The transfer of ICT training to the workplace.

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The Transfer of ICT Training to the Workplace

By

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To Mum, Dad and Anna

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Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted for any degree.

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Statement

This thesis is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by explicit references. A bibliography is appended.

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Summary

This thesis examines the extent to which Information and Communication Technology (ICT) training is transferred to the workplace and how ICT training impacts on company performance with training transfer being defined as "the extent to which skills acquired in a training program are applied, generalised, and maintained over some time in the job environment" (Baldwin and Ford, 1988)

The thesis begins with an introduction to the subject area, including the money the European Union and the Welsh Assembly Government have invested in attempting to increase the provision of SME ICT training in Wales.

A review of the relevant literature was conducted, and whilst a fair amount was found in the area of technology acceptance, training effectiveness and general training transfer, it was found lacking in the area of ICT training.

A detailed survey concerned with some of the salient issues related to the transfer of ICT training to the workplace was carried out with employees and employers of small and medium sized enterprises (SMEs) in South Wales. In addition, a number of small case studies with were also conducted.

The resulting data from the analysis showed a number of findings, including: that training transfer is not necessarily related to post-training usage, training is more beneficial (in terms of transfer) for employees who had little previous experience than those who had more experience, and older employees do not benefit from training as much as younger employees.

The resulting information can be used by the stake holders involved in the training transfer process, namely funding agencies, training providers, employers and employees, to improve the transfer of training to the workplace and the impact this has on company performance.

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Chapter 1. Introduction

This thesis will primarily investigate the extent to which Information and Communications Technology (ICT) training is transferred back to the workplace in SMEs, with training transfer being defined as "*the extent to which skills acquired in a training program are applied, generalised, and maintained over some time in the job environment*" (Baldwin and Ford, 1988). In doing so, the thesis will attempt to measure current levels of transfer, the reasons for full transfer not taking place, and possible solutions for resolving any transfer problems. It will also weigh up the costs and benefits of ICT training to employers and funding agencies, as well as suggesting methods of increasing transfer and discussing the future of ICT training in the workplace.

The aim of this chapter is to provide an insight into the ICT training industry, with particular attention being given to the current situation in South Wales, as well as defining some of the key terms that will be used throughout the thesis. Chapter 2 critically analyses the literature in the subject area and highlights the gaps in the literature which have given rise to the treatment afforded in this thesis. Chapter 3 discusses the overall objectives of the thesis, and how the information from the literature review has been used to define suitable topics for investigation, as well as detailing how the primary data was collected and analysed. Chapters 4 and 5 present the results from the main quantitative study, with chapter 6 providing a discussion of the results. Chapter 7 introduces and details the results from a longitudinal qualitative study. Finally, chapter 8 draws conclusions from both studies, examines some practical implications, and suggests directions for future research.

The ICT training market has witnessed massive growth in the past decade, and as one might expect, the market has developed at different rates throughout the world, with worldwide growth in terms of value now at an estimated seven

percent (Patra, 2003). Currently one of the fastest growing countries is India, which is seeing a rate of growth of 16 percent (Patra, 2003). In contrast the ICT training market in Sweden has shrunk by up to 50 to 60 percent in recent years, with the main reason being that the market has become saturated and the country now has a skills surplus (Howells, 2004). The market in the US is currently growing at only 1.9% (therefore in real terms is actually decreasing); although experts have been expecting a steady decline for some time as companies are developing their own internal ICT training infrastructure. Moreover, organisations are increasingly expecting individuals to take responsibility for their own training expenses (Adkins, 2006). The UK training market is growing very slowly in terms of value. It was estimated that at the end of 2005, the value of the UK training market was £17.62bn, which was a rise of only 0.5% on 2004. This value is still below the level it was in 2001 and 2002 (Key Note, 2005), with the most probable reason being that the UK market (like Sweden's) has also become saturated.

1.1. The ICT market

For some time the ICT industry has been seen as an important catalyst for economic growth in Europe, with the European Union attempting to harness its potential. As an influential Governmental report has stated: "*ICT is having a profound impact on the potential for economic growth; it has become one of the main sources of competitiveness and increases in incomes*" (Europa, 2001). The European Commission has invested significant financial resources in ICT training, with particular attention being given to SMEs which are seen as vitally important to the national economies, given that "*they represent 99% of all companies and generate a substantial share of the GDP, and a key source of new jobs, as well as a breeding ground for entrepreneurship and new business ideas*" (Europa, 2001). Whether this money has been, and still is, being well spent is debatable, a point which emerges throughout this thesis.

Despite significant Government investment in ICT training, there are still serious barriers that prevent some companies, and particularly SMEs, investing in ICT training. Such barriers include cost, employers failing to recognise the link

between ICT investment and bottom-line profit, employers' fear of their employees taking their new ICT skills and moving to another company or demanding higher salaries, lack of knowledge of what training is available, and most importantly, an inability to identify what training is actually needed.

1.2. Government funding and ICT training

The Welsh Assembly Government along with the UK Government and the European Union has addressed these issues and have made various resources available to help SMEs to develop their employees' ICT skills, to increase internet usage, and to increase the general level of ICT knowledge throughout Europe. Table 1.1 lists, and briefly details, the goals of some of the schemes that have been initiated since 1999.

Table 1.1: Government initiatives to increase ICT usage

Initiative	**Goals**
eEurope 2001	"*To develop cheaper, faster and secure Internet access, to invest in people and skills and to stimulate the use of the internet.*"
eEurope 2005	"*To create new jobs, to boost productivity, to modernise public services, and to give everyone the opportunity to participate in the global information society.*"
Go-digital	To encourage SMEs to "*Go Digital through co-ordinated networking activities for the exchange of knowledge on best practice, e-commerce readiness and bench marking reference centres to help SMEs introduce e-commerce into their business strategies.*"
Career space	Set up as part of the Go Digital programme to support industry-led initiatives for new ICT curricular.
The ICT skills and monitoring group	Set up by the Enterprise Directorate General (DG) of the European Commission in 2001, with the task of analysing ICT and e-business skills in Europe.
Cymru Ar-lein	This UK government Green Paper was set up by Department for Education and Skills in 1999, to help Wales "*realise the potential of a highly literate workforce.*"
ELWA	Set up by the Welsh Assembly in 2001 to help promote and develop training provision in Wales.

Broadband Wales	Set up by the Welsh Assembly in July 2002 to help improve Welsh citizens' access to broadband. The programme has set itself a number of targets to be met within the five years including: improving the awareness of broadband communications and its benefits, and providing broadband access in most business parks.
The Learning Country	Forms part of the Government's Winning Wales Initiative, and of the Education and Lifelong Learning Programme which is planned to last until 2010. The Learning Country's goal is to "*have one of the best education and lifelong learning systems in the world.*"
The Learning Age	White Paper and programme set up by Department for Education and Skills in 1999 to encourage lifelong learning.
A Winning Wales	This is the Welsh Assembly Government's strategy for transforming the economy of Wales. The objectives of the scheme are to: • "*improve ICT facilities in all training and education establishments and enable effective use of these facilities*"; • "*encourage the development of essential ICT skills throughout local communities*"; • "*encourage the development of a coherent framework for ICT qualifications in Wales*";
Opportunity Wales	Cymru Ar-lein have set up Opportunity Wales which has assisted about 5,000 SMEs in Objective 1 regions by delivering support, advice, facilitation and training to increase SMEs' use of ICT in business.
ECDL	An internationally recognised qualification, which enables people to demonstrate their competence in computer skills. It is a basic qualification which requires no previous knowledge of computers, but gives a foundation for future learning.
TMB (Technology Means Business)	A Welsh-government backed scheme for certifying ICT and business skills for SME advisers. The programme offers consultancy and mentorship to larger businesses or those at an advanced stage of ICT and e-business integration.
Meet-the-Mouse	A scheme developed by Cymru Ar-lein which has initiated a major campaign aimed at raising the awareness of the benefits of ICT. The programme is targeted at individuals who have no previous knowledge of ICT, or whose experience is limited to using computers largely as word processors.
Wales Information Society	A project that aims to "*stimulate and develop the use of information and communications technology throughout the Principality*".
ICT in Schools	The training helps ensure that teachers and school librarians know when and understand how to use ICT effectively in teaching.

From the range of initiatives shown in Table 1.1, it can be seen that a significant amount of money has been spent on developing and running these projects because the respective Governments and agencies see a link between an ICT-literate workforce and a buoyant economy. This thesis, which investigates training transfer in South Wales, will, at least in part, gauge the extent to which such schemes have been successful and may prove to be in the future.

It is commonly assumed that it is a good thing for small businesses, that all employees should be trained to at least a basic level of ICT, but this assumption may be open to debate. For example, if employees gain these extra skills and qualifications, they may demand higher wages, expect promotion, refuse to accept menial jobs, or move to a company that can offer a higher salary or better prospects. Furthermore, is it always certain that employees actually want to be ICT-trained? Do all employees have the ability to be trained and to what level? There is also the fact that if employees do not want to attend training, or are unable to understand the content, then money spent by the employer or a funding authority will be wasted.

South Wales is of particular interest in this context because it was awarded Objective 1 status in 2000. South Wales qualified for funding because its GDP was below 75% of the EU average (Kay, 2000). The European Social Fund (ESF) was set up to help reduce differences in living standards between the regions of the EU by reducing unemployment, improving and developing skills of employed people, investing in industrial or rural areas which are in decline, and investing in areas with low economic development. The money has been shared out under three objectives, which cover different areas/regions and which have different aims, although only Objective 1 will be discussed here as Objectives 2 and 3 are not directly relevant to this thesis.

