this. Ask yourself are you willing to apply the techniques you are learning here (being present, acceptance, willingness) in the moment to help you to respond in a way that you have chosen (not just habitual or in response to something). Consider, how will your choices benefit you in the long term?

Heath\* holds many values across different life domains. For example, he values his career, he values time spent with those he loves (family and friends) and he values his fitness.

It is the end of the work day but there is still much to finish, he thinks ‘*there is too much to get through*’, ‘*I am not good at this*’, ‘*I have so much to do*’ he feels overwhelmed and worried about how he will finish everything and experiences a physical response (heart rate beats faster, muscles tense and he feels a headache coming on).

In the moment can you be kind to yourself and choose to take actions that are in line with your values and goals.

Heath\* decides to take three minutes out to stand up, stretch and look out the window.



During this time he also stopped to ask himself what his values told him about how to act in this situation. Then he decided on an action that would bring a value to life and he committed to it.

The value he placed on his career told him to work to the best of his ability. Taking time to step back and observe his reactions meant he was able to choose to acknowledge that the situation was difficult and that he felt overwhelmed. This in turn allowed him to take committed action and complete the task he was working on until the end of his shift.

Previously he had stayed at work late and filled up on snack foods for an energy boost. However this led him to feel resentful and too tired to go for his after work run.

**Ask yourself** are you willing to commit to your choices and to live a meaningful valued life? A Yes answer means being willing to accept the pain and discomfort that comes along with this.

### Try now

#### Choosing exercise

As humans we have the ability to choose our actions, in each given moment. Sometimes we need to make a choice not to act in a habitual way or not to respond in the way our mind tells us to first.

We can choose to behave in ways that are consistent with the things we value and the goals we want to achieve. What are you going to choose? This exercise aims to help you practice making choices you might automatically make. For example picking up litter, walking the same route to work, and eating your lunch in the same place you always do.

Try and think about one thing you do that you could practice changing in a way that helps you move towards something you value, something meaningful to you.

Situation (time/place)	What did your mind tell you to do/not do?	What did you choose to do?	What did you notice?
Eg: Eating lunch at work	"Sit in your usual seat"	Go for a walk and sit outside to eat	The walk helped me refresh.  I liked the view from the new seat,

#### How did you find it?

#### Try at home

#### **BOLD**

**Breath:** take 3 breaths and connect with the present moment

**Observe:** what is happening, what are you feeling, what are you telling yourself about it? Accept what is happening and make space for it. Don't fight it.

**Listen:** to your values, what are they? What do you want to do?

**Decide:** take action to do something you value...

**Committed action, situations activity**

Observe the things you do, acknowledge them and consider whether they are in line with your values and whether you want to change how you respond to them (or not)

Consider the situation you are in, what your mind told you to do, how you chose to respond (now that you have observed them happening) and what was the outcome?

Where were you? what happened? (time/place)	What did your mind tell you to do/not do?	What did you choose to do?	What did you notice?
<i>E.g. 12:30pm I ate lunch at my desk</i>	<i>“stay inside, its too cold to go out. Work through lunch and get more done”</i>	<i>I took a short break to stretch my legs, get some fresh air and to eat my lunch in the staff room</i>	<i>I felt more refreshed in the afternoon as a result of taking a short break and I spoke to someone in the staff room which made me feel more connected to my colleagues</i>

**Goal setting**

Goals help us along the way they let us know we are heading in the right direction (checkpoints). They are achievable actions or objects. Choose one value to focus on and set three goals you want to reach which will help you know that you are working towards your valued direction.

Goals can be specific activities or actions. Your goal can help you choose behaviours which will help you move towards your values and also let you know you are on the right path.

For example

*Vivienne\** valued her interest and enjoyment in photography both as a career (she is a photography lecturer) and as a leisure pursuit (she finds it relaxing and enjoyable and it gives her a sense of achievement when she captures a beautiful scene). However, over the past year she has found that she has not been able to give as much time and energy to pursuing her chosen life value (a practicing photographer) as much as she had hoped. She decides to set some goals to help her develop her achieve her value and to foster her interest and love of photography again

*Get them now goals:*

Once a week / month dedicate an hour/day to visiting a new coastal area of Gower with her camera

- *Future goals:*

Continue to develop her skills and expertise in photography by learning or practicing a new/existing technique to improve her work and to share her learning with her students

- *Wild card goals:*

Submit a photograph to national geographic or a national photography competition

### **Ask yourself**

What meaningful activities do you want to pursue in your life?

Turn your values into actions for your everyday life. Remember that these goals are here to help you along your road to reaching your values (chosen life directions)

## **Week 9**

### **Psychological flexibility**

A general goal of ACT is to increase psychological flexibility.

Psychological flexibility means “contacting the present moment fully as a conscious human being, and based on what the situation affords, changing or persisting in behaviour in the service of chosen values”

What this means is that learning to connect with the present moment can help you resist acting out behaviours which are impulsive responses to feelings and emotions and move towards behaviours that you actually want to do (i.e. those that match your long term values).

*The 6 techniques that have been described in the previous 6 lessons combine to create psychological flexibility. Let’s briefly go through them again now*

**Values** (week 3) identifying what it is that’s really important to you and setting realistic goals to help you move towards your values. Values are a motivation for change

**Acceptance** (week 4) Willingness to experience thoughts feelings and bodily sensations as an alternative to avoidance

**Cognitive fusion** (defusion) (week 5) A technique to look at your thoughts. A fused thoughts consist of “I should” “I must” “I always” “I never”. Cognitive defusion is learning to accept that thoughts are just thoughts, thoughts aren’t harmful

**Being present** (week 6) Paying attention to the present moment, as it occurs rather than ruminating on past experiences

**The observing self** (week 7) Seeing the world from the perspective of you, “I am...”, always noticing events and experiences from your own point of view i.e. a focus on your sense of self and observing your thoughts and daily experiences with the world

**Committed action** (week 8) Strategies for achieving values through a process of defining specific targets and specific actions

Often our responses are habitual or learned (behaviours like avoiding situations or taking the quick fix and engaging in unhealthy actions (like smoking, drinking and eating) or emotional responses like anger, fear and anxiety. We can let go of these responses but this takes practice.

Understanding what your goals and values are for the long term can help you keep going. So instead of running away from unpleasant thoughts, emotions or memories you can practice defusing them and accepting them.

### Two sheets of paper activity

Take two sheets of paper and write on one of them ‘values’ and on the other ‘unhelpful thoughts, feeling and sensations’. Hold them up side by side. Notice that the unhelpful thoughts and feelings are up close to you. Now move the values sheet in front of the other.

Psychological flexibility simply involves bringing your values into focus, without removing unhelpful thoughts and feelings (which is impossible). They are still present just not as prominent.

### Psychological flexibility

This exercise is designed to bring the six techniques together

Spend a few minutes considering the way you respond to situations and events which have recently caused you to have unwanted or unwelcome thoughts. What happened? How did you respond to the thought? Is this something you do often? Was it in line with your values? Did it move you towards a valued action or away from it? What did it cost you in terms of energy?

Now practice holding your thoughts lightly by saying ‘I am having a thought that...’ Acknowledge it, accept it is there and let it float by like you are watching a cloud pass overhead in the sky.

If it helps, write it down using this exercise sheet

<b>Explain the situation in a sentence or two.</b> What happened?	<b>What unwanted thought, feeling, sensation or memory did you have?</b>	<b>How did you respond at the time?</b> Did you try to suppress them/ did you try to avoid the situation? Did you leave?	<b>What did this cost in energy?</b> Did you feel emotionally drained after? Or were you left with energy? How much time did you spend on this response?	<b>Was this in line with your values?</b> i.e. did this help you move towards something you hold important? Or did it reduce the experiences and opportunities open to you?

Being aware of the present moment and what you are experiencing in the moment can help you to view the thoughts, feelings, sensations or memories from an objective perspective. I.e. it can

help you step back and consider how you wish to respond to them and to *choose* your response, one that is in line with the things you most want. Turn off auto-pilot and act mindfully.

## Goal setting

This time choose a different value to focus on for the week and set three goals you want to reach which are in line with it.

Consider the goal as a specific activity. Your goal can help you choose actions and behaviours which will help you move towards your values and also let you know you are on the right path.

For example

*Kayley\** valued her interest and enjoyment in reading, she finds it relaxing and enjoyable. However over the past year she has found that she has not been able to give as much time and energy to pursuing her chosen life value (exploring literature and expanding her knowledge) as she had hoped. She decides to set some goals to help her along her way to living in accordance with her values

*Get them now goals:*

Once a week / month dedicate an hour/day to visiting the library to find a new book

- *Future goals:*

Join a book club to read and discuss her favourite books with others

- *Wild card goals:*

Write her own book

Ask yourself

What meaningful activities do you want to pursue in your life?

Turn your values into actions for your everyday life. Remember that these goals are here to help you along your road to reaching your values (chosen life directions)

## Week 10

### Barriers

But what about those barriers that stop you reaching your goals and living in accordance with your values? We all face them but what do we do about them?

Over the coming weeks you will be introduced to a technique called ‘cognitive defusion’ (in week 6) and in week 8 you will learn how to hone your skills in self-observation. These skills will help you when faced with unwanted thoughts and feelings.

Thinking ahead and predicting your own personal barriers is one way you can begin to accept them. Try to think about the barriers you face? Here are some examples;



### Internal barriers

For example: situations, thoughts, and feelings

Fearful thoughts that crop up even when we are ready to make positive life changes ‘*it’s too hard*’, ‘*I will fail*’.



### External barriers

For example, events and behaviours of others, colleague’s behaviour at work, they fail to arrive on time for a work meeting or they do not communicate with their team information that you/others require.

Sometimes you can plan for such barriers and prepare how you will respond and what you will do in such a situation. You can think about this ahead of time and write down what you could do to overcome a barrier.

## Goal setting and Barriers activity

*Example*

**My goal is** to continue and complete my education and training programme. **I wish to achieve this** each week I will attend my course and dedicate one evening a week at home to my studies. **This goal will help me in the pursuit of my value** to educate myself and work hard towards bettering my career **Which is important and meaningful to me (because)** I want continue to provide for and to support my family so they too can grow and learn and take part in activities which they enjoy and value.

**My goal is to**

I wish to achieve this \_\_\_\_\_ often or when  
\_\_\_\_\_

This goal will help me in the pursuit of my value  
\_\_\_\_\_

Which is important and meaningful to me (because)  
\_\_\_\_\_



### Internal barriers which I might experience

1.

---

2.

---

3.

---



### External barriers I might experience are

1.

---

2.

---

3.

---

## Week 11

### Self-compassion

Self-compassion simply put is all about being kind to yourself. Looking after yourself and treating yourself as your best friend might.

Suffering and discomfort can last a moment or it can last longer. Remind yourself that that this is part of life. Everyone experiences some level of unpleasant emotions. You are not alone, others feel this way too. Be kind to yourself.

Self-compassion is also about acknowledging your own limitations and accepting them for what they are, simple human traits. None of us are perfect, we all have flaws. You have been asked earlier to set realistic and achievable goals that are important to you. Try and be realistic and kind to yourself as well.

#### Example

Tom\* experienced a setback at work in response he became defensive and blamed others then he criticised himself. This didn't improve his well-being. Trying to avoid responsibility by being defensive and blaming others may have made him feel better for a moment but it meant he didn't consider the reasons why he failed and so he didn't learn from the situation. Meanwhile the being

so hard on himself lead him to have low self-esteem and lose confidence in his abilities which also undermined his personal development.

Instead Tom could have been kind to himself as his friend Jamie\* was. Jamie said “mate that’s disappointing, I’m sorry you missed out, want to go for a coffee and talk about it?”.

Self-compassion can in this way lead to growth mind-set as you allow yourself to learn from what’s happened and being kind to yourself can boost well-being.

### **Try now**

#### **Self-compassion exercise**

Working in a care-giving profession or simply being a family member means there will be times when you will need to recharge and refresh to ensure you have enough energy available to share with others.

For some of us we need this each day, others less often. Either way it’s important to allow yourself that time to recharge. Even recognising that we each have needs is a good starting point to boosting your well-being.

#### **Practice the following.**

1. Each day give yourself permission to meet your own needs.
2. Plan ahead and add in something you can do for yourself each day (stay small) and each week / month (think big).

#### **Example**

**Stay small**, set aside 10 minutes to listen to relaxing music, learn a yoga move to try out each day, chat to a friend, get up 5 minutes earlier or go to bed 5 minutes earlier.

**Think big**, book yourself an hour session at the LC2 spa £6, ask a friend to join you for a walk one day or book a lunch out/event. Join a book club or an exercise class you love and go to it once a month. Plan a new adventure!

Of course it’s also important to consider your own needs whilst at work as well. Not everything can be left until ‘home time’. If you’re feeling stressed or over stretched try giving yourself positive words of support (for example “I know this is hard right now, its ok to feel overwhelmed”).

### **Simple Ways to Get Present (From Russ Harris 2018)**

#### ***Take Ten Breaths***

This is a simple exercise to centre yourself and connect with your environment. Practice it throughout the day, especially any time you find yourself getting caught up in your thoughts and feelings.



1. Take ten slow, deep breaths. Focus on breathing out as slowly as possible until the lungs are completely empty—and then allow them to refill by themselves.
2. Notice the sensations of your lungs emptying. Notice them refilling. Notice your rib cage rising and falling. Notice the gentle rise and fall of your shoulders.
3. See if you can let your thoughts come and go as if they're just passing cars, driving past outside your house.
4. Expand your awareness: simultaneously notice your breathing and your body. Then look around the room and notice what you can see, hear, smell, touch, and feel.

### **Watch**

The School of Life self-compassion clip

<https://www.youtube.com/watch?v=-kfUE41-JFw>

### **Audio**

[https://self-compassion.org/wp-content/uploads/2015/12/self-compassion.break\\_.mp3](https://self-compassion.org/wp-content/uploads/2015/12/self-compassion.break_.mp3)

This is the final mindful mediation included in this course, it's a full body scan exercise so you will need time to give this one a try

**Body scan meditation (45mins)** <https://www.youtube.com/watch?v=u4gZgnCy5ew>

### **Lesson summary**

These skills take time to learn and get comfortable with. Ask yourself again how much time are you prepared to spend on you each day, each week? Go back and look at the time you promised yourself you would set aside. How are you doing? Be kind to yourself.

## **Week 12**

### **Summary**

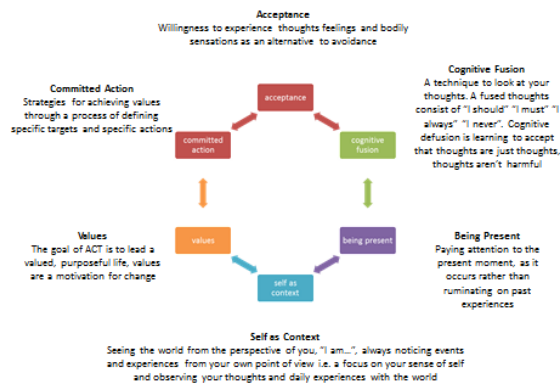
Congratulations!