The aim of Objective 1 funding is to develop regions which are currently under-developed. The single programme document (the development plan of Objective 1) set out three headline objectives:

- to contribute to boosting per capita GDP to 78% of the EU average by 2006;

- to help towards the National Economic Development Strategy's (NEDS) goal of creating 72,000 new jobs (net) by contributing to projects which create approximately 43,500 new jobs (net) by 2006;

- to contribute to meeting the NEDS target of increasing economic activity (by reducing the number of people of working age not in employment by 53,000) by 2006.

(Europa, 2001)

From these three headline objectives, seven priorities have been set out, which have been further subdivided into 37 measures. The priorities that have been allocated the most funding are Priority 1 (expanding and developing the SME base) with a share of 26% of the total funding, and Priority 4 (developing people) with 24%. The funding from the ESF meets only a proportion of the project costs. The amount varies depending on a number of factors, but is typically between 40% and 50%. The rest of the cost of a project has to be funded from either a company's own resources or from some other national source of funding. This is known as match funding, of which the majority in Wales is provided by Assembly Sponsored Public Bodies (ASBPs), higher and further education institutions and local authorities.

Upskilling the workforce in the area of ICT is, then, a major aim of the EU. Employees are being encouraged to gain extra ICT skills and join the so-called information highway. As a result, the Welsh Assembly Government is spending significant amounts of tax-payers' money on improving the level of ICT training in South Wales. However, the extent to which employees and companies benefit from the training they receive needs to be considered. In particular, to what extent do employees transfer the training back to the workplace? Does such transfer of training result in immediate and tangible benefits to the company? This thesis will attempt to address such questions, in the hope of providing employers,

training providers, and the Welsh Assembly Government with best practices to maximise training transfer.

1.3. Training and company performance

It is assumed that employers provide ICT training for their employees so as to increase the performance of their company. Yet while in theory the training process may seem straightforward, as shown in Figure 1.1, this is rarely the case in practice (as will be demonstrated throughout this thesis).

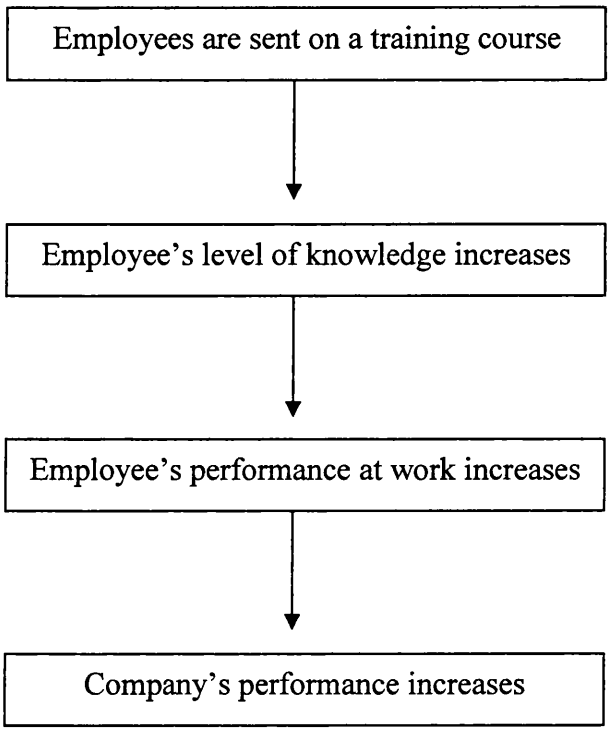

Figure 1.1 – A basic training process model

The training process consists of a number of stages, all of which are essential in determining the extent to which training eventually leads to improved company performance. However, whilst training and increased performance are naturally correlated, they are by no means the same thing – not everything that has been taught will be learnt, not everything learnt will be transferred to the workplace, and not everything transferred to the workplace will lead to improved company performance.

Training is traditionally thought of as formal training, by which we mean training that takes place in training institutions, and often leading to recognised diplomas and qualifications. For SMEs, formal training generally involves employees either attending a training course at the trainer's premises (external formal training) or the trainer attending the SME's premises and conducting the training on-site (internal formal training). The majority of SMEs have to conduct their formal training off-site perhaps because of the need for special facilities and technical support, especially as regards ICT training. At the outset, the option of internal formal learning entails extra cost which many small companies are often unable to bear.

Informal training, which is arguably at least as important as formal training, has been defined as:

> *"Learning which takes place in the work context, relates to an individual's performance of their job and/or their employability, and which is not formally organised into a programme or curriculum by the employer. It may be recognised by the different parties involved, and may or may not be specifically encouraged" (Dale and Bell, 1999).*

Essentially, it involves either the employer or other employees from inside the company instructing the trainee how to perform a particular job or task. It mainly consists of just-in-time training, and is thus training which has not been specifically planned, since it occurs as and when needed, and naturally tends to lack structure. In practice, such informal learning takes place in the workplace daily, and takes many different forms such as instruction, demonstration, shadowing and constructive feedback. However, despite the prevalence of informal learning in the workplace, researchers in this field of workplace training have focused primarily on formal training (as maintained, for example, by Rouiller and Goldstein, 1993).

Dale and Bell (1999) have highlighted several advantages and disadvantages of informal training.

Advantages include:

- employees are more flexible and become more employable;
- employees have greater self-confidence and better awareness of their abilities;
- learning can be adapted to company and individual needs and situations;
- learning sinks deeply into the subconscious and becomes a part of the normal way of behaving as it occurs over time and is reinforced on-the-job by colleagues and managers;
- learning is rapidly put into practice;
- better relationships exist between colleagues and with managers.

The disadvantages noted include:

- it may be too narrowly based so the employee learns only part of a task or acquires superficial skills which may not be transferable;
- it may be unconscious and not be recognised, so does not build confidence or lead to personal development;
- it is not easy to accredit or use for formal qualifications;
- the employee may learn bad habits or the wrong lessons.

Although vast amounts of money are spent on formal workforce training by SMEs (Facteau *et al*, 1995) it has been shown that it only actually accounts for 30% of total workforce training (in terms of training time), with informal training accounting for the other 70%. As Stewart (2001) has put it:

> *"Class room training (formal training) is inefficient. Half the people in the room are secretly working on 'real' jobs, half are so relieved not to be doing their real jobs, they've turned their minds entirely off. Half already know the stuff being taught and are playing Buzzword bingo on their palms; half will never need to know more than half of it."*

As a result, employers are beginning to question the relative contribution of formal training compared to that of informal training (Rouiller and Goldstein, 1993).

Cross (2003) notes that employees have different attitudes towards formal and informal learning, adding that

> *"Workers are pulled to informal learning, and formal learning is pushed at them [...] informal learning is a necessity in any job, and can take place without the employee consciously realising it [...] workers are motivated to participate in informal learning because of the direct impact it has on their workplace skills."*

It has been contended that formal learning tends to be conducted away from the workplace and is not always directly relevant. According to Stewart (2001), employers regard informal learning as important because of its immediate return on investment and its effect on employees' morale. For these reasons, some believe that it would be better to concentrate on improving the efficiency of informal training rather than continuing to invest in formal training that is often inefficient and costly (Enos *et al*, 2003). This will be discussed further in chapter 6.

1.4. Categories of companies and variations in training provision

The extent to which employers offer training to their employees varies considerably from company to company. A study conducted on SMEs by Sadler-Smith *et al* (2000) noted, unsurprisingly, that smaller British businesses generally provide less training than larger businesses. The study identified three distinct types of SMEs as regards training, *viz.* those providing:

- restricted trainers – providing informal off-the-job training;
- instrumental trainers – providing training only of a directly vocational or technical nature; and

- sophisticated trainers – those who in addition to instrumental training provide training of a more developmental and innovatory nature.

The study, again, not surprisingly, showed that smaller firms tended to be 'restricted trainers' whereas larger ones were more likely to be 'sophisticated trainers'. Sadler-Smith *et al* (2000) also categorised the firms by managerial structure:

- monarchic structures – where no managers other than the owner manager were employed (here, restricted training was more likely to be the case);
- diarchic structures – where there is a single line manager below the owner manager (here, instrumental training was more likely to be the case); and
- polyarchic structures – with two or more management levels beneath the owner manager (here, sophisticated training was more likely to be the case).

Further variables that have been found to influence the level of training conducted include, the main industry activity of the company (those using technologically advanced equipment being more likely to train) and the location of the company (companies in areas which have local development agencies with access to external funding and growing businesses located in areas of skills shortages being more likely to train) see Goss and Jones (1992) for further details.

This chapter has introduced the major themes of the thesis. The next chapter is a review of the relevant literature, and provides the direction for research and specific research objectives.

Training transfer: "the extent to which skills acquired in a training program are applied, generalised, and maintained over some time in the job environment" (Baldwin and Ford, 1988).

Chapter 2. Review of the Literature

2.1. Training effectiveness

Vast amounts of money are spent by firms of all sizes on training their workforce (Facteau *et al*, 1995). The ultimate goal of training should be positive transfer to the workplace (Berry and Morris, 2005). Yet both Georgenson (1982), and, later, Detterman (1993), showed that a mere 10% of expenditure leads to behavioural change on the job. Newstrom (1986) believed that only 40% of the content of training programs conducted is transferred back to the workplace immediately after training, about 25% was still being applied six months later, and only 15% was still being used at the end of the year. More recently, Saks and Belcourt (2006) found that 62%, 44% and 34% of employees transfer training immediately, six months, and one year after training respectively. Other than the study of Saks and Belcourt (2006), it is difficult to find much in the way of more recent information in respect of this issue. The figures reported above imply that training is perhaps not transferred to the extent that some employers may believe. It therefore comes as no surprise to find that much research has gone into developing ways of measuring and increasing training effectiveness and transfer.

Training effectiveness can be theoretically determined by using the hierarchical model of training outcomes as found in Kirkpatrick (1967). The hierarchy consists of four levels of training outcomes.

Level 1: trainees' reactions to the programme content and training process (reaction);

Level 2: knowledge or skill acquisition (learning);

Level 3: behaviour change (behaviour);

Level 4: improvements in tangible individual or organisational outcomes such as turnover, accidents, or productivity (results).

Kirkpatrick proposes that each level of the hierarchy affects the following ones; for example, a positive reaction towards the training (level 1) leads to higher levels of learning than a negative perception of the training (level 2) (this may seem self-evident, but it is nevertheless worth noting), and a high level of learning will lead to a significant behavioural change (level 3), which in turn will lead to improved results (level 4). Although other models of measuring training effectiveness exist (for example see, Hamblin, 1974 and Warr *et al*, 1999), Kirkpatrick's hierarchy remains the most cited. However, as will be evident by the end of the thesis, this process is not as simple as it first seems. Not everything learned will increase behavioural change and any change that may occur will not necessarily improve organisation performance.

Since Kirkpatrick produced his hierarchy, a good deal of research has been conducted into training effectiveness; the paper by Baldwin and Ford (1988), which heavily cited, divides the training process into three stages:

- training inputs – trainee characteristics, training design, and work environment;
- training outputs – learning and retention; and
- conditions of transfer – generalisation and maintenance.

Baldwin and Ford's model of the transfer process is shown in Figure 2.1.

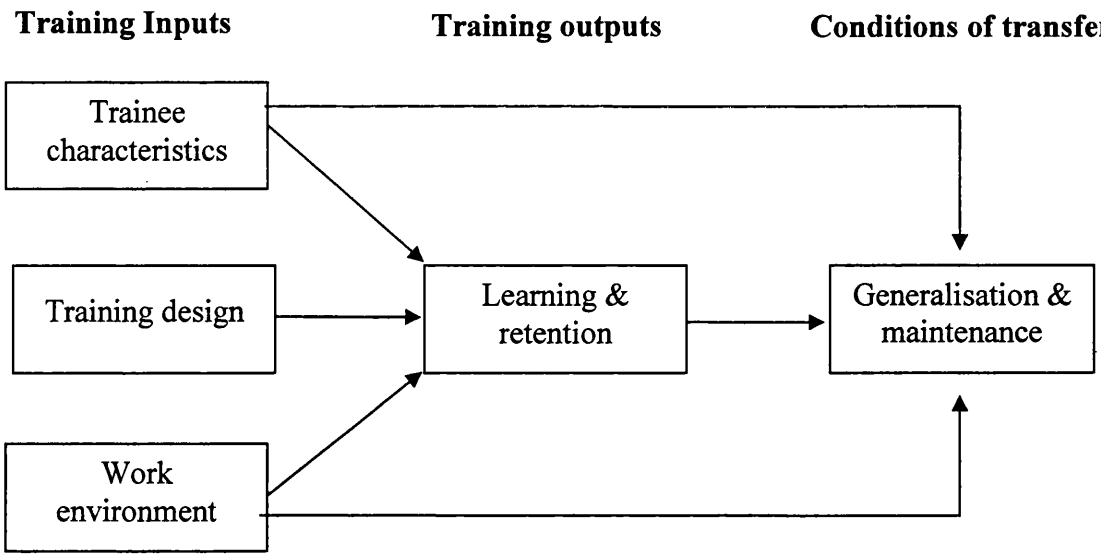

Figure 2.1 - Model of the transfer process (from Baldwin and Ford, 1988)

2.2. Influences on training effectiveness

Although Baldwin and Ford (1988) provided the framework for analysing training effectiveness and transfer, more research was needed to understand how these categories (trainees characteristics, training design, and the work environment) influenced learning and transfer, and what variables made up these categories. Table 2.1 lists some studies in the area of training effectiveness, together with the variables associated with it (for training transfer, see Table 2.2).

Table 2.1: Studies related to learning/training effectiveness

Trainee characteristics

Motivation	Noe (1986) Baldwin and Ford (1988) Mathieu *et al* (1992) Tannenbaum and Yukl (1992) Mathieu and Martineau (1997) Orpen (1999) Colquitt *et al* (2000)
Ability	Baldwin and Ford (1988)
Attitudes & attributes	Noe (1986)
Age	Warr *et al* (1999)
Gender	Warr *et al* (1999)
Job involvement	Noe and Schmitt (1986)
Self-efficacy	Colquitt *et al* (2000)
Level of learning	Tan *et al* (2004)
Reactions to training	Tan *et al* (2004) Rowold (2007) Velada and Caetano (2007)
Assignement	Mathieu *et al* (1992)
Supervisor support	Tharenou (2001) Chiaburu and Tekleab (2005)
Opportunity to use	Bates *et al* (2000)
Training choice	Baldwin and Goldstein (1991)
Work environment	Baldwin and Ford (1988) Mathieu and Zajak (1990)
Continuous learning	Chiaburu and Tekleab (2005)

Training design

Training method	Mathieu *et al* (1992)
Content validity	Bates *et al* (2000)
Course structure	Warr *et al* (1999)
Errors	Lorenzet *et al* (2005)

The following section will discuss some of the studies mentioned above.

2.2.1. Discussion of the literature on training effectiveness

Motivation to learn – which, according to Colquitt *et al* (2000), is "*the direction, intensity, and persistence of learning-directed behaviour in training contexts*" - is arguably the most cited variable in the literature with respect to influencing training effectiveness. On the one hand, the literature on training generally recognises that motivation can be influenced by trainee characteristics, training design and the work environment (see, for example, Noe, 1986; Tannenbaum and Yukl, 1992; Mathieu and Martineau, 1997). On the other hand, it is also recognised that motivation influences learning efficiency, and also learning participation, since motivated participants have heightened attention and an increase in their receptivity to new ideas (Mathieu *et al*, 1992). Whilst this relationship may seem self-evident, it still should be discussed because of the attention it has received in the literature and the impact it seems to have on usage and transfer.

Noe (1986) believed that motivation had a direct influence on learning, and maintained that employees will only be motivated to participate in training if they perceive that the following three factors are true: (1) high effort will lead to high performance in training; (2) high performance in training will lead to high job performance; and (3) high job performance will be instrumental in obtaining desired outcomes and avoiding undesired outcomes. It is clear that if trainees are unable to perceive a link between these factors, both pre- and post-training motivation is likely to be low. It is equally clear that low pre-training motivation can lead to a fall in training performance, and low post-training motivation may lead to low training effectiveness. It may be that employers are not consciously aware of these links, and so do not actively portray to employees that if they do well in training that it could lead to career progression.

Mathieu *et al* (1992) also considered motivation as an important influence on the level of learning during training. Their study, not unexpectedly, revealed a

positive relationship between training motivation and learning, although it should be noted that some studies have found a fairly low correlation between learning and behaviour; for example, Tan *et al* (2004). Nevertheless, the suggestion therefore was (entirely reasonable) that improving trainee motivation will increase training effectiveness, something which can partly be achieved by decreasing constraints in the workplace. Tan *et al* (2004) results also showed, again as one might expect, that trainees' reaction to the training was correlated with that of learning, which, in turn was partly determined by training motivation and assignment (see Figure 2.2). They define assignment as the extent to which a trainee was given an option whether or not to attend the training, and the extent to which the trainee was offered a range of training courses.

It should be noted, however, that while Mathieu *et al* (1992) found that these factors led to improved knowledge (as shown in their pre- and post-test scores), this does not mean that the trainees will necessarily transfer it to the workplace, a major factor in undermining training effectiveness (Bates *et al*, 2000). Moreover, the difference between pre- and post-test scores is not necessarily the best way of measuring training effectiveness, although it does depend on how training effectiveness is defined. For example, if the training provider and employer are interested in finding out how much the trainees knowledge has increased from the beginning to the end of the training, this will of course give a reliable measure. However, if the definition of training effectiveness is along the lines of 'the impact employee training has on company performance', then this method of measurement is no doubt flawed.