Over the past 11 weeks you have been introduced to 6 techniques which work together to help you develop psychological flexibility on the basis that this can, over time, improve your emotional well-being and bring you closer towards living a full and meaningful life.

The techniques work together, through practice, to help you accept unwanted thoughts, feelings and emotions rather than trying to fight against them which often in the long run can deplete your well-being. You have been asked to consider your commitment to your own personal goals and values and have had time to notice and consider any barriers that block you and send you in a different direction to the one you really want to go.

Be kind to yourself and give yourself the time you need to embed these new skills and understanding into your daily life so that each day you move towards the life you value and away from old, unhelpful thoughts or habits. Remind yourself that this is a choice you are making with each committed action and each new behaviour. Think about the health challenges you have signed up to here in the champions programme and set realistic, achievable goals.

Return to the exercises and metaphors you have been introduced to as often as needed. Keep reading, visit the ACT website, watch the YouTube clips and explore other resources. Everyone will find different resources useful. Think about the ones you've used.



### Try now

**Feedback** questionnaire Tell us what you think? How did you find it? What worked for you?

**AAQ-II post** questionnaire

**WEMWBS and PHQ4**

### Try at home

### Evaluate your journey

Notice your thoughts this week. What are they?



Notice the techniques you practiced. What were they?



Notice the barriers to practice. What were they?

## Appendix 11: Updated study website used in the final RCT

The study website used in the RCT was developed externally (chapter 4), using wordpress.com and installed onto the university servers. As in the feasibility phase, the study website had several components; Study information, Registration, Personal profile, User dashboard, Communications schedule, Five Champions for Health lifestyle behaviour change modules, and ‘Track your progress’.

The updated website had several changes implemented. For example, all six modules were displayed in the user dashboard as opposed to those which users enrolled onto. Thus, one element of personalisation was lost. However additional functionality was included which addressed the concerns raised in the feasibility study (chapter 5) specifically the inclusion of a password reset, a ‘contact us’ function and a series of improvements to the database and data extraction functions. Other changes included additional instructions on ‘how to take part’ and ‘testimonials’.

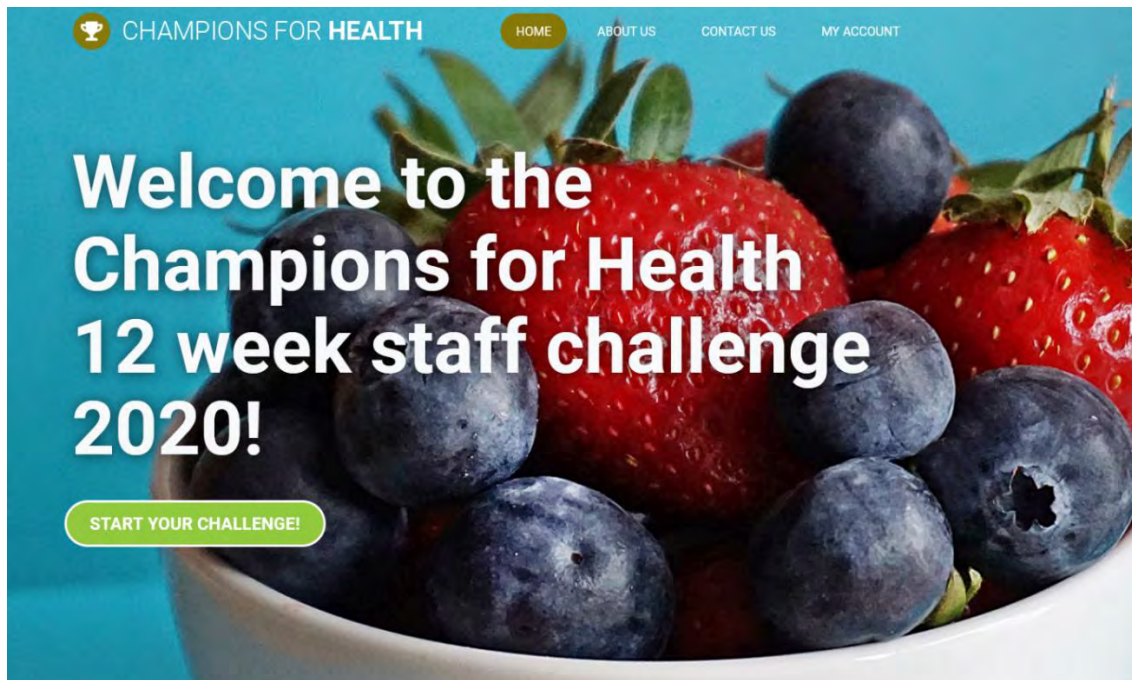
### Study information

Study information refers to all information presented to users via the study website. Study information was displayed on three separate web pages which were externally accessible i.e. any user could access them without the requirement to register.

### Home page

The home page was displayed in five sections; the banner image (Fig. 6.1), the modules (Fig. 6.2), ‘how to take part’ (Fig. 6.3), testimonials, and the bottom banner (Fig. 6.4). Users navigated these sections via the scroll function located on the right-hand side of the screen. A main menu was also located across the top of the website which provided access to the other pages within the website.

### Banner image



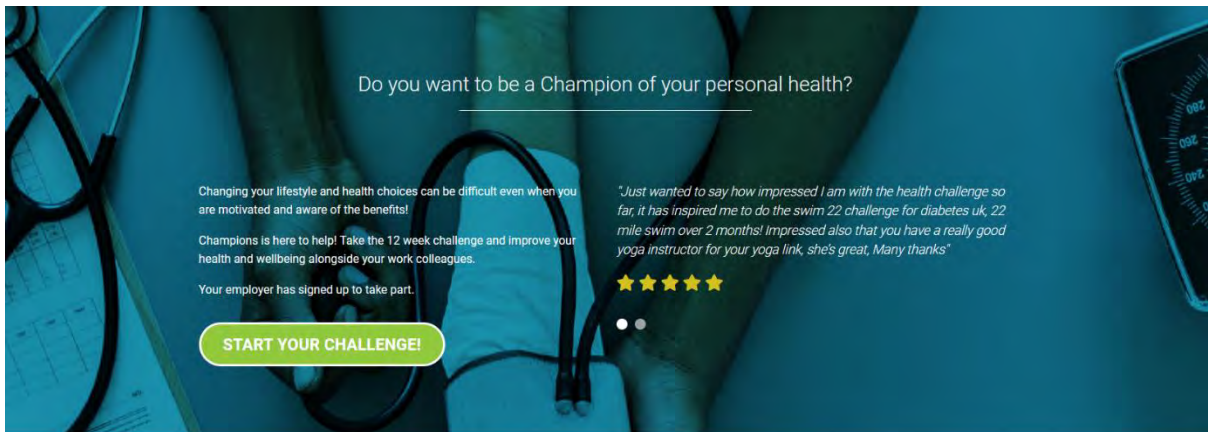
## Lifestyle and well-being modules

<p><b>WEIGHT OPTIMISATION</b></p> <p><a href="#">MORE</a></p>	<p><b>QUIT SMOKING</b></p> <p><a href="#">MORE</a></p>	<p><b>REGULAR EXERCISE</b></p> <p><a href="#">MORE</a></p>	<p><b>DRINK RESPONSIBLY</b></p> <p><a href="#">MORE</a></p>	<p><b>EAT HEALTHILY</b></p> <p><a href="#">MORE</a></p>	<p><b>ACTIVATE YOUR WELLBEING</b></p> <p><a href="#">MORE</a></p>
<p>If you want to optimise your weight, enroll for this challenge. Help yourself with handy hints and tips while you track your progress over the 12 weeks.</p>	<p>If you are ready to Quit Smoking enroll for this challenge and BOOST your health for 2020. Keep motivated with the 12 week tracker.</p>	<p>Looking for ideas on how to introduce new exercise and maintain a regular routine then take this challenge and tell us how you get on.</p>	<p>Want to get your festive drinking back in check? Enroll for this challenge and find out about the health and wellbeing benefits of drinking responsibly.</p>	<p>Looking for a healthy food boost? Trying to get your five-a-day but in need of motivation or ideas? Enroll for the challenge and BOOST your health.</p>	<p>Health and wellbeing go hand in hand. Follow this 12 week Wellbeing booster, learn six quick new techniques to help you with your chosen health challenge(s).</p>

## How to take part



**Testimonials and bottom banner**



**About Us**

This page included background information pertaining the champions programme and included interactive link to contributors' websites.

**About Us page**



### About Us

Champions for Health was developed by Public Health Wales and researchers at Swansea University, Medical School (SUMS). It is an online health and wellbeing programme designed to support staff to make those tricky lifestyle behaviour changes that improve physical health and emotional wellbeing.

There are three specific elements to the programme:

- An online system which allows you to choose a health challenge to take part in.
- A personal dashboard to track and view your personal progress over the 12 week challenge period
- A personal communication schedule through which you will receive the 'weekly wellbeing bite', a series of weekly emails designed to support you in your chosen health challenge.

Champions was first launched in 2012, all across Wales and again in 2014 across Betsi Cadwaladr University Health Board and Velindre NHS Trust. Since then it has been launched in Swansea Bay University Health Board in 2019 with the addition of a new wellbeing resource, designed in collaboration with SBUHB staff.

This year, 2020 the wellbeing resource 'ACTivate your Wellbeing' has been updated



### Acknowledgements and thanks to;

Those staff across SBUHB who contributed to the design and development of the wellbeing resources, your time and energy was gratefully received.

Dr Nic Hooper, an expert ACT practitioner and lecturer at UWE, [visit his website for further information.](#)

Viki Metzler a freelance Illustrator, Cartoonist and Painter based in Swansea, Wales who designed the staff image. [Visit her website for further details.](#)

Vivienne Ventress a local photographer and photography lecturer who provided the beautiful Gower images.

PocketMedic, who kindly provided the wellbeing films. [Visit their website for further information.](#)

Wellbeing through work team for their support and guidance.

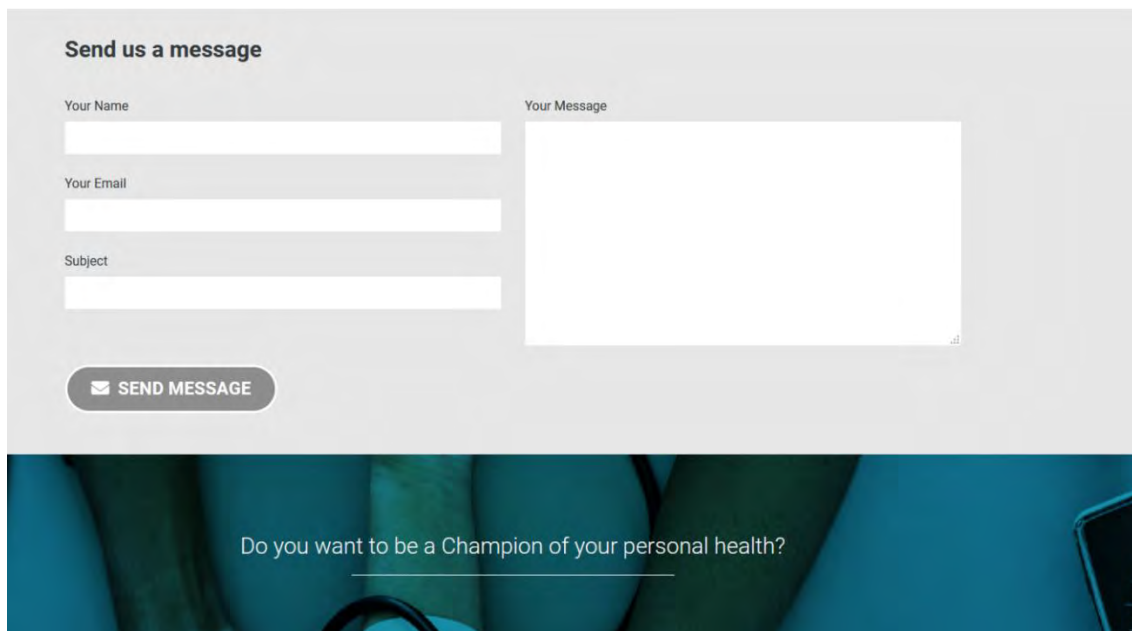
ThomasDesign who supported the development of the website. [Visit their website for further information.](#)



### Contact Us

This page was updated and included a functioning email form for participants to contact the primary researcher (12-hour response). Otherwise the page remained the same.

### Contact form

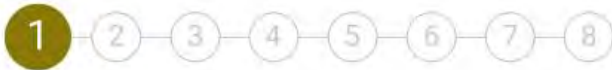


### Consent and registration

The registration form followed the same structure as the feasibility study however each section was separated by a new page and a numbered system was added to show users their progression. The eight pages are displayed All fields were mandatory (an update). If an error occurred an error bar and message was displayed to indicate which page needed to be corrected.

All participants were required to provide consent prior to accessing the study website (beyond the home page). This was provided electronically using a tick box process on the first page of the online registration. The re-designed registration form asked for; username, password, gender, age, location, self-rated health, self-rated work performance, sickness leave in past six months, quantity of one-week absences in the past thirty days and completion of the three self-assessed primary outcome measures.

### Consent



### Step 1 - Consent and Participant Brief

Champions for Health: A Randomised Control Trial (RCT) of a web-delivered acceptance and commitment therapy (ACT) intervention to enhance subjective wellbeing and encourage engagement with lifestyle behaviour changes.

You are being invited to take part in some research. Before you decide whether or not to participate, it is important for you to understand what it will involve. Please read the following information carefully.

#### What is Champions for Health?

Champions for Health, is a web-based, health promotion programme developed by Public Health Wales and researchers at Swansea University Medical School. This website contains information and resources which have been specifically developed to help staff improve their own health and wellbeing.

#### Choose from 5 Health Challenges:

- Get Active
- Five-A-Day Eat healthily
- Weight Optimisation
- Alcohol Reduction
- Quit Smoking

We recommend you choose one or two health challenges to take part in and that you track and view your progress weekly for the 12 weeks.

#### If you take part:

You will have access to the five health challenges (listed above). You can 'track your progress' weekly for your chosen health challenge and view progress in your user dashboard. You can earn health points and health trophies as you go!

Some staff will also have access to a wellbeing resource 'ACTivate your wellbeing' which includes bitesized wellbeing exercises and resources. You will not know if you have access to this resource or not until after you have registered. The researchers will not know what group you are registered to. The purpose of this is to allow evaluation of the wellbeing resource. This resource has been designed with experts and in collaboration with SBUHB staff to meet your needs. It is designed to be used as a self-help resource. This website is not supported by a therapist.

By registering on this website for you are agreeing to take part and are giving permission for your data to be evaluated by the research team at Swansea University. All data will be anonymous. You are free to withdraw at any time, without consequence.