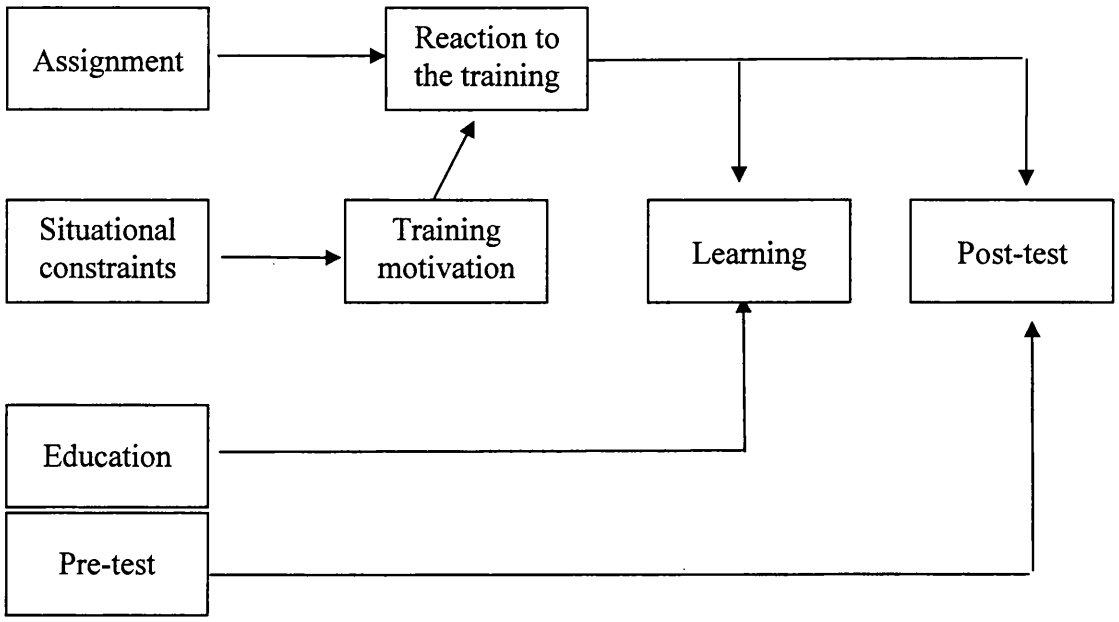

Figure 2.2 - Training effectiveness model (Mathieu et al 1992)

Velada and Caetano (2007) also looked at how trainees' reactions towards training impacted on learning and perceived training transfer. They used a sample of 185 Portuguese teachers who attended a professional training programme. The results showed that along with job attitudes, reaction towards the training had a significant impact on the level of transfer. However, despite the findings of Mathieu et al (1992) and Velada and Caetano (2007), Tan *et al* (2004) found that reactions to training programs tend to be poor predictors of training success, even though most training programs are evaluated based solely on trainee reactions. Moreover, Tan *et al* (2004) discovered, somewhat contrary to popular notion, negative affective reactions best predicted employee learning. That is to say, the results showed that trainees who disliked the training program showed higher levels of learning. This is intuitively difficult to account for; although Tan *et al* (2004) offer the possible explanation that "*trainees who are already knowledgeable evaluated the training more harshly because it failed to live up to their high expectations*". However, if these trainees were already knowledgeable, did their knowledge increase further? If so, then this could be a possible explanation; if not, then it cannot be supported. It also suggests that trainees'

feelings towards the training program might not have had such a large impact in their learning or in their behaviour after the training, which, as mentioned above, means that studies which have used this as a measure of effectiveness are not reliable. This is supported by Rowold (2007), who found that employees' general attitudes regarding training are not valid for predicting pre- or post training motivation and effectiveness.

An earlier paper by Mathieu and Zajak (1990) suggests that trainees who reported many situational constraints in their job entered training with lower motivation to learn. These trainees naturally had little incentive to learn new skills in an environment where the skills could not be applied. This is again not a surprising finding. However, the study is included here because situational constraints represents an important factor in determining the success or otherwise of training transfer, as will be shown throughout this thesis.

Orpen (1999) analysed the influence of the training environment on trainee motivation, and separated the training environment into two categories: trainee characteristics (organisational commitment, job involvement, self-esteem and personnel control), and organisational aspects (social support at work, social support outside work, trainee incentives, trainee resources and trainee needs). The analysis showed that all the organisational aspects were found to be significantly correlated with trainee motivation with reported p-values $<.01$; however, with regard to trainee characteristics, organisational commitment was the only variable found to be significant with a reported p-value $<.05$. One must be careful in making the assumption that these results suggest that organisational aspects are more important than trainee characteristics in determining training motivation. It may be that there are other trainee characteristics, not included in the study, that could have been significant if tested.

Chiaburu and Tekleab (2005) investigated how a continuous learning culture within a company and supervisor support impacted on training motivation, and whether training motivation is linked to multiple dimensions of training effectiveness (such as learning, transfer, maintenance, and generalisation). They

used a sample of 119 employees from a large company in the USA and the data was collected using self-reported questionnaires. The results from the study supported the relationship between a continuous learning culture and supervisor support with motivation. Moreover, as have many previous studies found – motivation was found to be related to training effectiveness.

Baldwin and Goldstein (1991) examined whether giving trainees the choice of training session influenced the level of motivation. This is similar to the variable 'assignment' included in the study by Mathieu *et al* (1992). Baldwin and Goldstein (1992) concluded that trainees who were offered a choice of training, and received it, had a higher level of motivation to learn prior to attending the training session than those who were not provided with a choice, or those who had made a choice of training which they did not then receive. Whilst, in theory, this seems intuitively reasonable and an example of good practice, smaller companies such as the ones surveyed in this thesis, are often unable to bear the cost of providing various training courses for their employees. Nevertheless it is worth noting this relationship, because, as e-learning becomes more prevalent in the workplace, it should provide opportunities for employers to offer a wider choice of training at a lower cost.

Facteau *et al* (1995) found six variables with an influence on pre-training motivation:

- training reputation;
- compliance (similar to that of assignment);
- intrinsic incentives (the extent to which training meets internal needs or provides employees with growth opportunities);
- extrinsic incentives (the extent to which training results in tangible external rewards such as promotions, pay rises, and higher performance evaluations);
- career exploration and career planning (the extent to which an employee explores various career options and plans for future career accomplishments); and

- organisation commitment (the relative strength of an individuals identification with and involvement in a particular organisation).

It should be noted that many of these variables are either no different from, or very similar to, those already discussed. Indeed, few dramatic advances have been made since the initial 'concepts' of the three categories of influences outlined by Baldwin and Ford (1988), *viz.* trainee characteristics, training content and situational constraints.

Warr *et al* (1999) examined training effectiveness, and to a lesser extent training transfer. They found again, and not unexpectedly, that pre-training motivation and perceived usefulness of the training were positively associated with learning. Once again it should be highlighted that they are measuring learning as opposed to increase in usage. They also found a negative correlation between perceived course difficulty and post-training learning, and evidence that older trainees achieved lower post-course knowledge scores. They suggest that the negative impact of age might be reduced by introducing activities especially suitable for older learners (guided discovery, self-questioning, concrete examples, and avoidance of the need to use working memory). However, once again, the extent to which this is feasible, especially with regards to SMEs is questionable, since SMEs usually have limited funds and resources and are unlikely to have the time, or expertise to provide added support for their older employees. Warr *et al* (1999) measured the learning scores at three points: immediately before the training, immediately after the training, and one month after training. They found from a multiple regression analysis that the delayed learning score is significantly affected by situational variables such as the extent to which supervisors and peers encourage or discourage the application of course material. With regard to training transfer, they found perceived difficulty of the training was strongly predictive of lower use of the training one month later, as was the environment in which a person works after training.

Self-efficacy has been defined as "*the belief that one has the capability to perform a particular behaviour*" and, more specifically, computer self-efficacy is

concerned with "*one's confidence in performing in a range of situations with using a computer*" (Compeau and Higgins, 1995b). Self-efficacy has been used as both an independent and a dependent variable in the training-effectiveness literature. Coffin and MacIntyre (1999) found that self-efficacy had a significant impact on learning performance in a programming course. Compeau and Higgins (1995b) found that computer self-efficacy exerted a strong influence on performance in learning Lotus 123 and WordPerfect. Christoph *et al* (1998) considered the influence of self-efficacy on multimedia based training effectiveness; their findings indicated that training effectiveness was determined partly by the trainees' self-efficacy. Whilst the impact of self-efficacy will unlikely have the same impact on training effectiveness it did have 10 years ago, it is still an important variable that should be looked at.

Lorenzet *et al* (2005) examined whether introducing 'guided errors' into training would have an impact on learning, performance, and self-efficacy. They used a sample of 90 undergraduate students and designed a presentation software training course that incorporated 'guided errors' into the course material. What they mean is common errors that students make with regards to using the software are identified, and then students are guided into and out of these errors during training. Their results revealed that the performance of the students increased as did their self-efficacy. There is little in the way of further research with regards to incorporating error guidance into employee/student training classes, and so it is not possible to see how the results of Lorenzet *et al* (2005) compare to other findings, however, this is an approach that will no doubt receive interest in the future.

2.3. Transfer of training

Training transfer is defined by Baldwin and Ford (1988) as "*the extent to which skills acquired in a training program are applied, generalised, and maintained over some time in the job environment.* There has been only a limited amount of research in the area of the transfer of training from training course to workplace (see Baldwin and Ford, 1988; Tannenbaum and Yukl, 1992; Facteau *et al*, 1995;

Lim and Johnson, 2001; Salas and Cannon-Bowers, 2001), especially in the area of ICT in recent years.

However, Machin and Fogarty (2003) attempted to identify the relationship between a range of trainees' perceptions of in-training transfer enhancing activities (over learning, fidelity, stimulus variability, principles-meaningfulness, self management strategies, relapse prevention and goal setting) and several endogenous variables (the trainees' post-training self-efficacy, the trainees' learning during the training, and the level of trainees' transfer intentions). The variables that proved to be most correlated with transfer *intentions* were post-training self-efficacy, reactions to previous training and transfer enhancing activities. It should be noted that the study of Machin and Fogarty (2003) only used transfer *intentions* as their measure of transfer, however the strength of the relationship between transfer intentions and actual transfer could be brought into question, with one reason being the number of situational constraints in the workplace that can inhibit training transfer.