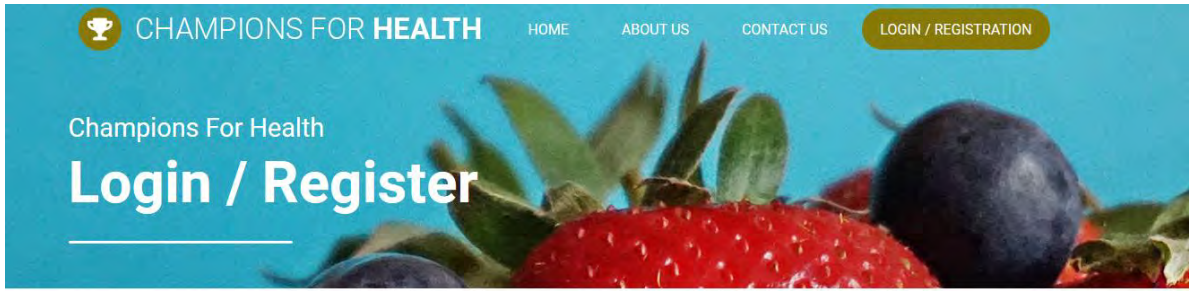
give my consent

BACK

PROCEED

## Registration page two





- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Step 2 - Your Details

Username	Email Address	Role
<input type="text" value="Username"/>	<input type="text" value="Email Address"/>	<input type="text" value="Please select"/>
Password	Re-Type Password	
<input type="text"/>	<input type="text"/>	

Registration page two, error example



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Step 2 - Your Details

Username	Email Address	Role
<input type="text" value="Menna"/>	<input type="text" value="blah@gmail.com"/>	<input type="text" value="NHS Wales Staff"/>
Password	Re-Type Password	
<input type="text" value="*****"/>	<input type="text" value="*****"/>	

**Weak**

## Registration page two, error example two

Email is not valid.

1 2 3 4 5 6 7 8

### Step 2 - Your Details

Username:

Email Address:

Role:

Password:

Re-Type Password:

Weak

## Registration page three

CHAMPIONS FOR HEALTH HOME ABOUT US CONTACT US LOGIN / REGISTRATION

1 2 3 4 5 6 7 8

### Step 3 - Registration Form

As part of the evaluation of this website, we would like to ask some brief questions about you and your general health and wellbeing. This is to help us understand more about who has used the website and whether using the website has an effect on health and wellbeing. Your answers will be completely confidential. (All sections are mandatory. Cannot register without filling in all the boxes).

Age Bracket:

Gender:

Subscribed to emails:

Do you supervise any other employees?:

University Campus:

Occupation:

Generally, over the past 30 days, how would you rate your performance at work?

## Registration page four



**Step 4 - My health and wellbeing**

In general would you say your health is:

In the last 6 months, how many days were you off work for health reasons?



## Registration page five



### Step 5 - WEMWBS

"The Warwick-Edinburgh Mental Well-being Scale was funded by the Scottish Executive National Programme for improving mental health and well-being, commissioned by NHS Health Scotland, developed by the University of Warwick and the University of Edinburgh, and is jointly owned by NHS Health Scotland, the University of Warwick and the University of Edinburgh".  
Copyright statement.

Total score will be displayed in your user profile.

Over the last 7 days I've been feeling...

I've been feeling optimistic about the future

I've been feeling useful

I've been feeling relaxed

I've been feeling interested in other people

I've had energy to spare

I've been dealing with problems well

I've been thinking clearly

I've been feeling good about myself

I've been feeling close to other people

I've been feeling confident

I've been able to make up my own mind about things

I've been feeling loved

I've been interested in new things

I've been feeling cheerful

BACK

PROCEED



## Registration page five, error example

Please answer all fields.



### Step 5 - WEMWBS

"The Warwick-Edinburgh Mental Well-being Scale was funded by the Scottish Executive National Programme for improving mental health and well-being, commissioned by NHS Health Scotland, developed by the University of Warwick and the University of Edinburgh, and is jointly owned by NHS Health Scotland, the University of Warwick and the University of Edinburgh". Copyright statement.

Total score will be displayed in your user profile.

Over the last 7 days I've been feeling...

I've been feeling optimistic about the future

None of the time

I've been feeling useful

None of the time

I've been feeling relaxed

None of the time

I've been feeling interested in other people

None of the time

I've had energy to spare

None of the time

I've been dealing with problems well

None of the time

I've been thinking clearly

None of the time

I've been feeling good about myself

None of the time

I've been feeling close to other people

None of the time

I've been feeling confident

None of the time

I've been able to make up my own mind about things

None of the time

I've been feeling loved

None of the time

I've been interested in new things

Please select

I've been feeling cheerful

Please select



## Registration page six



### Step 6 - PHQ4

The Patient Health Questionnaire for Depression and Anxiety (PHQ-4).

Total score will be displayed in your user profile.

An Ultra-Brief Screening Scale for Anxiety and Depression: the PHQ-4

Over the past 2 weeks have you been bothered by these problems?

Feeling nervous, anxious, or on edge

Please select

Not being able to stop or control worrying

Please select

Feeling down, depressed, or hopeless

Please select

Little interest or pleasure in doing things

Please select

BACK

PROCEED

## Registration page seven

1 — 2 — 3 — 4 — 5 — 6 — **7** — 8

### Step 7 - AAQ-II

AAQ-II questionnaire is a measure of psychological flexibility.

Total score will be displayed in your user profile.

Reference; Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (in press). Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological inflexibility and experiential avoidance. Behavior Therapy.

Below you will find a list of statements. Please rate how true each statement is for you.

My painful experiences and memories make it difficult for me to live a life that I would value	I'm afraid of my feelings.
<input type="text" value="Please select"/>	<input type="text" value="Please select"/>
I worry about not being able to control my worries and feelings.	My painful memories prevent me from having a fulfilling life.
<input type="text" value="Please select"/>	<input type="text" value="Please select"/>
Emotions cause problems in my life.	It seems like most people are handling their lives better than I am.
<input type="text" value="Please select"/>	<input type="text" value="Please select"/>
Worries get in the way of my success.	
<input type="text" value="Please select"/>	

[BACK](#) [PROCEED](#)

↑

## Registration page eight



### Registration Complete

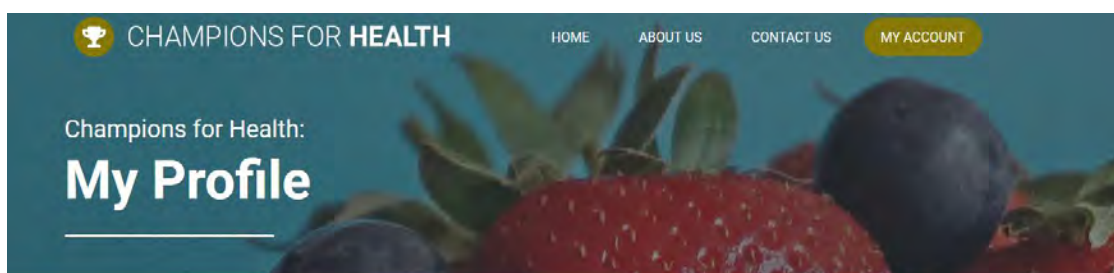
Welcome! Please log in to start your 12 week staff health challenge.



### 6.1.3 Personal profile

As before, following registration users could log into the study website and access their personal profile page. The personal profile page was displayed in coloured sections (colours corresponded to the modules in the user dashboard), users needed to scroll down the page to view all sections. The first section included fields which could be edited after registration by the user; email, age, gender, email 'opt in', supervision of employees, occupation, work performance. The second section displayed the scores from the three outcome measure questionnaires. The final section and the new component displayed user inputted data from 'try now' and 'track your progress'.

#### profile page part one

A screenshot of a form titled 'Your Details'. The form is organized into three columns. The first column contains 'Username: swansea\_admin', 'Age bracket: 36-45', and 'Supervise any other employees: No'. The second column contains 'Role: null', 'Gender: Female', and 'Occupation: Professional occupation (Teacher, nurse)'. The third column contains 'Email address: menna.brown@swansea.ac.uk', 'Subscribed to emails: Yes', and 'Performance at work? (out of 10): 10'. At the bottom left of the form is a yellow 'UPDATE' button. A small upward-pointing arrow is visible at the bottom right of the form area.

#### profile page part two (dummy account)

## Health

Your health is:  
null

Days off:  
null

## Wellbeing Scores

WEMWBS Score is:  
0

Your wellbeing score indicates that you might benefit from additional support. We advise you to use the 12 week wellbeing intervention included in this website. You may also want to contact your GP to access additional support.

PHQ4 Score is:  
0

No further screening is required

AAQ-II Score is:  
0

Your score indicates positive psychological flexibility. We recommend you use the 12 week wellbeing intervention included in this website to develop your skills further.


## After Course

WEMWBS Score is:  
0

PHQ4 Score is:  
0

AAQ-II Score is:  
0

### profile page part three (try now)



## ACTivate Your Wellbeing

---

### Week 1

Your goal for the week:  
make small changes every week Test 2

Dedicated time:  
1 a day

---

### Week 2

Nature based wellbeing goal:  
Test 2

How can you help yourself:  
Test 2

Did you achieve your wellbeing goal last week:  
yes

---

### Week 3

Week 3 wellbeing goal:


How can you help yourself:

Do you need to make time:

Did you achieve your wellbeing goal last week:  
no

### profile page part three (track your progress)



 **Quit Smoking**

**Enroll Results**

<b>Do you currently smoke?</b> Yes	<b>How many cigarettes or e-cigarettes do you smoke each week?</b> 111	<b>Do you want to quit?</b> Yes
---------------------------------------	---	------------------------------------

**Your Goals**

<b>Your goal:</b> blah	<b>Ways to help reach your goal:</b> blah
---------------------------	--


 **Drink Responsibly**

**Enroll Results**

<b>How many days this week did you have an alcoholic drink?</b> 1	<b>How many units of alcohol did you have this week? (recommendations for Men and women are 14 units per week)</b> 10
--	--

**Your Goals**

<b>Your goal:</b> blah	<b>Ways to help reach your goal:</b> blah
---------------------------	--


 **Eat Healthily**

**Enroll Results**

<b>How many days last week did you consume the recommended 5-a-day portion of fruit and vegetables?</b> 5	<b>On average how many of your 5-a-day portions do you eat in a regular day?</b> 4
--	---

**Your Goals**

<b>Your goal:</b> blah	<b>Ways to help reach your goal:</b> blah
---------------------------	--


 **Regular Exercise**

**Enroll Results**

<b>Did you meet the NHS recommendations for physical activity last week? i.e. 150 minutes moderate to vigorous activity</b> Yes	<b>Plus 2 days strength building exercise?</b> No
--	--

**Your Goals**

<b>Your goal:</b> blah	<b>Ways to help reach your goal:</b> blah
---------------------------	--

 **Weight Optimisation**

**Enroll Results**

<b>What is your current BMI?</b> 20
--

**Your Goals**

<b>Your goal:</b> b	<b>Ways to help reach your goal:</b> blah
------------------------	--

**Message displayed to users in profile page**

Messages displayed	Threshold for message		
	WEMWBS	PHQ-4	AAQ-II
No further screening is required. We recommend you use the 12-week well-being intervention included in this website to develop your skills further.	49 and above	0-2	
We recommend you use the 12-week well-being intervention included in this website to develop your skills further. You may also want to contact your GP to access additional support	44 -48	3-5	
Your well-being score indicates that you might benefit from additional support. We advise you to use the 12-week well-being intervention included in this website and that you contact your GP to access additional support.	43.5	6-12	

#### 6.1.4 User Dashboard

The user dashboard displayed username, listed all available modules, provided a summary of recent activity, health points and trophies (Rewards) earned and progress towards next trophy, including information on how points and trophies were earned. Data entered via ‘Track your progress’ was automatically displayed back to the user via a series of colourful graphs. One graph was generated per challenge and each graph displayed progress over the successive weeks i.e. if users recorded data for week one, two, three and four this would be shown in the same graph. Functionality remained the same as in the feasibility study, including the use of gamification features however the visual display was updated.

If a participant hovered over a module it displayed three options; Enrol, Track your progress and More info. Participants could select to enrol on the module, after which point only the latter two options were displayed. ‘Track your’ progress took users directly to the weekly tracking form and ‘More info’ took users to the module content.

#### User dashboard



### Your Current Challenges

Sign up to another health challenge today

- 🚫 Quit Smoking
- 🍷 Drink Responsibly
- 🍴 Eat Healthily
- 🏃 Regular Exercise
- 🏋️ Weight Optimisation
- 🧠 ACTivate Your Wellbeing

### Your Recent Activity

How your time has been divided between challenges

### Your Achievements

All of your progress earns you a success score

**Score = 125**

Progress towards your next achievement

- 🏆 You have earned the Bronze Trophy for achieving 50 points. Congratulations!
- 🏆 You have earned the Silver Trophy for achieving 100 points. Congratulations!

You can earn points and trophies by taking part in the activities found in each module and recording your progress. They will appear here in your user dashboard. You will receive 1 point for each visit and 5 points for each activity you complete. Collect points to unlock new trophies.

### Feedback graphs



### 6.1.5 Communication schedule

During registration participants could 'opt in' to receive a semi-automated weekly email reminder, which included the website link, the challenge week, contact details for the primary

researcher and a health and well-being related motivational message. The messages changed weekly and were planned in advance. However, the message content was altered (week six onwards) in light of the global COVID-19 pandemic and UK-wide lockdown. The messages aimed to encourage participants to keep going even if they had missed a week (in line with suggestions from the consumer panel reported in chapter 5).

The email reminder was semi-automated, a list of participants who had ‘opted in’ was retrieved weekly from the website and checked against participant emails (some participants replied directly to the primary researcher via the weekly reminder and requested to be removed from the weekly email distribution list), email addresses were then extracted and added to a pre-planned schedule of emails (in outlook) which were automatically sent.

The weekly email was formatted as follows

### Weekly email, week one

**WELCOME to the Champions for Health, 12-week Staff health challenge 2020**  
**Thanks for joining us! Week 1 starts today**



We hope you found the registration process easy and that you have selected one or two health challenges to take part in?

You can take part by yourself or as a team to boost motivation.

So what next? well log in and...

[champions-for-health.swan.ac.uk](http://champions-for-health.swan.ac.uk)

- Each challenge is designed to be used on a weekly basis
- You will find information, tips, advice and links to extra resources in each challenge area
- Then once a week ‘**Track your progress**’ and set a personal motivational goal to keep motivated. The more specific your goal the more likely you will be to stick with it.
- You can view your progress, find out how many health points you have in your personal dashboard
- Your profile area can be edited if needed

If you have been randomised to receive **'ACTivate your Well-being'** then each week you have a **'Try Now'** area to set your weekly well-being goal, **'Try me out activities'** and exercises and a 'skill' to learn. Plus, lots of super short YouTube clips and audio files to help you along the way with your challenge. Don't forget your headphones!

Each week there will be an event organised. Watch this space for details. Next Tuesday on Singleton campus, ILS1 atrium 12-1pm, we will be holding a lunch time 'drop in' session. Bring your lunch and come for a chat and meet others taking the challenge. There will be free portions of fruit to boost you in your challenges.

Please feel free to get in touch via the **'Contact Us'** page or email me directly if you have any questions or want to share feedback. Good luck and enjoy the 12 week health boost!!

Best Wishes  
Menna

### **weekly email, week two**

Champions for Health, 12 week staff health challenge 2020

#### Week 2



**Welcome to everyone who joined the challenge last week.....**This the start of week 2. We hope you have selected one or two health challenges to take part in and have tracked and viewed your progress for last week? Did you set a motivational goal? If not you can still do so, just log into the website, visit your user dashboard, you can log in [here](#) and click on track your progress for your selected health challenge. You will also

see 'more info' here if you hover over your selected challenge. This is where the hints, tips, links and info can be found for each challenge. Any questions just get in touch via email. If you have access to the well-being module, have you tried any of the exercises/activities and set your well-being goal in 'Try now'?




**Tomorrow (Tuesday 25<sup>th</sup>) why not come along to ILS1 Atrium 12-1pm and join us for a BYO lunch and launch on singleton Park Campus.** Meet others taking the challenge, have your photo taken (group photo) and grab some fruit for your 5-a-day. If you have any questions or comments this is a good opportunity to ask. Events at other locations to follow if you are not close enough to join this week. Watch this space.




February 6<sup>th</sup> was [Time to Talk day](#). Time to talk day is about the chance for all of us to be more open about mental health – to talk, to listen, to change lives. Keep this momentum going all month and beyond.





The challenge will run for the next 11 weeks and each week you can log in to 'track your progress' in your chosen health challenge. By doing this you can earn health points, trophies and view your progress in your personal dashboard. We hope this is helpful in boosting motivation.

Good luck.

### Email message content

Week	Message content	Image used
3	Many people find working with a 'buddy' helpful in achieving their Champions for Health goals - is there someone you could join up with to encourage each other?	
4	New year seems a very long time ago and those healthy resolutions may have faded. Writing them down and talking about them might help boost your motivation?	
5	How are you getting on? Don't worry if you have missed a day or a week, there is plenty of time to get back on track and regain your health focus and motivation.  A handy tip - Don't forget to let your friends, family and colleagues know that you're taking part - why not ask them to help you stick to your challenges? This can help motivate you to make those changes you want to make.	

6	<p>Yesterday our PM announced that we should all stay home to help flatten the curve and to support our NHS help those of us who will need it. This will be challenging times and as such looking after your health and well-being remains important.</p> <p>Please feel free to continue to use the website to make positive changes to your health. We have taken the decision to continue this project, to support those engaged with the challenge to boost their own health and to support others around them with ideas and tips and a positive approach. Plus reminding us all to be kind to ourselves too.</p> <p>Some people love to record their C4H weekly progress, others hate it! Whichever you are, try to keep a record of how you're doing - it can be a great incentive. Your personal dashboard can be a great way to track and monitor changes and progress. Log in here.</p> <p>There are also many other amazing online resources to access to support your health and well-being during this period. For example, today (a day late) myself and the children joined Joe Wicks online with a structured HIT exercise routine followed by a good play in the garden for fresh air. Please feel free to share your tips and ideas here by return of email and I can add them to the website for others to try out.</p>	
7	<p>Thank you to those who have stayed with us. If anyone would like to be removed from the mailing list though, please just hit reply and let me know. If you have a reason you can share with me that would be helpful but don't feel you have to. Circumstances are difficult for all right now.</p> <p>With all the changes to our daily routines including exercise and eating habits, now could be a good time to switch things up and try a new approach. Log onto Joe wicks at 9am before WFH or use home/garden to get your steps in. Try a new recipe or take time to listen to a guided mindful meditation to switch off.</p> <p>Strategically placed Post-It notes can be a great way to remind ourselves to stick to our C4H challenges and be kind to ourselves. What would you write on yours?</p>	
8	<p>As individuals, families, a country and a global community we are facing an incredibly difficult challenge. Each day we must keep ourselves and others safe. It can be hard to concentrate and focus on things that would normally be straight forward. Be kind to yourself.</p> <p>Keep setting small motivational goals, take each day at a time, and track your progress - Log in here.</p>	

9	<p>If you have stuck with your health challenge well done. Getting and staying more active, eating/drinking healthily and quitting smoking can be hard at the best of times, however right now we are living in challenging times. But dont forget staying active and looking after your health can be a helpful way to manage stress and worry. Stay focused and be kind to yourself. We all have good days and not so good days.</p> <p>Track your progress here. Talk to a friend/family member/colleague tell them what’s working for you, share your experiences.</p>	
10	<p>Take a moment to remind yourself of the reason why you signed up for the Champions for Health staff challenge 2020. Has the challenge helped? Please feel free to get in touch and let us know how you’re getting along, you can reply to this email.</p>	
11	<p>I hope week 11 finds you well. Looking after your health and well-being remains vital during such challenging times. Please be kind to yourself.</p> <p>We have only two more challenge weeks to go! Then it’s time to fill in the feedback form and answer the well-being questionnaires again to see if the staff health challenge has been helpful. This is really important for future developments of the website. We want to make sure the resources are in line with your needs. Log in here.</p> <p>Also after the feedback stage I will open up the well-being resources to all who are interested.</p>	
12	<p>This is the final week of the Champions for Health 12 week staff challenge, the 12 weeks haven’t been as expected. I hope everyone this email reaches is well and that in some way you have each have found some time to be kind to yourself, even if that has just been to carve out 10 minutes to yourself each day.</p> <p>Taking care of your health and well-being remains vital when faced with sustained difficulties.</p> <p>Please can I ask everyone who signed up, regardless of how much or little you have used the website to please, please provide feedback even if its just to say how it could be improved to better suit your needs. All feedback is welcomed. We do really want to know what you would like to see added/changed/removed etc.</p> <p>Also its really important for you to complete the two well-being questionnaires again, this allows us to evaluate whether there has been any benefit. If you could all find time to finish the challenge that would be really helpful for future improvements.</p>	

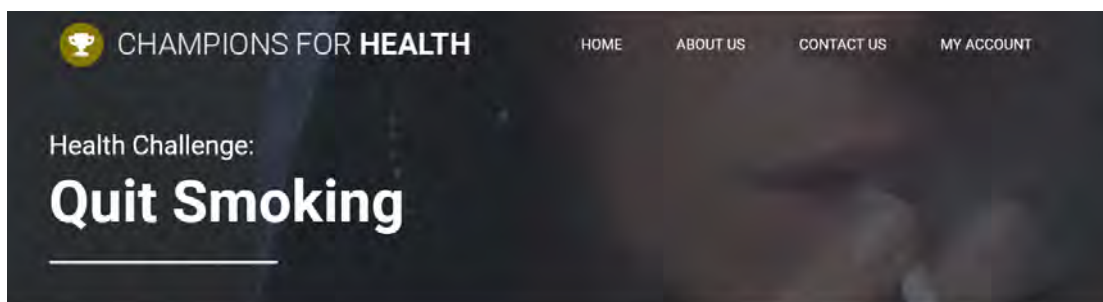


	Both the feedback survey and the well-being questionnaires can be found in the website.	
Additional email	<p>Further to my final week email (and request for feedback and completion of the two well-being questionnaires, it has been brought to my attention, that the feedback form doesn't allow for a n/a response for those not randomised to receive the well-being intervention.</p> <p>If this is you and you are kind enough to provide feedback, please select the first option available and then in the free text comment box please indicate that you were 'control'. This might also be a good opportunity to let me know if you would like to have access to the well-being module after the website has closed for those that didn't have it already.</p> <p>Apologies for the inconvenience, hope this suggestion is easy to use and doesn't put anyone off providing feedback.</p>	

### 6.1.6 Champions for Health lifestyle behaviour change modules

The modules (described in chapter 5), were displayed on a vertical menu bar, using a tab system to aid navigation as before all modules were accessed via the home page or user dashboard. Updated enrolment questions are presented, no enrolment was required for the emotional well-being module.

#### Quit Smoking



The image shows the content of the 'Quit Smoking' module. On the left is a vertical menu with options: 'Stop Smoking', 'Hints & Tips', 'Getting Support', 'How Bad is Smoking?', 'Nicotine Addiction', 'What's in a Cigarette?', and 'Local Picture'. The main content area features an illustration of a red figure kicking a cigarette pack and the title 'Quitting smoking equals better health'. It lists health benefits in two columns:

- Immediate Health Benefits:**
  - After 8 hours:** Nicotine and carbon monoxide levels in your blood reduce by half. Oxygen levels return to normal.
  - After 24 hours:** Carbon monoxide eliminated from your body. Lungs start to clear out mucus and other smoking debris.
- Longer Term Health Benefits:**
  - After 2-12 weeks:** Your blood circulation improves.
  - After 3-9 months:** Coughs, wheezing and breathing problems improve as your lung function is increased by up to 10%.
  - After 1 year:** Your risk of a heart attack falls to about

## Alcohol Reduction

 **CHAMPIONS FOR HEALTH**HOME ABOUT US CONTACT US MY ACCOUNT

Health Challenge:

# Drink Responsibly

- Drink Safely
- Hints & Tips
- Alcohol Knowledge
- Night Out
- Alcohol and Health
- Units
- Alcohol and Weight



### How drinking responsibly can improve your health

There's nothing wrong with enjoying a drink within sensible limits, but regularly drinking more can be bad for your health and the way you feel.



## Weight optimisation

- Healthy Weight
- Yo-yo Weight
- Lifestyle
- To Diet or Not?
- Do's and Don't's
- Overweight So What?
- Healthy Body Weight
- Local Picture



### Working Towards a Healthy Weight

#### A healthy weight equals better health

How you will improve your health by working towards a healthy weight...

#### Physical Benefits

Maintaining a healthy weight can reduce the risk of;

- Coronary heart disease, angina and heart attacks
- Chronic health conditions including type 2 diabetes, obesity, and high blood pressure (hypertension)
- Some cancers
- Excessive weight gain
- Dental problems

A healthy and balanced diet can help you maintain a healthy weight and keep your heart healthy

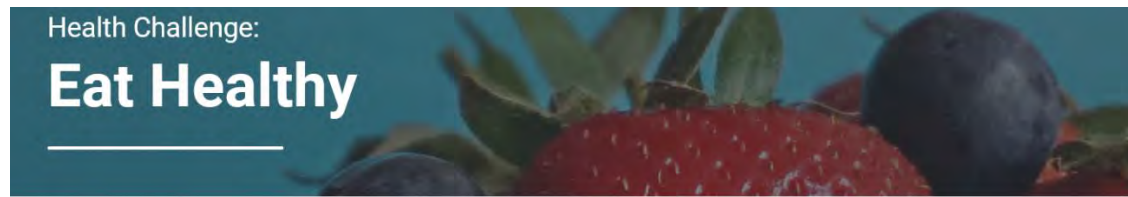
#### Wellbeing Benefits

Maintaining a healthy weight can improve your mental health and wellbeing;

- You can have increased energy levels which help you keep active
- Your levels of self confidence and motivation will be higher
- Your sense of wellbeing will be improved along with your self-esteem.



## Eat Healthily



- Eat Healthily
- Boost your 5 a day
- Swap
- Plan Ahead
- Poor Diet?
- Balanced Diet
- Local Picture



### How eating 5-a-day can improve your health

#### Fruit and vegetables are good for you because...

- Different fruit and vegetables contain many combinations of fibre, vitamins, minerals and nutrients.
- Fruit and vegetables are low in fat and calories

#### Fruit and vegetable improve your health because...

- Making sure you eat your 5-a-day can reduce the risk of serious lifestyle health issues such as obesity, type 2 diabetes, heart disease, stroke and some cancers

## Regular exercise

- Regular Exercise
- Getting Started
- Avoid Injury
- Alcohol, Sport & You
- Boost Activity
- Lifestyle Changes
- Top Tips
- The Problem
- Aim For
- Local Picture

### The right amount of exercise equals better health. Being active is great for your health.



Here are some ways you can improve your health if you increase your activity levels.

#### Physical Health Benefits

- Reducing the risk of coronary heart disease and strokes by up to 35%
- Reducing the risk of colon cancer by up to 50%
- Reducing the risk of breast cancer by up to 20%
- Reducing the risk of early death by up to 30%

#### Mental Health & Wellness Benefits

- Lowering your risk of suffering anxiety
- Reducing the risk of dementia by up to 30%
- Improving your self-confidence and self-esteem

Exercise is medically proven to help protect against the chronic health conditions of;

- Obesity
- Type 2 diabetes
- Hypertension (high blood pressure)

Increasing exercise can also help manage these other health and wellbeing conditions:

## Module enrolment questions

Module	Enrolment question 1	Enrolment question 2	Enrolment question 3
<b>Quit Smoking</b>	Do you currently smoke? y/n	How many cigarettes or e-cigarettes do you smoke each week?	Do you want to quit?
<b>Alcohol Reduction</b>	How many days last week did you have an alcoholic drink?	How many units of alcohol did you have this week? (recommendations for Men and women are 14 units per week)	-
<b>Weight Optimisation</b>	What is your current BMI?	-	-
<b>Eat Healthily</b>	how many days last week did you consume the recommended 5-a-day portion of fruit and vegetables?	On average how many of your 5-a-day portions do you eat in a regular day?	-
<b>Regular Exercise</b>	Did you meet the NHS recommendations for physical activity last week? i.e. 150 minutes moderate to vigorous activity	Plus 2 days strength building exercise?	-

- no additional questions were included.

### 6.1.7 Track your progress

Each of the five lifestyle behaviour change modules included a ‘track your progress’ function button. This option enabled users to record their progress on a weekly basis. Data entered here populated the user dashboard. For example, in the quit smoking module participants were asked to set a weekly goal, to describe ‘how will you ensure you meet your goal?’ and to enter the number of cigarettes smoked each week. Figures display the other ‘track your progress’ forms.

### Quit Smoking

**Goal setting** Write down your quit smoking goal here.

For example, I will not smoke at all. I will try nicotine replacement patches, I will contact my GP for support. This will help boost my health and wellbeing.

Setting a goal can help keep you motivated. Be as specific as possible.

**How will you ensure you meet your goal?** Jot down ways to help you achieve your goal here.

For example, I will use patches, call the helpline, find something to distract yourself when cravings hit, contact my GP for support, talk to a friend.

Update the above each week to keep you motivated and engaged in your health journey and the 12 week challenge.

How many cigarettes did you smoke this week?

Week 1	Week 2	Week 3	Week 4
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>
Week 5	Week 6	Week 7	
<input type="text" value="5"/>	<input type="text" value="8"/>	<input type="text"/>	

**COMPLETE**



## Alcohol reduction

**Goal setting** Write down your alcohol reduction goal here.

For example, I will not drink on X day, or I will stick to X amount of drinks. This will help boost my health and wellbeing.

Setting a goal can help keep you motivated. Be as specific as possible.

**How will you ensure you meet your goal?** Jot down ways to help you achieve your goal here.

For example, make a mocktail, have a soft drink between alcoholic drinks, switch to light or alcohol free versions of your favourite tittle, plan ahead and schedule in dry days or offer to be the designated driver, don't keep alcohol in the house etc

Update the above each week to keep you motivated and engaged in your health journey and the 12 week challenge.

How many days this week did you have an alcoholic drink? (recommendations are for at least 2 dry days)

Week 1	Week 2	Week 3
<input type="text" value="3"/>	<input type="text" value="2"/>	<input type="text"/>

How many units of alcohol did you have this week? UK recommendations for Men and women are 14 units per week.