Nevertheless, training transfer is an important issue, given the large amounts of money spent on training provision each year, especially in commerce, industry and the Government. The traditional principles for maximising the transfer of training were originally set out by McGehee and Thayer (1961):

- identical element – the presence of identical stimulus and response elements in training and a job environment maximises positive transfer;
- teaching underlying principles – transfer is facilitated when trainees learn not just applicable skills, but also the general rules and theoretical principles underlying the content of their training;
- over-learning – trainees are provided with continued practice beyond the point at which they have performed a task correctly.

Although these principles have found some support (for instance McGehee and Thayer, 1961), other researchers have indicated that such traditional approaches have become outdated and insufficient for today's training needs (see Leifer and Newstrom 1980; Michalak 1981; Wexley and Baldwin 1986).

Haskell (2001) and Cornford (2002) have identified a number of different types of transfer. These include positive transfer, negative transfer and zero transfer. Whilst in theory negative transfer seems unlikely – which in many cases is true, in practice it can happen. For example, if a trainee has always used Microsoft Excel as a database tool and then attends a training course on the whole of the Microsoft suite, this trainee may switch from using Excel to using Access– this represents negative transfer in Excel. There is also the practically important distinction between near and far transfer. Near transfer is essentially transfer that does not differ too much from the original learning and specifically has similar or identical cues to indicate the application of previously learned knowledge and skills. Far transfer is transfer that involves substantial modification of previous learning for the new situation, or a situation in which the cues are considerably different from those involved in the original application and learning. There is also general transfer: this is, essentially a notion that by learning something like mathematics, aspects of learning are transferred to other subjects and areas.

Although attaining near transfer remains a challenge with inexperienced learners, there is certainly evidence that near transfer can be reliably attained if there is conscious awareness in learners and teachers that specific training for transfer is engaged in (Haskell, 2001; Cornford, 2002). Hence, it seems that the position generally adopted is that near transfer can reasonably be expected to occur if there is conscious, effective education and learning, and social conditions are receptive to application of new learning.

Detterman (1993) found that workplace training often fails when the task changes slightly from the original setting or where there are changes in technology or machinery. If too much is demanded from those with a low knowledge base, or the initial learning too difficult, there will be 'turning off' and loss of motivation vital for other aspects involving maintenance of skills and application (Cornford, 1996). Moreover, central to the achievement of near transfer is guidance by more knowledgeable teachers who understand real world applications and the variety of such applications (Haskell, 2001; Cornford, 2002). This last point is an example of informal training, which is further discussed later in this chapter. The

level at which to set the difficulty of the training is clearly a recurring problem with education of any kind. Does one set it at the lowest common denominator but then risk alienating the more knowledgeable trainees, or as described above, set the level too hard and whilst, in theory, allocating employees to courses dependent on their ability would appear to improve training effectiveness, in practice with regards to SMEs it is unlikely to be a viable option

Table 2.2 lists some of the studies in the literature that have examined training transfer.

Table 2.2: Studies related to training transfer

Personal Characteristics

Motivation-to-transfer	Noe (1986) Seyler *et al* (1998)
Organisational commitment	Mathieu and Zajac (1990)
Training attitudes	Facteau *et al* (1995)
Post-training motivation	Ruona *et al* (2002)
Training motivation	Salas and Cannon-Bowers (2001) Rowold (2007)
Age	Webster and Martocchio (1993) Hastings (1994) Kubeck *et al* (1996) Thijssen (1996) Morris *et al* (2005)
Self-efficacy	Compeau and Higgins (1995b) Webster and Martocchio (1992, 1993, 1995) Martocchio and Judge (1997) Compeau *et al* (1999) Fagan *et al* (2003)
Ability and skills	Gattiker (1992)
Perceived behavioural control	Taylor and Todd (1995a)
Technophobia	Brosnan (1998) Coffin and MacIntyre (1999) Durnell and Haag (2002)
Cognitive ability	Cornford (1996, 2005)
Performance in tests during	Tannenbaum *at al* 1991
Job Satisfaction	Egan *et al* (2004)

Situational Factors

Management Support	Klien and Rolls (1977) Igbaria and Livari (1995)
Rewards	Tannenbaum and Yukl (1992)
Feedback	Rouiller and Goldstein (1991)
Opportunity to practice	Pentland (1989) Lim and Morris (2006)
Punishment	Rouiller and Goldstein (1991)
Work-group level support	Facteau *et al* (1995)
Work-environment	Rouiller and Goldstein (1991) Tannenbaum and Yukl (1992) Tracey *et al* (1995) Ruona *at al* (2002)
Peer support	Tracey *et al* (1995)
Supervisor support	Lim and Johnson (2002)
Goal-setting	Tziner *et al* (1991)
Setting of behavioural targets	Feldman (1981) Anderson and Wexley (1983) Locke and Latham (1984) Wexley and Baldwin (1986)
Self-management strategies	Gist and Bavetaa (1990) Gist *et al* (1991)
Work experience	Quiones *et al* (1995)
Management interventions	Brinkerhoff and Montesino (1995)
Relapse prevention	Tziner *et al* (1991) Gaudine and Saks (2004)
Job function	Lim and Morris (2006)
Organisational learning culture	Egan *et al* (2004)

Training Design

Content validity	Yamnill and McLean (2005)
Play	Webster *et al* (1990)
Needs assessment	Bell and Ford (2007)

2.3.1. Trainee characteristics

Noe (1986) defines motivation-to-transfer as "*the trainee's desire to use the knowledge and skills mastered in the training programme on the job*". Seyler *et al* (1998) defined motivation-to-transfer as "*the intended effort towards utilising the skills and knowledge learned in a training atmosphere to the real world.*" Both studies assert that motivation-to-transfer is a good predictor of actual transfer because of the traditional link between behavioural intention and actual behaviour. In a more recently study, Rowold (2007) also found that motivation to learn significantly predicates transfer motivation. Whilst this may seem obvious, it is important that employers are aware of this link, so they can be proactive and encourage their employees to attend training.

Egan *et al* (2004) found that job satisfaction seemed to have a positive influence on employees' motivation to transfer the training, with organisational culture significantly impacting on job satisfaction. Moreover, they found that turnover intention was found to be negatively influenced by organisational learning and culture and job satisfaction. It is believed here, that in small companies, employers have a big impact on organisational culture and as has been mentioned above, employers need to be made aware of the impact their actions can have on the effectiveness of the training in their company.

Seyler *et al* (1998) examined factors affecting motivation-to-transfer in computer-based training in a large petro-chemical company. Organisational commitment, desire to learn, training attitudes, reactions to both the learning environment and the content validity, opportunity to perform, peer support, supervisory support and supervisory sanctions were all found significantly to influence motivation-to-transfer. Once more, all these variables can be fitted into the three broad categories mentioned above (training design, trainee characteristics, and work environment), although the findings are similar to those found in previous studies. Furthermore, Seyler *et al* (1998) also found that, overall, the environmental factors explained a larger amount of the variance of motivation-to-transfer compared with personal characteristics.

Baldwin and Ford (1988) showed that the degree of learning gained and prior knowledge of the transfer climate into which trainees would return had a positive effect on motivation; Tannenbaum *et al* (1991) also found that trainees who scored higher on performance tests during training had higher post-training motivation.

Ruona *et al* (2002) explored the relationship between learner reactions and the expected learning transfer among trainees. Their results indicated that participant utility reactions that is, the perceived benefit from attending the training session, had a small but statistically significant impact on the ability to predict motivation-to-transfer. Salas and Cannon-Bowers (2001) have said that:

> *"in the future we need to gain a deeper understanding of training motivation because it is crucial for learning and has direct implications for the design and delivery of training"*

Whilst a significant amount of research has been conducted on age and its impact on the ability to learn (see for instance, Plude and Hoyer, 1985; Webster and Martocchio 1993; Posner, 1996), little has been conducted on the impact of age on training transfer (Morris *et al*, 2005), and, as we have discussed, learning and transfer are by no means the same thing. Hastings (1994) showed that older trainees experienced more difficulty in applying their training in the workplace. Kubeck *et al* (1996) too, found a negative correlation between age and transfer of training. However, Thijssen (1996) doubted the validity of these results, finding that older trainees with a broad variety of experience exhibited fewer problems in transferring to the workplace the skills learned during training. Webster and Martocchio (1993), in their review of literature on learning, memory, comprehension and problem-solving, nevertheless suggested that older individuals are less equipped than their younger counterparts to acquire the skills necessary for performing microcomputer-based word-processing tasks. It is probable that the extent to which older trainees cope with training varies from industry to industry and area to area. For example, if the training only slightly differs from their current work practice that is, near transfer they will find it

easier to transfer training than if the training greatly differs from their current work practices (far transfer). It may be that ICT training is an area that differs from older workers 'usual' work practices; this will be discussed in further detail later in chapter 6.

Webster *et al* (1990) found that university students experienced greater involvement and learned more when computer-training classes were labelled as 'play' rather than 'work'. Whether this approach can be realistically applied in business practice is questionable; because of the distinction between 'work' and 'play': employers may be seen as ridiculing adults by suggesting that they play at work. Nonetheless, Webster *et al* (1990) tested the effects on learning outcomes of task labelling (work and play) and trainees' age, using a sample of 68 clerical and administrative staff at a large university, and WordPerfect as the software of choice. Their results indicated that younger employees who received training labelled as 'play' scored higher on the training outcomes than older employees, although no differences were found between younger and older employees for training labelled as 'work'.