Week 1	Week 2	Week 3
<input type="text" value="4"/>	<input type="text" value="3"/>	<input type="text"/>

**COMPLETE**



## Weight optimisation

**Goal setting** Write down your weekly weight optimisation goal here.

For example, I want to lose 1lb a week, I want to maintain my weight, I want to put on weight.

Setting a goal can help keep you motivated. Be as specific as possible.

b

**How will you ensure you meet your goal?** Jot down ways to help you achieve your goal here.

For example, what healthy swaps can you make? Can you plan meals ahead of time? Can you carry healthy snacks in your bag so you don't give in to cravings? Create an exercise plan? Take a photo of everything you eat? keep a food diary? talk to your family to share your goal and let them to join you.

blah

Update the above each week to keep you motivated and engaged in your health journey and the 12 week challenge.

Track your progress each week by entering your BMI.

[Click here](#) for BMI calculator

Week 1	Week 2	Week 3	Week 4
<input type="text" value="20"/>	<input type="text" value="22"/>	<input type="text" value="22"/>	<input type="text"/>

Weight converter link: [Click here](#)

COMPLETE



## Eat Healthily

**Goal setting** Write down your 5-a-day goal here.

For example, I will aim to increase my fruit and veg intake by one portion each day this week. This will help boost my health and wellbeing.

Setting a goal can help keep you motivated. Be as specific as possible.

blah

**How will you ensure you meet your goal?** Jot down ways to help you achieve your goal here.

For example, Add fruit and veg to your lunch, have fruit with brekkie, swap meat for vegetables once a week at dinner, take a fruity snack with you to remind you. Write your shopping list and add in new fruits and vegetables to the list each week, talk to your family and get them involved in the challenge too. Print out this chart and on the go, or share with your family.

blah

Update the above each week to keep you motivated and engaged in your health journey and the 12 week challenge.

How many days this week did you get your 5-a-day?

Week 1	Week 2	Week 3	Week 4
<input type="text" value="5"/>	<input type="text" value="2"/>	<input type="text" value="6"/>	<input type="text"/>

On average how many portions did you eat over the week?

Week 1	Week 2	Week 3	Week 4
<input type="text" value="5"/>	<input type="text" value="4"/>	<input type="text" value="4"/>	<input type="text"/>

COMPLETE



## Regular exercise

**Goal setting** Write down your get active goal here.

For example, I will do X on X day for X minutes. This will help boost my health and wellbeing.

Setting a goal can help keep you motivated. Be as specific as possible.

**How will you ensure you meet your goal?** Jot down ways to help you achieve your goal here.

For example, take your trainers to work so you can walk on your lunch break, pack your gym kit to use on way home, plan ahead decide which day of the week you will walk, swim, jog, cycle etc. ask a friend to join you for a brisk walk. Get your Active 10 in.

Update the above each week to keep you motivated and engaged in your health journey and the 12 week challenge.

How many minutes of moderate or vigorous activity did you get this week (recommendations are 150 mins)

Week 1

Week 2

Week 3

How many days this week did you do strengthening exercises? (recommendations are 2 days a week)

Week 1

Week 2

Week 3

COMPLETE

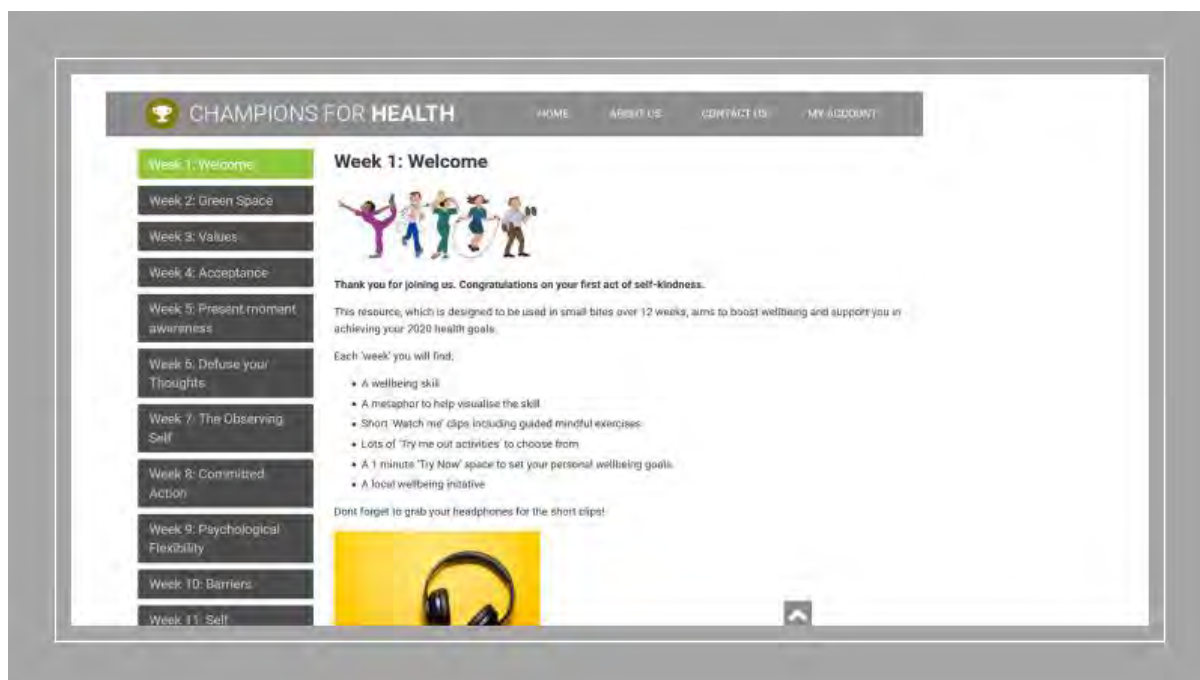


## Appendix 12: Updated intervention used in the final RCT

The well-being intervention was updated following the feasibility study findings (chapter 5), in terms of its content, structure and visual display.

Firstly, the content was streamlined. The psycho-educational ‘pop up’ resources were incorporated into the therapeutic sections. For example, the PocketMedic well-being films were added to week one, the ‘Green space gallery’ was added to week two, the ‘Sleep’ resources were added to week 12, and the ‘Relaxation’ resources were integrated throughout. In addition, the therapeutic content, based on ACT, was condensed and the volume of text shortened, additional scenarios and audio files were added where possible to reduce the dependence on text. These changes were based on qualitative feedback (chapter 5) with the aim to simplify the resource for workplace use. This created 12 standalone sessions, navigated via one vertical menu, each session was based on a different ACT core principle.

### Vertical menu: ACTivate your well-being





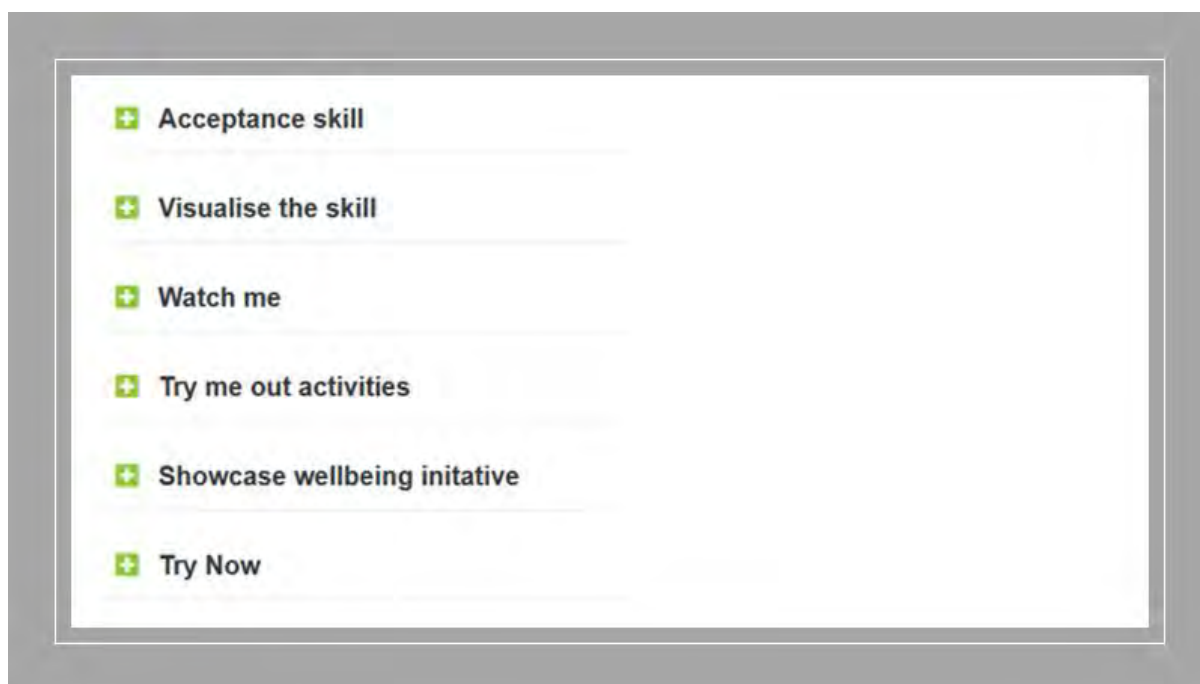
## Module summary

Week	Weekly topic	ACT component	Metaphor	Experiential exercises	'Watch me' clips
1	Welcome	What is ACT?	-	-	Pocket Medic well-being films
2	The restorative effects of nature	-	-	Choose a nature-based activity	Green space gallery
3	-	Values	Compass	Popular self-values exercise, Life as a movie, Camera roll, 80 <sup>th</sup> Birthday party, Batteries exercise, Ten steps to trying on a value	Values vs goals Mindful meditation 1.
4	-	Acceptance	Cold shower metaphor	Big red bus, NAME technique, Butterfly exercise, Acceptance and willingness, Two sides of a coin	Acceptance, The happiness trap, Mindful meditation 2.
5	-	Being present	The dandelion	Notice 5 things, Label your thoughts, Breathing exercise, Practicing gratitude, Mindful listening, Be kind to yourself	Being present, Mindful meditation 3.
6	-	Defusion	Boat on the water	Leaves on a stream, Defusion, Defuse your past, Rule governed, thinking	Defusion, Mindful meditation 4.
7	-	Self-observation	Sky and weather	Self-observation, Documentary, maker	Self as context, The choice point, The value factory, Mindful meditation 5.
8	-	Committed action	Wrong train	Be BOLD, SMART goals, Goal setting, Choosing exercise, Committed action	Values an committed action, Willingness/the struggle switch, Mindful meditation 6.
9	Psychological flexibility	Summary of above	Two sheets of paper	Choice point	Passengers on a bus, Internal hijackers, Mindful meditation 7.

10	Barriers to change	-	Tug of war	Thinking about, Internal barriers, Costs of avoidance	Demons on a boat, Mindful meditation 8.
11	Self-compassion	-	Mirror	Self-compassion, Simple ways to get present	Self-compassion Body scan meditation
12	Sleep			Evaluate your journey Moving forwards	Beyond tired National sleep foundations Excessive sleepiness

The structure of each week was also updated. Each week now included six elements listed in an expandable/collapsible vertical sub-menu. Each element was accompanied by an image.

### Vertical sub-menu



Each week included a description of a ‘skill’, a metaphor to help ‘visualise the skill’, a series of short YouTube clips to ‘watch’ and a selection of ‘try me out’ activities. Within this area a range of downloadable PDF documents were available which could be saved or printed out. participants were encouraged to try one or two each week. A range of exercises were included to offer participants a choice. Each exercise included an ‘indicated completion time’ (in line with user feedback). A new structured goal setting area was added. Participants were able to, set a personal goal for the week ahead, set a specific time and date to undertake the goal, to record how they

would achieve the goal. A final question asked whether they had achieved last week's goal (week two onwards).

The show case well-being initiative included local well-being initiatives being run at ground level across the SBUHB and Swansea University, identified by the primary researcher.

#### **showcase well-being initiatives per week**

<b>Week</b>	<b>Well-being initiatives</b>
2	Well-being Champions Programme (SBUHB)
3	Well-being week (SBUHB)
4	Couch to 5K, Patient feedback team (SBUHB)
5	Power to the Pot Plants (Swansea University)
6	Sustainability craft club (Swansea University)
7	Mindful photography (Swansea University)
8	Waist-line winners (SBUHB)

### **ACTivate your well-being**

The following section displays the well-being intervention, as it would have looked to the participants in 2020.

#### **Week 1**

Week one included a welcome message, a description of what was included in the 12 weeks and introductory resources.

#### **Week 1**



Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers

Week 11: Self

### Week 1: Welcome



Thank you for joining us. Congratulations on your first act of self-kindness.

This resource, which is designed to be used in small bites over 12 weeks, aims to boost wellbeing and support you in achieving your 2020 health goals.

Each 'week' you will find;

- A wellbeing skill
- A metaphor to help visualise the skill
- Short 'Watch me' clips including guided mindful exercises
- Lots of 'Try me out activities' to choose from
- A 1 minute 'Try Now' space to set your personal wellbeing goals.
- A local wellbeing initiative

Dont forget to grab your headphones for the short clips!



Before you start

Wellbeing in Wales

Watch me

Try Now

## Before you start

### This module is suitable for everyone, whatever your wellbeing score was at registration

This 12 week resource is broadly based on acceptance and Commitment therapy (ACT) and has been compiled by an expert ACT practitioner and experts in health psychology and mental health.

## What is Acceptance & Commitment Therapy?

Acceptance and Commitment Therapy (pronounced as the word ACT) is an evidence based psychological therapy. It has been clinically proven to be successful for many psychological problems including depression, anxiety and workplace stress.

ACT is effective at maintaining long term behavioural change and fits well within the Champions for Health programme.

## Taking action

The resources will guide you through 6 ACT techniques to help you boost your wellbeing. They will help you identify your personal values, set motivational goals and support you in facing your personal barriers.



## Wellbeing in Wales

### Local picture

Data from the **National Survey for Wales 2018/19** reports that Welsh average wellbeing scores were **51**. This was calculated using the Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS i.e. the questionnaire you filled in at registration).

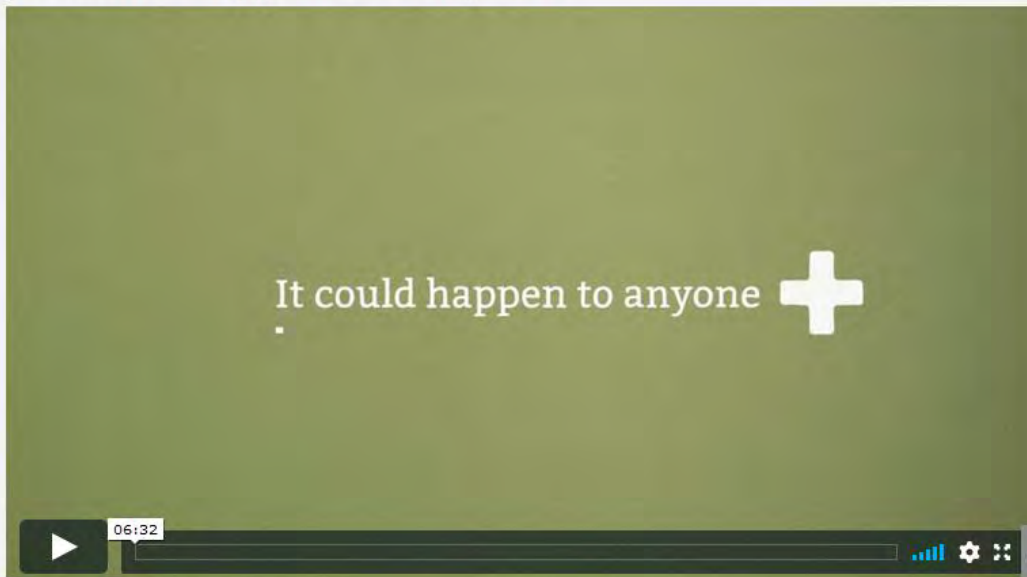


Watch me

Grab your headphones for these 5 PocketMedic Wellbeing films...



## It Could Happen To Anyone



## Try Now

### Try Now

Over the next 12 weeks you will have the opportunity to set your own wellbeing goals.

Let's start now. Take a moment to consider what you want to achieve by taking part in this 12 week health challenge and wellbeing journey.

Set your goal here

How much time (minutes) can you give to yourself each day/week? be kind to yourself.

**SAVE**

## Week 2

Week two focused on the benefits of nature and the natural environment and highlighted the benefits of small interactions in nature.



- Week 1: Welcome
- Week 2: Green Space
- Week 3: Values
- Week 4: Acceptance
- Week 5: Present moment awareness
- Week 6: Defuse your Thoughts
- Week 7: The Observing Self
- Week 8: Committed Action
- Week 9: Psychological Flexibility
- Week 10: Barriers
- Week 11: Self Compassion
- Week 12: Wrapping Up

## Week 2: Green Space



**Nature and the natural environment help BOOST recovery from mental exhaustion, burn out and workplace stress.**

It's not always possible to escape to a beautiful secluded beach or wander through a local nature trail. However...**Research** has shown that *small* interactions with nature have positive health benefits, restore concentration and aid illness recovery.

Read more [here](#) and [here](#).

Small interactions like...

- travel through areas of natural beauty (think your walk to work or a walk over coffee/lunch break)
- viewing outdoor scenes via computers, photographs, windows!
- gardening
- sitting outside (think lunch break, find a bench and take 10)

- [+ Watch me](#)
- [+ Try me out activities](#)
- [+ Showcase wellbeing initiatives](#)
- [+ Try Now](#)



**Watch me**

### **Green Space Gallery**

If you don't have a view from your work space or time for a 10 min (or longer) walk at lunch then try our green space gallery for inspiration.

These beautiful photographs were kindly provided by local photographer and lecturer, Vivienne Ventress.

Please use the 'Contact Us' page to send in your own photographs that you would like to share here.



## Try me out activities

### Choose one or two from the following activities to try out this week

Take part in a nature based activity like:

- Gardening
- Walking / running in natural environment
- Rest periods in a natural environment
- Cycling
- Geocaching
- Geocaching / Family scavenger hunt/ Treasure hunt
- Go Ape
- Surfing



The Gower has some great walks, from short easy ones to more time consuming options.

- **Easy:** Stroll through Singleton National Botanical Gardens, walk down to Swansea bay sea front, pootle round Brynmill Park on lunch break or after work.
- **Medium:** Tor bay, Caswell to Castleamare, Clyne gardens.
- **Difficult:** Swansea coastal path, for longer routes, Rhossilli downs, the Gower MacMillian challenge (September each year)

For more walking ideas visit;

[National trust website](#)

[Gower ramblers club](#)

Let us know what your favourites are and we can add suggestions for others here.



Relaxation in nature can also help. For example see whats on offer at;

- [Urban Zen](#)
- [Swansea community Farm](#)
- [Swansea bay park run](#)
- [Park lives](#)

## ■ Showcase wellbeing initiatives

### Wellbeing Champions Programme


October 2016 saw the launch of the **Wellbeing Champions network** coordinated by Bethan Lavercombe, Workforce Programme Manager – Staff Health & Wellbeing, Swansea Bay University Health Board.

To date 360 wellbeing champions have been trained and are available to support staff with health and wellbeing needs.

This initiative has meant that health board staff have peers and colleagues on hand to help them when they need it.

To find out more or to become a wellbeing champion contact the team via email on [SBU.WellbeingChampions@wales.nhs.uk](mailto:SBU.WellbeingChampions@wales.nhs.uk) and read about the service development [here](#)



 Try Now

### Try Now

Can you choose a nature based wellbeing goal for the week ahead (week 2)? What is it?

How can you help yourself achieve it? When will you do it? What day? What time? what do you need to do?  
Can you ask someone to help you?

Be specific set small achievable goals that will help you move to where you want to be.  
Did you achieve your wellbeing goal last week?

**SAVE**



### Week 3

Week three introduced the first of the six core ACT principles

Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers

Week 11: Self Compassion

Week 12: Wrapping Up

## Week 3: Values



### What do you value?

Knowing what you really value in life is crucial to positive psychological health. This is because knowing what your values are helps you to live in a way that is consistent with what matters most to you.

+ Values skill

+ Visualise the skill

+ Watch me

+ Try me out activities

+ Showcase wellbeing initiatives

+ Try Now



## Values skill

### Develop your values

Often we act impulsively and in a way that is not consistent with our values. As a result we end up doing things that we don't actually want to be doing; snacking on cake when we want to live a healthier life, avoiding a networking or social event that would help us connect with others, drinking too much alcohol to avoid thinking about something, sitting down and watching T.V in the evening instead of going for a walk or to an exercise/hobbie class that could boost our energy or allow us to make new connections.

Spend some time thinking about your values. Don't feel you have to restrict yourself, think big and small. No need to wait for your thoughts or feelings to be ready before you take action!



Practice making choices that will lead towards this direction and set small daily or weekly goals to help you get there. If there was something you used to do but have stopped doing can you try it again? Or can you think of something that will bring you the same benefits?



## Visualise the skill

### Compass



A popular way of thinking about Values is the 'compass metaphor'. The value is the direction you want to move towards (north, south, east or west) and goals are the check points along the way that help you stay on track (they are reached/obtained). Goals are specific actions you set out to achieve but they are not the end point.

Values and goals are something to explore and consider. It may take some time to pin them down. It is easy to loose sight of our values in the pursuit of a goal.

Watch me

### Grab your headphones...

In the following clip 'Values and goals' Dr Russ Harris explains a values based approach to life. This is an alternative way to live that isn't focused on the pursuit of 'goals' which are short term and less helpful in directing our lives.

### Values vs Goals (3:41)

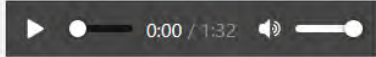


### Mindfulness Meditation 1: stress and relaxation guide (3 mins)



## Try me out activities

### Choose one or two from the following activities to try out this week



These are exercises that you can try out. You can return to these exercises any time and try them again. They are designed to be used over time. **Pick and choose the ones that appeal to you.** No need to do them all.



#### Popular self-values (5 mins)

Consider what is important to you, how you would like to spend your time, what sort of person you would like to be. What do you want your life to look like? Think about a celebrity or person you like. What is it about them that you admire?

Using this [PDF](#) or on a piece of paper take a few minutes to add the following values under one of the three headings:





## ■ Showcase wellbeing initiatives

### Wellbeing week

October 2019 was the 3rd **wellbeing week** at SBUHB, approx 650 staff took part in the health and wellbeing fayre which included interactive stands and workshops covering both physical health and emotional health.

**Mindfulness, meditation, menopause and positive psychology, Living Life Well Programme, Time to Change Wales, sedentary working, salsa dancing, smoking cessation, nutrition and dietetics** were all included.



If you would like to be involved in the planning and delivery of the Wellbeing Week 2020 or have any ideas to improve future events please email [SBU.WellbeingWeek@wales.nhs.uk](mailto:SBU.WellbeingWeek@wales.nhs.uk)

Swansea university also held a staff wellbeing week in 2019. The week had similar opportunities for staff to think about their own lifestyles and wellbeing needs and to try out workshops.

Can you set one up in your organisation? or contribute to an existing event?



## Week 4

Week four explored the principle of acceptance



Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers

Week 11: Self Compassion

### Week 4: Acceptance



Life can be difficult at times. Try to EMBRACE and ACCEPT difficult thoughts and feelings rather than AVOIDING them. Avoidance is an energy drain.

+ Acceptance skill

+ Visualise the skill

+ Watch me

+ Try me out activities

+ Showcase wellbeing initiative

+ Try Now



## Cold Shower Metaphor



Imagine two scenarios: You are thinking of taking a shower but you discover there is no hot water:

1. If you had the choice to have a cold shower...or not to, you might choose not to because it's cold, uncomfortable! You could not shower, 'I will be cold afterwards', 'I'm not that smelly' or 'I'll wait until the morning' etc. You might not shower because there's no point in putting up with that much discomfort for no good reason.
2. But if a close relative or friend was getting married that day, you might want to be clean and fresh. If you stopped for a few minutes and you thought about the person getting married and how much you care about them, and the enjoyment you would get sharing their special day, would you embrace a few minutes of discomfort in the cold shower, because it was important to you? Might you be able to put aside your feelings of discomfort, because you wanted to be fresh and clean for the great day ahead?

Watch me

Grab your headphones...

Guided mindfulness clip 2: being present (5:19)



Acceptance (1:46)

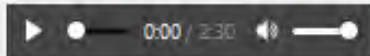


The Happiness Trap: Evolution of the Human Mind



## Try me out activities

### Choose one or two from the following activities to try out this week



As with last week pick **one or two** to try out over the week to help you learn and practice acceptance, this weeks skill.



#### A big red bus (2 mins)

- Spend 1 minute not thinking about a big red bus.
- How many times did you picture a big red bus, even briefly?
- Now spend 1 minute thinking about something else, anything....
- How many times did you picture a big red bus, even briefly?

This exercise is an example of how trying to avoid something, a thought, feeling, behaviour is not easy and in fact trying not to think about it makes it more likely that you will think about it over time.

Adapted From: Steven C. Hayes (2005) *Get out of your mind and into your life.*



#### NAME technique (5 mins)

Noticing, Acknowledging, Making room for, Expanding to work with difficult internal barriers.

Imagine an unwanted thought, feeling, physical sensation or memory. It might be a challenge or conflict at work. It just pops into your head. You didn't ask it to but it did. Imagine it, picture it in a physical form.

Interact with it, observe it with curiosity, welcome it like an invited guest, make space for it, soften it, hold it lightly, breathe into it, put your arms around it, carry it with you as you move forwards in life. Open up to it.

This is acceptance.

Create space and allow what is present

What shape would it be?

## ■ Showcase wellbeing initiative

### Couch to 5K

In 2019 The Patient Feedback Team Swansea Bay University Health Board (SBUHB) completed the Couch to 5K programme and raised £302 for Macmillan\*

The team started the Couch to 5K programme as part of the department's wellbeing in work initiative.



Hazel Lloyd, Head of Patient Experience, Risk and Legal Services said: We would like to thank all the staff and everyone who has donated. A special mention to Ceri Viazzani for starting the wellbeing groups and keeping us all motivated. *We really did not think that we would be running 5K. All the hard work paid off and it's been a great way of getting fitter and making new friends.*



The department also started a walking group (for those who didn't fancy running) and a team curry night.

Click [here](#) to see staff comments

Based at Baglan Head Quarters the walking group has proved very popular and has extended to include some staff from the finance and Planning departments.

\*Article showcased on the staff intranet

## Week 5

Week five explored the benefits of learning to pay attention to the present moment



Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers

Week 11: Self Compassion

Week 12: Wrapping Up

## Week 5: Being Present



Pay attention to the present moment. This means letting go of future worries and past experiences. Be in the here and now. If you find yourself worrying about the future or dwelling on the past, bring your attention back to the here and now. It can help to focus on your breathing as a starting point.

+ **Being present skill**

+ **Visualise the skill**

+ **Watch me**

+ **Try me out activities**

+ **Showcase wellbeing initiative**

+ **Try Now**

## Develop present moment awareness

Being present is about connecting with the moment and noticing what's around you. Accepting thoughts and feelings as they arise and making space for them. It won't happen overnight. This will take practice. Notice when your attention wanders to the past or future and bring your focus back.

Just BE. Be you. Here in the moment. Even if you only manage it for 1 minute a day.



Being present and connecting with the moment can give you freedom to pursue the things you value the most. Notice what is happening and acknowledge that it is happening.

For example, notice you are having a thought (*'I can't do this'; 'I'm not clever enough'*). Allow yourself time to look at the thought and accept it for just that, a thought, a word. Once you have taken a step back from the thought you can allow yourself the space to respond in a way that you really want to (i.e. by doing something that's important to you or takes you towards something that you value).

Having an anxious thought does not mean that you have 'anxiety' it means you are experiencing a symptom of anxiety. Equally feeling stressed and out of control does not mean that you are 'stressed' it means you are experiencing a symptom of stress. Watch it come and go.

When we get wrapped up in our thoughts and feelings, we can react in unhelpful and value inconsistent ways. But when we slow down, there is a better chance that we can choose our behaviour.

**Although mindfulness exercises can feel a bit odd, they are just there to help practice contacting the present moment so that we will be better able to do so when the situation calls for it in the real world.**



## Visualise the skill



### The Dandelion

Think of an internal experience that is uncomfortable or that you wish would go away. If you are experiencing anger, fear, anxiety, or sadness, you can often feel it physically somewhere in your body. If you are in physical pain, you can certainly identify a place in your body where the pain is most significant. For now, focus on the most intense area of sensation or suffering in your body.

**Begin by gently closing your eyes and finding a position that is as comfortable as possible.**



Watch me

Grab your headphones....

Mindfulness Meditation 3: How to mediate when you want to but can't –one moment meditation (5:36)



Being present (2:34)



**Try me out activities**

**Choose one or two from the following activities to try out this week**



**Notice 5 things (2 mins)**

You can do this anywhere but if you're desk based, nip out for a breath of fresh air and take notice of what you hear, see and feel. You can share your thoughts with a colleague when you are back. Or if you are taking a quick break from tasks, sit still, focus for a few minutes and notice the present moment.

Download this [PDF](#) to fill in yourself, why not share with your colleagues?

**Notice 5 things you can hear / see / feel...what are they?**



**Label your thoughts (3 mins)**

Past / Present / Future. As they happen. You don't need to silence your mind to be present. Observe the thoughts, label them and watch as they pass.

This can bring awareness and with it a sense of relaxation which has benefits for health and wellbeing.

Practice present moment living.



**Five quick fire techniques to practice mindfulness (5 mins each)**

Download/print out the [PDF](#) as a reminder in the moment.

## [-] Showcase wellbeing initiative

### Power to the Pot Plants




Staff at Swansea University Medical School have been adding pot plants to their desks and shared office spaces to bring the outdoors indoors and benefit from the restorative effects of nature!!

Can you do the same?