Machin and Fogarty (2003) believe that it is unclear whether the list of variables that supposedly influence training effectiveness and transfer of ICT training is comprehensive or whether it can change according to the focus of the training; in other words, do the exploratory variables vary from software package to software package? It is believed here that this is unlikely to be the case, but as there is very little in the literature regarding this, it cannot be known for sure, however, it is something that should be looked at, in the future. Machin and Fogarty (2003) also highlight the fact that there are few studies that have examined the characteristics promoting the transfer of ICT training skills. Machin and Fogarty (2003) list the studies which have examined the transfer of training to the workplace, and the characteristics found to be predictors of training transfer of ICT skills. These characteristics are: management support (Klein and Rolls, 1977), individual characteristics including abilities, motivation, and skills (Gattiker, 1992), self-efficacy (Compeau and Higgins, 1995a; Compeau *et al*, 1999), and the use of training strategies such as behaviour modelling (Simon and Werner, 1996).

Machin and Fogarty (2003) tested a model of the transfer of ICT training that was adapted from a model by Thayer and Teachouts (1995). The results showed that the strongest predictors of transfer intentions were post-training self-efficacy and transfer enhancing activities (fidelity, varied practice, principles-meaningfulness, self-control cues, relapse prevention, goal setting and top management support) which had a significant impact on both the effectiveness of training and its transfer. Richman-Hirsch (2001) also found that training in goal-setting was effective in improving the extent to which trainees applied their skills to the job.

Self-efficacy, mentioned above, is a concept that has received some attention in the area of training effectiveness and transfer. Research specifically in the area of ICT training has found computer software self-efficacy to be a significant predictor of task performance and in determining individuals' behaviour towards using ICT (Gist *et al*, 1989; Martocchio, 1992, 1994; Webster and Martocchio, 1992, 1993, 1995; Compeau and Higgings, 1995a; Martocchio and Judge, 1997; Fagan *et al*, 2003). Moreover, researchers have identified many antecedent and consequent factors theoretically related to computer self-efficacy. These include: encouragement by others (Compeau and Higgins, 1995b), management support (Igbaria and Livari, 1995), perceived behavioural control, (Taylor and Todd, 1995b), age, emotional arousal, verbal persuasions, situational support, perceived effort, and prior success or failure (Marakas *et al*, 1998). Fagan *et al* (2003) maintain that experiences are the most influential sources of efficacy because "*they provide the most authentic evidence of whatever it takes to succeed.*" Agarwal *et al* (2000) conducted a study of the effects of self-efficacy on the ease of use of Windows 95 and Lotus 123. They found that relevant prior experience was strongly related to general computer self-efficacy, and Windows self-efficacy. These results are not unexpected but, perhaps surprisingly, no relationship was found between relevant prior experience and Lotus 123 self-efficacy. However, overall the model provides strong support for the effects of self-efficacy on ease of use (see Figure 2.3).

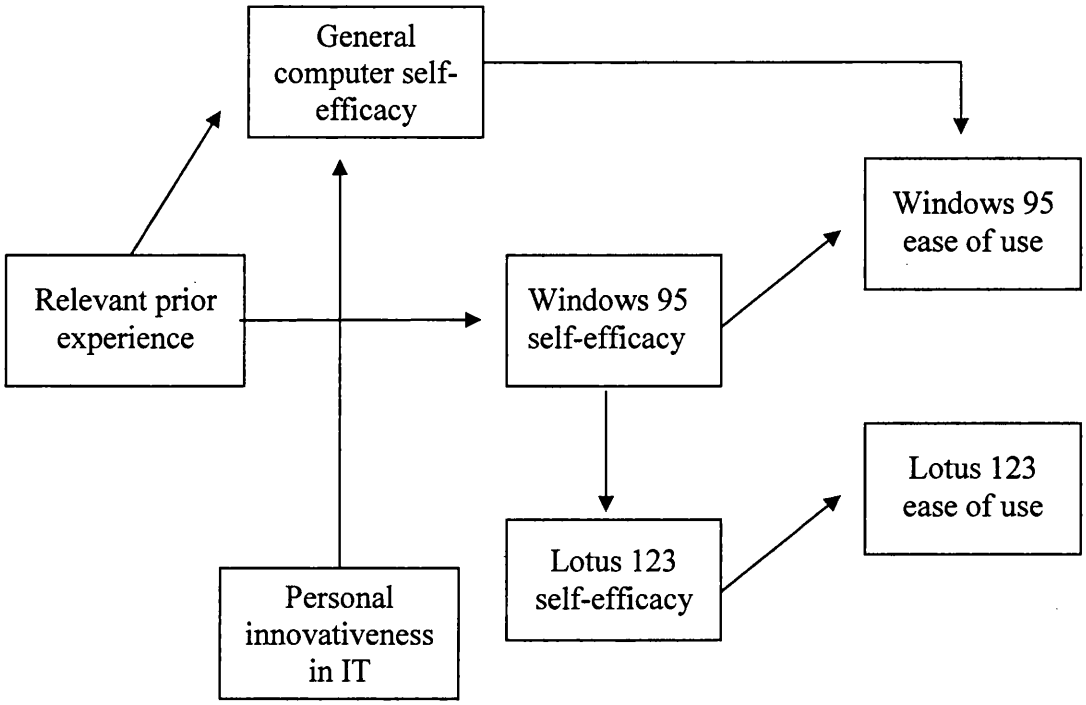

Figure 2.3 – Self-efficacy and ease of use model: adapted from Agarwal et al (2000)

A number of researchers have found significant relationships between computer anxiety (also referred to as technophobia, computer-phobia, and computer avoidance), and usage intention, usage behaviour, and performance (Harrison and Ranier, 1992; Brosnan, 1998; Coffin and MacIntyre, 1999; Durnell and Haag, 2002; Vician and Brown, 2003). Igbaria and Parasuraman (1994) found that individuals' adverse feelings towards using computers can severely affect their performance, when compared with individuals with positive feelings towards computers, and there is no reason to imagine that such reactions have changed despite the ubiquity of information technology. Research has been conducted into ways of decreasing computer anxiety. Methods tried have included: providing more hands-on experience (Rosen and Maguire, 1990; Maurer, 1994), making training more play-like rather than work-like (Webster and Martocchio, 1992, 1993), providing differential motivational responses during computer-training sessions (Martocchio, 1994), and providing computer instruction within a cooperative learning framework rather than individually focused instruction (Keeler and Anson, 1995). It is likely that the prevalence of computer anxiety has decreased as the use of computers at home and work has become more

widespread, and whilst this anxiety will not evaporate altogether, it seems reasonable to assume that it is less likely to have an effect on transfer than it did now than 10 years ago.

2.3.2. Situational factors

Klink *et al* (2001) believe that trainee characteristics account for most of the variability in training transfer, based on the theory that trainees will transfer the training only if they have the ability and motivation to do so; however some have thought otherwise. Seyler *et al* (1998) and Rouiller and Goldstein (1993) believed that the work environment is a much stronger predictor of training transfer than the trainees' performance in the training itself, while Tannenbaum and Yukl (1992) found that elements of the work environment can either encourage (rewards, job aids), or discourage (ridicule from peers, task constraints) training transfer. Once again many of these variables seem evident; however some employers may be unaware of the relative benefits. If this is the case, employers could be made more aware that they should be looking for things such as task constraints in the workplace that inhibit transfer.

Baldwin *et al* (1991) demonstrated that three organisational 'signals' influence trainees' intentions to apply what they have learned to their jobs. These were when trainees (a) received relevant information before the training; (b) recognised that they would be held accountable for learning; and (c) when the training is mandatory. In these instances, trainees reported stronger intentions to transfer learning to their jobs.

Lim and Morris (2006) found that a trainee's job function was identified as an influential variable for perceived learning transfer, and their immediate training needs to use the training content on the job appeared to be a strong variable affecting perceived learning and perceived learning transfer. When there were immediate needs to use the training content, the study indicated that the trainees were motivated not only to transfer their training but also to learn better when they expected to use immediately what they had learned in training. The above

finding raises an interesting issue, which concerns the time gap between training and when trainees actually get to apply it to their jobs. As Lim and Morris (2006) found, the longer the time between training and application the less likely that they are to transfer the training. The likely reason for this is skill decay, which therefore promotes the need for informal training, this is discussed in chapter 6.

It is unsurprising to discover that situational constraints in the workplace can significantly hinder the transfer of training. If the opportunity to apply the training is not given to the trainees, companies will not, of course, acquire any possible benefits. Furthermore, it is reasonable to assume that if trainees are not given the opportunity to transfer their own learning, they are more likely to exhibit greater skill decay than those who have had a chance to practise what they have learned (Pentland, 1989). Much attention has focused on how work-environment factors affect the transfer of learning in a climate which favours it, such a climate being seen as a mediating variable in the relationship between the organisational context and individuals' job attitudes and work behaviour. In other words, it is clear that even if the training content and trainee characteristics tend to favour transfer of learned skills to the workplace, workplace environment factors still play a significant role (Ruona *et al*, 2002). Perceptions of support for training at the work-group level have also been shown to be an important predictor of transfer. Facteau *et al* (1995) found that peer support influences transfer of training to a large degree, although they also found further significant variables, namely training reputation, intrinsic and extrinsic incentives, compliance, career exploration, career planning, organisational commitment, subordinate support, supervisory support, and top management support. Tracey *et al* (1995) hypothesised that there would be a direct relationship between training climate, continuous learning environment, and post-training behaviour. They define a continuous learning environment as one in which "*organisational members share perceptions and expectations that learning is an important part of everyday life at work*". Their study, which used a sample of 505 supermarket managers from 52 stores, found both the training climate and the continuous-learning culture had direct effects on post-training behaviours. Moreover, Awoniyi *et al* (2002) found a positive relationship between positive training

transfer and support for autonomy/freedom, low workload pressure, creativity, and sufficient resources. The above variables again seem pretty reasonable but again are worth noting because some employers may be unaware that their employers are failing to transfer the training because of their work load, and instead believe that the training was inefficient.

Tracey *et al* (1995) believed that targeting team leaders and immediate supervisors might provide the greatest return on investment. A number of researchers have investigated the ways in which supervisors influence the transfer of training undertaken by employees, such as offering reminders and coaching (Brinkerhoff and Montesino, 1995), participative goal setting (Wexley and Baldwin, 1986), extrinsic rewards, and social cues and consequences – which can be defined as how employees within the workplace feel about their colleagues who succeed at the transfer of training (Rouiller and Goldstein, 1991).

Lim and Johnson (2002) also found supervisory support to be a significant factor influencing training transfer. Moreover, they identified variables influencing training transfer that had thus far not been found in the appropriate literature, for example: budget constraints, top-management involvement and interest in training, a lack of tolerance for trial and error, and the psychological burden imposed when trainees were expected to apply their training. Contrary to what Lim and Johnson (2002) found with respect to the significant influence of supervisor behaviour on transfer of training, the supposed impact of supervisor behaviour has not gained universal support. Indeed, Klink *et al* (2001) failed to find any relationship whatsoever between supervisory behaviour and training transfer, and Facteau *et al* (1995) even found that such support hinders transfer. On the other hand, some studies have found that work-group level support (such as peer support) is more strongly and positively related to transfer than organisational indicators (Den Ouden, 1992; Facteau *et al*, 1995; Tracey, *et al* 1995), and Xiao (1996) found that supervisory support had more of an influence than group-level support. It is believed here that support of any kind, whether from supervisors or peers, can only have a positive effect on increasing training transfer. It is also not understood how Facteau *et al* (1995) found that supervisory

support actually hinders transfer; there seems to be no obvious reason why this could be the case.

A further situational variable that has been shown to influence transfer of training is that of goal-setting, as mentioned briefly above. The theory of goal-setting has been built on the premise that trainees are more likely to apply new learning on the job when they are presented with an objective where the skill learned can be used (Tziner *et al*, 1991). A number of studies have reported that the setting of behavioural targets does in fact lead to higher levels of transfer (Feldman, 1981; Anderson and Lexley, 1983; Locke and Lathem, 1984; Wexley and Baldwin, 1986). However, Gist and Bavetta (1990) and Gist *et al* (1991) maintained that self-management strategies are more effective than goal-setting when it comes to the transfer of complex skills (although the definition of a complex skill is, of course, somewhat subjective).

Wexley and Baldwin (1986) analysed three strategies for facilitating positive transfer, having derived the strategies from the then existing transfer literature. The strategies were (a) assigned goal-setting (participants were given behavioural check-lists after completing training, but before returning to work); (b) participative goal setting (similar to that of assigned goal-setting but with the goals decided jointly with each individual participant); and (c) a self-control technique based on the relapse-prevention model (consisting of both cognitive and behavioural components designed to facilitate long-term maintenance of learned behaviours by teaching individuals to understand and cope with the problem of relapse). The study consisted of a sample of 256 participants, split equally into four groups (one being a control group). The authors found that two out of the three experimental conditions showed significantly better results than those of the control group (assigned and participative goal-setting). One reason for the influence of goal-setting on the transfer of training is given by Frayne and Latham (1989) who state that it provides cues for enhancing perceived self-efficacy.

Gaudine and Saks (2004) conducted a longitudinal quasi experiment testing the effects of a relapse prevention and transfer enhancement post training intervention on the self efficacy, transfer behaviour, and performance of a sample of nurses who attended a two-day training program. Results failed to support the effectiveness of the intervention; in fact participants in the transfer enhancement condition had the lowest transfer behaviour and performance except when it was combined with relapse prevention! This unusual finding could be explained by that the fact only a relatively small sample was used (90) or some sampling error is present.

Quiones *et al* (1995) found that the quality and variety of trainees' work experiences prior to the training can be a strong predictor of training transfer. This could be due to these trainees having realistic expectations of what is involved in the training process. Moreover, more experienced trainees are able to draw on knowledge from past training sessions and work experiences. However, similarly to many other authors, overall they found the organisational climate to be the single most important factor affecting efforts to apply new knowledge in the actual job setting.

Naturally, isolating the causal impact of a single work-environment variable in a real-world setting is difficult because of the lack of potential experimental control. To the knowledge of this author, the only study which attempted to isolate such a variable is that by Brinkerhoff and Montesino (1995) who manipulated the transfer environment and tested the effects on behaviour. Their study explored the impact of two management interventions on the transfer of training (pre-training expectations discussion and after-training follow-up discussion). The results showed significantly higher training usage and a more positive perception among the trainees who received the management support interventions. Many authors maintain the importance of transfer climate, with one study – Rouilier and Goldstein (1993) – stating that it may even be as important as the training itself.

The idea of relapse prevention as a source of increasing the transfer of training has received some attention in the literature. In the words of Tziner *et al* (1991), "*relapse prevention sensitises trainees to the issue of skills erosion and immunises them against environmental or situational factors which might inhibit the use of skills which process, in turn, causes the noted erosion.*" Trainees, if found not to be using the newly learned-behaviours, are taught a range of coping behaviours. The most important part of initiating relapse prevention training is identifying those on-the-job situations which might make transfer more difficult (Noe, 1986). Tziner *et al* (1991) found that trainees who participated in the relapse prevention programme showed significantly higher levels of knowledge of the course content, and were more likely to use the skill-transfer training strategies when compared with those who did not participate in the relapse-prevention training. However, Burke and Baldwin (1999) found in their study of 78 researcher-supervisors that relapse prevention did not directly affect maintenance outcomes. It appears that relapse-prevention is another form of supervisory support because supervisors sit down with employees, and identify those 'on-the-job' situations – however, this seems to have been over looked in the studies above. Moreover, the reason why Burke and Baldwin (1999) failed to find support for relapse-prevention may be because the person who arranged the relapse-prevention, did not do so effectively, as opposed to the idea of relapse-prevention itself.

According to Yamnill and McLean (2005), perceived content validity is the most important factor in explaining transfer of training. Therefore, they recommend that employees should be regarded as full stakeholders in the training process. For example, employees may be responsible for identifying training objectives, assessing their training needs, and participating in developing that training curriculum. This is supported by Kontoghiorghes (2002) who also found that content match and task similarity between learning and transfer settings were an important factor in determining training transfer. However, the extent to which this is feasible can be brought into question. It is likely that in many situations employees will not have the knowledge, experience or even motivation to participate in this process.

Bell and Ford (2007) found that trainees who perceive the needs assessment as providing useful information regarding skill strengths and weaknesses, will be more motivated to improve their skill weaknesses through participation in a related training program. They also found that trainees high in learning orientation reacted more favourably to the skill assessment than trainees low in learning orientation. A needs assessment is something that has not been discussed so far, and in my opinion, is a vital part of developing an effective training program. Too often, employees are sent on 'off-the-shelf' courses that have been designed to train the *average* employee, and as a result in many cases can prove ineffective. A needs assessment will encourage employers and training providers to develop training tailored to individuals needs. However, this can be very time consuming and expensive as many SMEs will be unable to afford such a process.

Although research has been conducted in the area of the impact of job/work environment factors on the transfer of learning, according to Clarke (2002),

> *"a major problem lies in the limited information available regarding those factors associated with the organisational environment which either contribute to or impede the use of trained behaviours once trainees leave the training environment and return to the workplace."*

This notion is supported by Elangovan and Karakowsky (1999) who stated that:

> *"To date we are still some way from determining precisely which aspects of the work environment mediate training transfer and in particular whether such aspects generalise across all organisational settings."*

The studies mentioned in this literature review have tended to veer either towards analysing trainee characteristics or towards work environment variables. Although researchers have included both types in their studies, these have still tended to be treated as if they were independent of each other (Ford and Weissbein, 1997).

Socio-cultural paradigms have been seen as critical in the issues of transfer and learning by some theorists (for example, Billet, 1996; Eraut, 2004). However, Cornford (2005) believes that the importance of these elements have been overstated where learning is concerned and thus, at best, that what they offer is a half-truth. Cornford (2005) argues very strongly that it is cognitive-constructivist views that hold the key to learning issues in transfer as opposed to social effects. He does not claim that cognitive psychologists hold all the answers, recognising that social factors are often important (Cornford, 1996). For example, Cornford (2005) maintains that power relationships in workplaces and workplace cultures (see Fuller *et al*, 2004) can certainly be important influences on learning. He believes that until now, concentration on socio-cultural factors in workplace learning literature, largely to the exclusion of cognitive elements, has resulted in far less attention being paid to the learning part of the equation. He holds that the learning processes are absolutely central to the acquisition, storage and refinement of schemas or mental models in memory, which are foundations of human understanding and behaviour. Cornford (2005) argues for the cognitive views of learning and almost ignores any other factors. The author of this thesis believes this is somewhat short-sighted; no matter how much an employee may learn during a training session or course, there are a number of other factors that have a significant impact on the transfer of training to the workplace which should not be over looked. Whilst cognitive elements should not be ignored, they certainly do not hold all the answers.