## Week 6

Week six aimed to support participants to learn skills to defuse unwanted thoughts

 **CHAMPIONS FOR HEALTH** [HOME](#) [ABOUT US](#) [CONTACT US](#) [MY ACCOUNT](#)

Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

**Week 6: Defuse your Thoughts**

Week 7: The Observing Self

Week 8: Committed Action


Week 9: Psychological Flexibility

Week 10: Barriers

Week 11: Self Compassion

Week 12: Wrapping Up

### Week 6: Defuse your Thoughts



Words, which sort of happen automatically in our minds, can feel like they have power over our actions. Defusing these words is a skill you can practice that will help you see thoughts for what they are (just thoughts), not as what they say they are (a truth).

- + Defusion skill
- + Visualise the skill
- + Watch me
- + Try me out activities
- + Showcase wellbeing initiative
- + Try Now

## Defusion skill

### Develop your defusion skills

Defusing your thoughts is about creating space between you and your thoughts, identifying your thoughts can help you to look at them as thoughts, not as truths.

Do this by paying attention to your thoughts.

To defuse the unwanted ones try saying, I am having the thought that...." *I cant do this*", "*I'm not good enough*" (this is your unwanted thought here).

How does it feel now?



## Visualise the skill



### Boat on the water metaphor

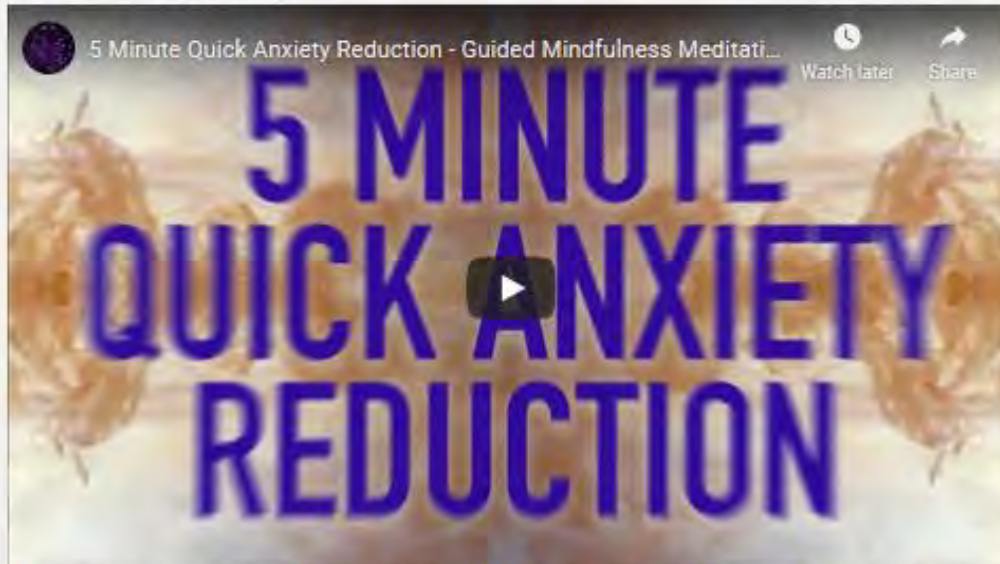
Imagine you're on a boat in the ocean. Imagine using all of your senses as you float along in this boat. Smell the ocean air. Feel the sun on your skin. Picture the horizon meeting the ocean. Feel the boat swaying gently beneath you. Light waves begin to hit the boat, and you feel the boat rise and fall as you hear each small wave hit. Almost as soon as you realize a wave has come, it has passed, and it's not long before another comes along. Sometimes the waves come quickly and powerfully, and then pass. Sometimes the waves are so big that they are all you can see and feel, until they, too, pass.

As the waves continuously go past you, some big and some small, feel each one. As you do, try to notice any thoughts and feelings that arise as well. As you notice these internal experiences, see if you can just ride the waves, allowing the thoughts and feelings to rise and fall, come and go. Stay on the boat, and if you notice that you've been swept overboard into the water, just notice that this has happened, climb back into the boat, and continue to ride the waves

Watch me

Grab your headphones...

Guided Mindfulness clip 4: Anxiety reduction focused (5:28)



This is a short clip produced by the veterans health administration to visually explain the technique of defusion

Defusion (2:43)



## Showcase wellbeing initiative




### Craft time

Craft club is a new lunch time wellbeing group that is run at both Bay and Singleton park campus. Staff can come along with their own personal craft projects or join in with a group craft activity.

Why not try it out or set up your own similar session?


## Week 7

Week seven focused developing awareness and skills to aid self-observation

 **CHAMPIONS FOR HEALTH**    HOME    ABOUT US    CONTACT US    MY ACCOUNT


- Week 1: Welcome
- Week 2: Green Space
- Week 3: Values
- Week 4: Acceptance
- Week 5: Present moment awareness
- Week 6: Defuse your Thoughts
- Week 7: The Observing Self**
- Week 8: Committed Action
- Week 9: Psychological Flexibility
- Week 10: Barriers
- Week 11: Self Compassion
- Week 12: Winding Up

### Week 7: The Observing Self



Self-observation skill: Observe thoughts that you have about yourself. Who is doing the noticing? Everyday we attach stories to our self's with the words 'I am' and everyday there is a part of us that notices this happen. Understanding this can help you to contact this stable observing self and to see self stories for exactly what they are

- + Self observation skill
- + Visualise the skill
- + Watch me
- + Try me out activities
- + Showcase wellbeing initiative
- + Try Now



## Self observation skill

### Develop your observing self

Everyday we make evaluations and judgments. So it is easy to see how we could start believing the thoughts we have to be truths and to respond to them as if they were a real. However, this can be problematic sometimes.

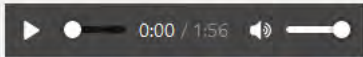
*Helen\* has a job interview, however, she also have a self-story that she is not good at interviews. Leading up to the interview this self-story plays over and over in her mind. The self-story feels so true that Helen decides there is no point in even going to the interview, so she withdraws her application.*

*Immediately following the withdrawal Helen feels relief. However, a few weeks later she realises that she has not acted in line with her values. Her behaviour took her away from where she wants to be.*





## Visualise the skill



### Sky and Weather Metaphor

#### Sky & weather metaphor

*Adapted from Russ Harris 2007 Acceptance and Commitment Therapy (ACT) Introductory Workshop Hand-out*

In this metaphor the sky represents the stable sense of 'I'. 'I' is independent of your unwanted thoughts, feelings and stories (which are represented by the clouds and weather). The sky holds the clouds but is independent of them. It is the stable and on-going sense of self that is always there.

Think of a crystal clear, blue sky. Imagine its expansiveness. Look at its pure beauty. Now picture a cluster of small soft white clouds slowly appearing in the distance, these clouds grow bigger and darker and they roll in and begin to cover the sky so that you can no longer see its crystal clear blue beauty. What if you took a hot air balloon ride or an aeroplane and you rose above those clouds, you would see the blue sky clearly again. The sky was always there it just wasn't visible to you.

The clouds or storms represent your passing thoughts, feelings, memories and sensations. They roll in and block the view but the sky is always there, it doesn't go away and it doesn't change (up past those clouds). The clouds will pass and the sky will be visible again.



Watch me

Grab your headphones...

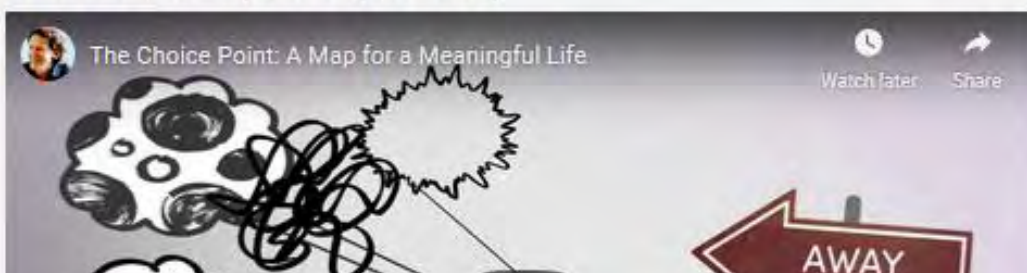
## Guided mindfulness clip 5: Deep breathing exercise



Self as context (1:45)



The choice point (3mins)



## Showcase wellbeing initiative




### Mindful photography

This display of mindful photography can be found in the Health and Wellbeing Academy on Singleton park campus. Its a thought provoking selection of images taken by staff and local people. You might feel inspired to take your own? If so feel free to send them in to be shared here.


## Week 8

Week eight aimed to develop commitment and to explore how-to live-in line with personal beliefs and values







 **CHAMPIONS FOR HEALTH** HOME ABOUT US CONTACT US MY ACCOUNT


- Week 1: Welcome
- Week 2: Green Space
- Week 3: Values
- Week 4: Acceptance
- Week 5: Present moment awareness
- Week 6: Defuse your Thoughts
- Week 7: The Observing Self
- Week 8: Committed Action**
- Week 9: Psychological Flexibility
- Week 10: Barriers
- Week 11: Self Compassion
- Week 12: Wrapping Up

### Week 8: Committed Action



Having values that are important and meaningful is great but if we don't choose to act in ways that support them then they are not much help. Choose commitment. Commit to you and your wellbeing.

-  **Committed Action skill**
-  **Visualise the skill**
-  **Watch me**
-  **Try me out activities**
-  **Showcase wellbeing initiative**
-  **Try Now**



## ■ Committed Action skill

### Develop your commitment to yourself and your personal wellbeing

A committed action is not a promise nor is it an attempt to be perfect. You will make mistakes. What is important is to try. Slowly over time you will build up new responses and patterns of behaviour. Setting goals can help you make choices that are in line with your values.



## ■ Visualise the skill



### Wrong train metaphor

"Imagine you are going on a journey. Somewhere really special, somewhere you really want to go, somewhere you've wanted to go your whole life.

When you get to the train station you see two trains, one is a bit odd looking and strange, some of the seats look a bit hard and overall it looks a bit dirty and uncomfortable.

On the next platform, there is a different train; it's a super train. It looks familiar, safe, reliable, the sort of train you might prefer. The sign says it has air conditioning, a cinema, and a fancy all you can eat restaurant that is free. You think, wow! I just have to take this train, I couldn't possibly make my journey on that other one! So you wait to board this great train' and the odd looking train goes on its way. And you wait for the safe train some more and another odd train leaves the station, and another.

All the while you are waiting for a chance to board this great reliable train so you can take your journey, as yet another odd looking one leaves.

But here is the thing. What if the safe train can't ever board, what if it won't ever leave the station. What if you are waiting for the wrong train.

Watch me

Grab your headphones...

Values and committed action video (1:54)



Willingness / the struggle switch (2 mins)



## ■ Showcase wellbeing initiative

### Waist-line winners

A team of colleagues within the Maxillofacial department in Morriston Outpatients are currently running a supportive weight loss group.

This is their story

"As a close teamed department, we all started to make plans come January that we would all make a conscious effort to be healthier and make better choices, so we've put together our own weekly weight loss group each Friday, called "**Waist-line winners**". Open to anyone that wants to join, the member pays 50p a week or £2 a month and at the end of each month the "biggest loser" wins the totalled amount collected, and a certificate of congratulations as a little incentive.

We also continue our motivation outside of working hours and put together a WhatsApp group, to keep each other motivated and share food ideas or just a little pick me up when each of feels we are struggling or inspiration.

This has so far been a success and we hope to continue this throughout the year."



### Week 9

Week nine brought together the six core principles to consider how they help develop psychological flexibility and the benefits for well-being



Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers

## Week 9: Psychological Flexibility



This week is all about bringing together the 6 skills you have learned. When combined, those 6 skills contribute towards your psychological flexibility, and the more psychological flexibility you have, the better choices you will be able to make and the better your wellbeing will be.

**+ Psychological flexibility skills**

**+ Visualise the skills**

**+ Watch me**

**+ Try me out activities**

**+ Try Now**



## ■ Psychological flexibility skills

### Develop and practice the skills

Skill 1: What is most important to you?

Skill 2: Be willing to experience thoughts and feelings is an alternative to avoiding them.

Skill 3: Be present in the moment.

Skill 4: Defuse your unwanted thoughts without fighting them. Don't waste energy on them!

Skill 5: See yourself as separate from your self-stories.

Skill 6: Commit to your goals



Often, we automatically try to avoid unwanted thoughts and feelings (like fear, anger or anxiety) in unhealthy ways (like smoking, drinking and eating). We can let go of these behaviours but this takes practice. Understanding what your goals and values are for the long term can help you keep going.

What comes up? What thoughts do you have? How did you respond? What skill can you use to create space





## Visualise the skills

### Two sheets of paper

In some ways this course can be summed up in the following exercise.

Take two sheets of paper and write on one of them 'values' and on the other 'unhelpful thoughts, feelings and sensations'. Hold them up side by side. Notice that the unhelpful thoughts and feelings are up close to you. Now move the values sheet in front of the other.



Psychological flexibility simply involves bringing your values into focus, without removing unhelpful thoughts and feelings (which is impossible). They are still present, just not as prominent.

Watch me

Grab your headphones...

## Passengers on a bus (4:51)



This short narrated clip explains the difficulties we often experience when trying to travel towards our valued direction. The internal unwanted thoughts we experience and the role of acceptance in overcoming them.

## Valued directions and acceptance: Struggling with internal hijackers? (3:28)



### Week 10

Week ten identified the role of personal barrier and provided exercises to explore these at individual level



Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers



But what about those barriers that stop you reaching your goals and living in accordance with your values? We all face them but what do we do about them?

**Noticing and just being aware of your own barriers can help lessen their impact.** Thinking ahead and predicting your own personal barriers is one way you can begin to accept them.

+ Overcoming barriers skill

+ Visualise the skill

+ Watch me

+ Try me out activities

+ Try Now



## Overcoming barriers skill

### Develop your skills

Try to think about the barriers you face to living in the way that moves you towards your values? Here are some examples;

#### Internal barriers

Situations, thoughts, and feelings.

Fearful thoughts that crop up even when we are ready to make positive life changes '*it's too hard*', '*I will fail*'.

#### External barriers

Events and behaviours of others, colleague's behaviour at work, they fail to arrive on time for a work meeting or they do not communicate with their team information that you/others require.

Sometimes you can plan for such barriers and prepare how you will respond and what you will do in such a situation. You can think about this ahead of time and write down what you could do to overcome a barrier.



## Visualise the skill

### Tug of war metaphor



Struggling with life experiences can have unintended consequences. For example, it has energy costs.

Imagine a game of tug of war. Your opposition (on the other end of the rope) is your internal barriers (unwanted thoughts and life experiences). Each time you fight against them you are using up energy.

The alternative is to put the rope down.

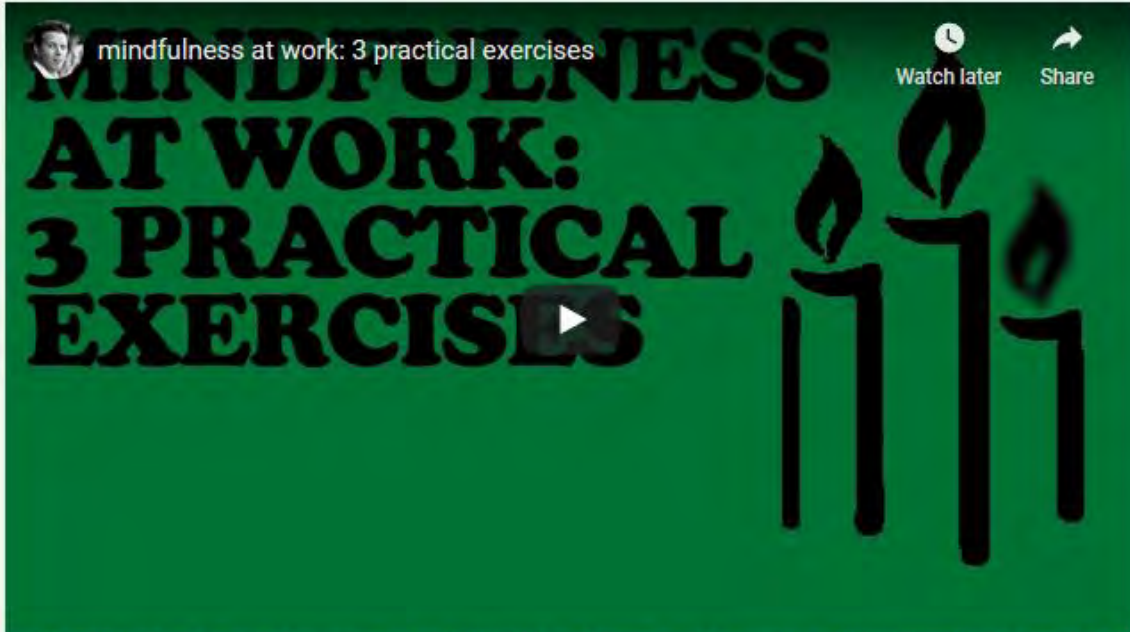
Try being more mindful of when you pick up the rope. Just being aware of the barriers is key.

View the full [Script](#) here

Watch me

Grab your headphones...

Mindfulness Meditation 8: Workplace mindfulness  
(2:45)



'Demons on a boat' metaphor is another narrated clip showing just how much control unwanted thoughts feelings, emotions can have over our life direction. It can be useful to remind ourselves that our thoughts can be like scary demons but they are just thoughts.

Demons on a boat (4:46)



## Week 11

Week 11 drew participants to consider the role of self-compassion in well-being and provided exercises to help explore ways to develop and build self-compassion



Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers

Week 11: Self

### Week 11: Self Compassion



Self-compassion simply put is all about being kind to yourself. Looking after yourself and treating yourself as your best friend might.

**+ Self Compassion skill**

**+ Visualise the skill**

**+ Watch me**

**+ Try me out activities**

**+ Try Now**



## Self Compassion skill

### Develop your self compassion

Suffering and discomfort can last a moment or it can last longer. Remind yourself that this is part of life. Everyone experiences some level of unpleasant emotions. You are not alone, others feel this way too. Be kind to yourself.

Self-compassion is also about acknowledging your own limitations and accepting them for what they are, simple human traits. None of us are perfect, we all have flaws. You have been asked earlier to set realistic and achievable goals that are important to you. Try and be realistic and kind to yourself as well.

*Tom\* experienced a setback at work in response he became defensive and blamed others then he criticised himself. This didn't improve his wellbeing. Trying to avoid responsibility by being defensive and blaming others may have made him feel better for a moment but it meant he didn't consider the reasons why he failed and so he didn't learn from the situation. Meanwhile the being so hard on himself lead him to have low self-esteem and lose confidence in his abilities which also undermined his personal development.*

*Instead Tom could have been kind to himself as his friend Jamie\* was. Jamie said "mate that's disappointing, I'm sorry you missed out, want to go for a coffee and talk about it?".*

Self-compassion can help your to learn from what's happened and being kind to yourself can boost wellbeing. But sometimes we will fail to meet the goals that we set for ourselves, but being harsh and critical to ourselves isnt useful.





## Visualise the skill

### Mirror mirror



#### **Mirror**

Mirror mirror on the wall who is the fairest of them all....me!

When we have self-compassion, we are less likely to depend on others for our self-worth.

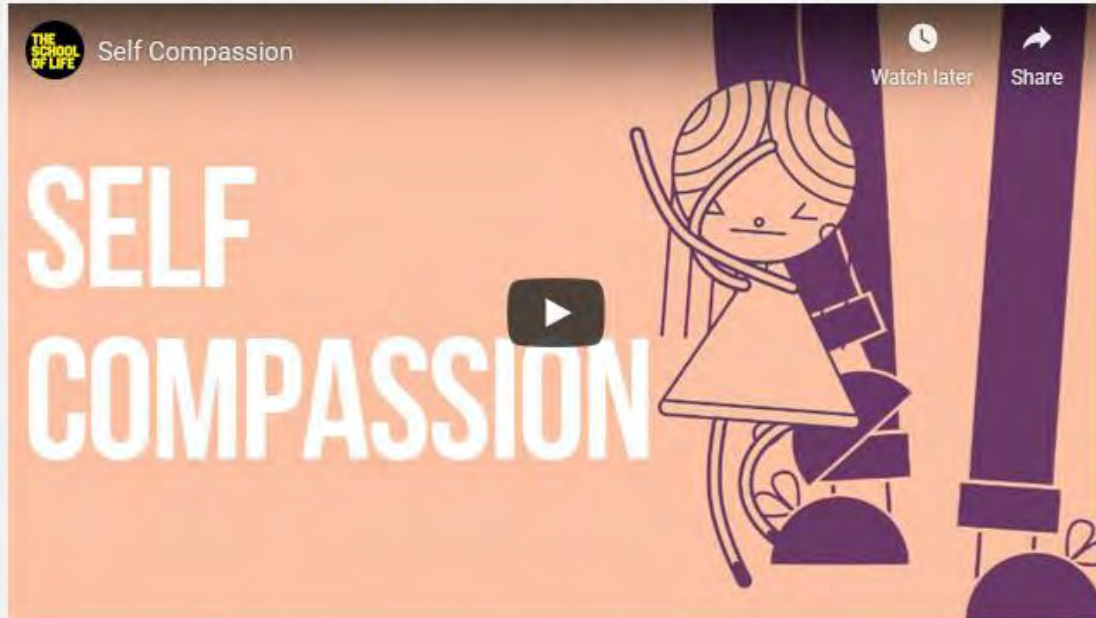
Treat yourself like you would treat your best friend. With kindness and patience.

Click [here](#) for a 5 min self compassion audio file

 Watch me

Grab your headphones...

The School of Life self-compassion clip



## Week 12

Week 12 wrapped up the preceding weeks with the opportunity to reflect on the skills learnt



Week 1: Welcome

Week 2: Green Space

Week 3: Values

Week 4: Acceptance

Week 5: Present moment awareness

Week 6: Defuse your Thoughts

Week 7: The Observing Self

Week 8: Committed Action

Week 9: Psychological Flexibility

Week 10: Barriers

Week 11: Self Compassion

Week 12: Wrapping Up

## Week 12: Wrapping up your Journey



Well done you have completed the 12 weeks, we hope the wellbeing resources have helped you along the way with your personal health challenges?

**Dont forget to fill in the wellbeing questionnaires** now you have reached the end. This will help you see if the course has been of any benefit and will help us evaluate its usefulness.

You can also provide **feedback** using the drop down menu option in 'my account'. Please help us improve by sharing your thoughts.

[+ One last skill](#)

[+ Watch me](#)

[+ Try me out activities](#)

[+ Completion certificate](#)

[+ Additional resources](#)



## ▣ One last skill

### Before you go...

Sleep is important; humans require sleep just like we require food and water to survive.

Disrupted sleep is common with anxiety, depression and mood disorders. The relationship between depression and sleep is not well understood but it is considered to be bi-directional. One may contribute to the other, someone with depression can develop insomnia or insomnia could be the cause of depression and other mental health conditions.

Sleep loss over time can affect also cognition including attention and, energy levels, mood and physical health including hypertension, diabetes, stress response, immune impairment and weight.

Greater sleep satisfaction and good sleep has also been associated with positive wellbeing. Sleep provides opportunity for your body to repair and regenerate itself allowing you to wake feeling refreshed (national sleep foundation). While you sleep your body repairs tissue, enables muscle growth and affords your body an opportunity to relax.

So even if you find you cant sleep at night, try to be kind to yourself by taking the opportunity to rest.



*The amount of sleep we each need varies by age and across the life span. This means that as we age our sleep needs change.*

 Watch me

## Grab your headphones one last time...

These final clips relate to sleep

### Beyond tired



### Symptoms video national sleep foundation (5:40)



## Try me out activities

### Evaluate your journey this final week



#### Evaluate your journey (5 mins a day)

- Notice your thoughts this week. What are they?
- Notice the techniques you practiced. What were they?
- Notice the barriers to practice. What were they?
- How has goals setting helped?
- What can you try again? When?
- How has planning activities helped?

Practice using the [Evaluate your journey PDF](#)



#### Moving forwards (5 mins a day)

To move forwards you must be willing to accept your experiences and connect with them as they occur. While understanding that you are open enough to hold them while not actually being them. For example you are like the sky rather than the clouds in the sky. This is a skill you can learn.

**I am willing to experience my distress**

**I am willing to accept my unwanted thoughts/ negative emotions**

## Completion certificate

### **ACTivate your wellbeing completion certificate**

Congratulations, you can download your certificate [here](#)



## ■ Additional resources



### Staff wellbeing advice and support services

Additional sources of help include;

- GP
- Therapist
- Councillor
- Psychologist
- MIND

MIND resource 'how to cope with [sleep problems, Stress, Depression](#)

Other information on [Stress, depression and anxiety](#)

[The Acceptance and Commitment Therapy \(ACT\) Diary 2020](#) Dr Nic Hooper

[Swansea Community Farm](#) have a volunteer programme where you can get involved and become part of a team and learn new skills in a green environment.

The [Swansea wellbeing centre](#) offers additional services.

[Urban Zen](#) in swansea offer a range of great Yoga classes

Time to Change [website](#)



## Try Now

### Try Now

Keep being open and keep returning to these resources and look for additional ACT resources to continue your journey. Don't forget we are all human.

Set your week 12 wellbeing goal.

**SAVE**

## Appendix 13: Authorship declaration

The following people and institutions contributed to the publication of work undertaken as part of this thesis:

Candidate	Menna Brown Swansea University Medical School
Author 1	Noelle O’Neill NHS Highland, Scotland
Author 2	Hugo van Woerden Public Health Scotland
Author 3	Matt Jones Swansea University Computer Science
Author 4	Ann John Swansea University Medical School
Author 5	Alex Glendenning Swansea University Medical School
Author 6	Alice Hoon Swansea University Medical School
Author 7	Nic Hooper UWE
Author 8	Parisa Eslambolchilar Cardiff University
Author 9	Phil James Swansea University Computer Science
Author 10	Darren Scott Swansea University Computer Science
Author 11	Owen Bodger Swansea University Medical School

### Author Details and their Roles:

#### *Paper 1*

Brown M, O’Neill N, van Woerden H, Eslambolchilar P, Jones M, John A. Gamification and Adherence to Web-Based Mental Health Interventions: A Systematic Review. *JMIR Ment Health* 2016;3(3):e39

#### *Located in Chapter 3*

Author 1 **Noelle O’Neill (NoN)** contributed to stage one and stage two of the review process and conducted the Risk of Bias in collaboration with the candidate and reviewed the manuscript drafts and approved the final version before submission and publication.

Author 2 **Hugo van Woerden (HvW)** contributed to the review process, provided comments on manuscript drafts and approved the final version before submission and publication.

Author 3 **Professor Matt Jones (MJ)** reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.

Author 4 **Processor Ann John (AJ)** was consulted at each review stage, reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.

### *Paper 2*

Brown M, Glendenning AC, Hoon AE, John A. Effectiveness of Web-Delivered Acceptance and Commitment Therapy in Relation to Mental Health and Well-Being: A Systematic Review and Meta-Analysis. *J Med Internet Res* 2016;18(8):e221.

### *Located in chapter 3*

Author 5 **Alex Glendenning (AG)** undertook the meta-analyses in collaboration with the candidate and reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.

Author 6 **Dr Alice Hoon (AH)** reviewed and provided comments on manuscript drafts, and approved the final versions before submission and publication.

Author 4 **Processor Ann John (AJ)** reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.

### *Paper 3*

**Brown M**, Hooper N, Eslambolchilar E, John A. Development of a Web-Based Acceptance and Commitment Therapy Intervention to Support Lifestyle Behavior Change and Well-Being in Health Care Staff: Participatory Design Study *JMIR Form Res* 2020;4(11):e22507

*Located in chapter 4*

Author 7 **Dr Nic Hooper (NH)** acted as the expert reviewer for the emotional well-being intervention and reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.

Author 8 **Dr Parisa Esmbolchilar (PE) Cardiff University** reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.

Author 4 **Processor Ann John (AJ)** provided comments on manuscript drafts and approved the final versions before submission and publication.

*Paper 4*

**Brown M**, Hooper N, James P, Scott D, Bodger O, John A. A Web-Delivered Acceptance and Commitment Therapy Intervention With Email Reminders to Enhance Subjective Well-Being and Encourage Engagement With Lifestyle Behavior Change in Health Care Staff: Randomized Cluster Feasibility Study. *JMIR Form Res* 2020;4(8):e18586.

*Located in chapter 5*

Author 7 **Dr Nic Hooper (NH)** acted as the expert reviewer for the emotional well-being intervention and reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.


Author 9 **Dr Phillip James (PJ)** supported the website installation, reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.


Author 10 **Darren Scott (DS)** programmed the study website, contributed to the additional components included in intervention 3, reviewed and approved the final versions before submission and publication.

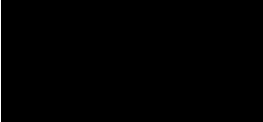
Author 11 **Dr Owen Bodger (OB)** provided expert guidance relating to the number of participants required to run a statistically powered RCT and the analysis methods required. He reviewed and provided comments on manuscript drafts and approved the final versions before submission and publication.


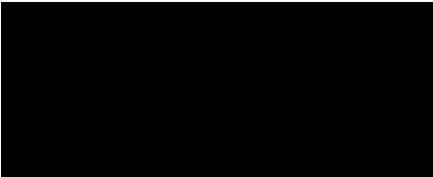
We the undersigned agree with the above stated “proportion of work undertaken” for each of the above published peer-reviewed manuscripts contributing to this thesis:


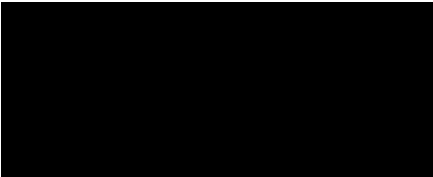
**Signed Candidate**

**Author 1** 

**Author 2** 

**Author 3** 

**Author 4**  

**Author 5**  

**Author 6**



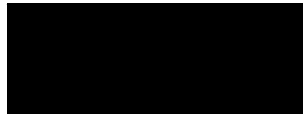
**Author 7**



**Author 8**



**Author 9**



**Author 10**



**Author 11**