There is only a limited amount of research on informal training, and whilst this study focuses on the transfer of formal training to the workplace, the impact of informal training on company performance should not be underestimated. Poell *et al* (2006) believes that the usually weak position of formal trainers in the organisation makes them prone to designing off-the-job training programs, whereas informal workplace trainers are in a position to also influence everyday employee learning on the job. Poell *at al* (2006) note that attention is beginning to move from formal training to informal training and learning in the workplace and ways in which informal training procedures can be enhanced. One issue they have raised with regards to informal trainers is that their role in the organisation

has not been formalised. It tends to be experienced colleagues and direct supervisors, who occupy a formal position related to the employees work, are often the ones who perform such roles. Poell *et al* (2006) also believe that knowledge about the positions and roles of informal workplace training is necessary for the maintenance and improvement of learning systems in organisations to take place. Moreover, their study showed that informal workplace trainers who have received formal training in preparation in their new role have a broader, more multifaceted repertoire that those who have not. However, SMEs may be unwilling to send their more experienced employees on training courses because they are needed at the workplace.

Whilst formal training should never be ignored, more research should be conducted into the advantages of informal training over formal training and if found to be superior then methods of increasing and improving provision in SMEs should be examined.

2.4. Behavioural change models

2.4.1. The theory of reasoned action model

If transfer of training to the workplace is to be satisfactorily effected, a change in attitude, and, eventually behaviour, will be paramount when it comes to dealing with employees' usage of ICT at work. A number of behavioural change models are to be found in the relevant literature, including the theory of interpersonal behaviour, the theory of planned behaviour, and the theory of reasoned action model, the latter being one of the earliest behavioural change models (see Fishbein and Ajzen, 1975). According to this model, an individual's performance of a specified behaviour is determined by his or her behavioural intention to perform the behaviour. This may seem tautologous, but it should be remembered that behavioural intention is jointly determined by individuals' attitude towards performing the behaviour, and their subjective norm concerning the behaviour (see Figure 2.4). As Davis *et al* (1989) have put it:

"Behavioural intention is a measure of one's intention to perform a specified behaviour. Attitude is defined as an individual's positive or negative feelings about performing the target behaviour. Subjective norm refers to the person's perception that most people who are important to him [sic] think they should or should not perform the behaviour in question."

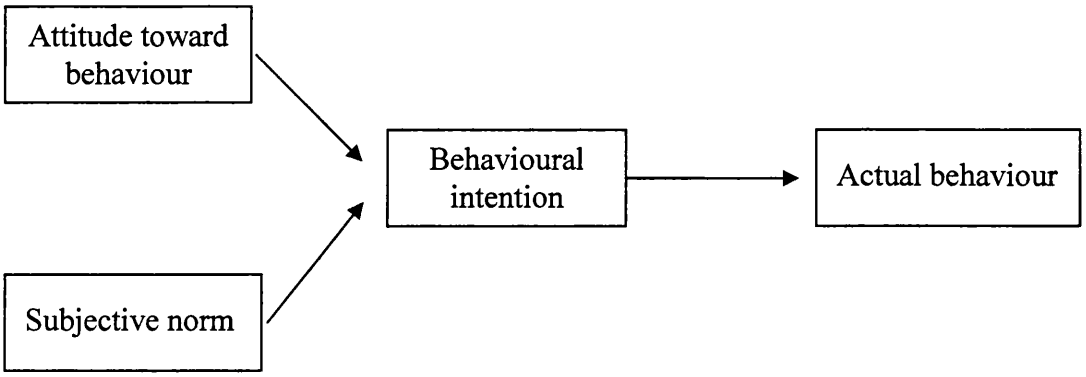

Figure 2.4 – The theory of reasoned action model (Fishbein and Ajzen, 1975)

According to the theory of reasoned action model, attitudes are made up of beliefs and evaluations. That is to say, attitudes are determined by the salient beliefs that the individual believes will come about as a consequence of performing the behaviour, multiplied by the individual's evaluations of these outcomes. Subjective norm comprises normative beliefs - that is, an individual's perception of the expectancy of referent others (people to whom one might refer; see Mathieson, 1991) - multiplied by motivation to comply with these others (in other words, how important the individual rates the opinions of these others). One point that must be highlighted is that the theory of reasoned action model is a general model which does not specify the beliefs that are operative for a particular behaviour, so that researchers must identify a new set of salient beliefs for every study looking at a different area. An important aspect of this model is that it asserts that any other factors which influence behavioural intention, do so only by indirectly influencing attitude toward the behaviour and subjective norm. Whilst the theory of reasoned action is a basic model, it has provided the base on which more complex models can be developed.

2.4.2. The theory of planned behaviour

The theory of planned behaviour has been built on the theory of the reasoned action model, and like other behavioural change models assumes that behaviour is determined by intention. It extends the theory of reasoned action to account for instances where individuals do not have complete control over their behaviour, the new variable being perceived behavioural control (PBC) which refers to the individual's perceptions of the presence or absence of requisite resources and opportunities (Ajzen and Madden, 1986). Similar to the theory of reasoned action, the theory of planned behaviour purports that the attitude towards the behaviour and subjective norms are direct antecedents of behavioural intention see Figure 2.5.

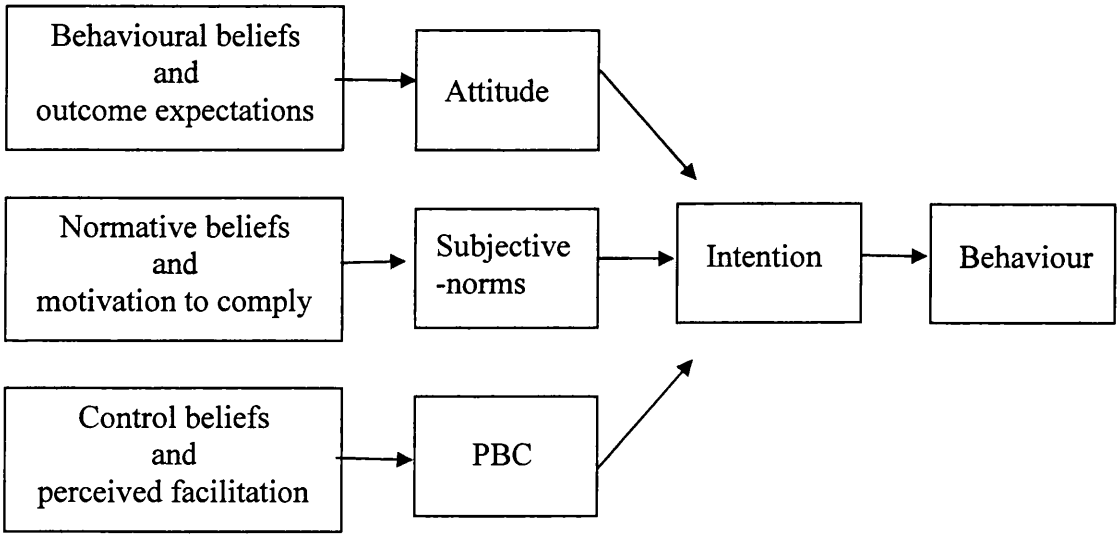

Figure 2.5 - The theory of planned behaviour model (Ajzen, 1985)

Beliefs are antecedent to the three factors. For example, as Mathieson (1991) put it:

> *"Attitude is a function of the products of behavioural beliefs and outcome evaluations (utilitarian outcomes). A belief is the subjective probability that the behaviour will lead to a particular outcome. Subjective norms reflect the perceived opinions of others. A referent other is a person or group whose beliefs may be important to the individual. A normative belief is the*

individual's perception of a referent of other's opinion about the individual's performance of the behaviour. Motivation to comply is the extent to which the person wants to comply with the wishes of the referent other. Perceived behavioural control refers to the individual's perceptions of the presence or absence of requisite resources and opportunities. Perceived behavioural control depends on control beliefs and perceived facilitation. A control belief is a perception of the availability of skills, resources, and opportunities. Perceived facilitation is the individuals' assessment of the importance of these resources to the achievement of outcomes."

The theory of reasoned action and the theory of planned behaviour models have been discussed briefly above; whilst they do not feature heavily throughout the remainder of the thesis, because research has moved on since their development and that it is believed that it does not account for the many variables present in the transfer process, they have been used as a foundation for developing this thesis and were seen as a stepping stone to the technology acceptance model (TAM) which is discussed below.

2.4.3. Technology Acceptance Model

In a seminal piece of work, Davis (1985) developed the technology acceptance model (TAM – see Figure 2.6), which is subject-specific. It is now undoubtedly the most cited behavioural change model in its field. Davis (1985) proposed that both perceived usefulness and perceived ease of use would jointly determine the acceptance of a new technology. Perceived ease of use is "*the degree to which the user expects the target system to be free from effort*", and perceived usefulness is the user's "*subjective probability that using a specific application system will increase his or her job performance within an organisational setting*" (Davis, 1985). TAM is based on the premise that individuals are likely to accept a new technology only if they feel that it will give them extra utility and is easy to use. Although Davis (1985) did not find a significant relationship between perceived ease of use and technology acceptance, perceived usefulness was found to be a

significant predictor. However, perceived ease of use was found to be indirectly related to technology acceptance through that of perceived usefulness.

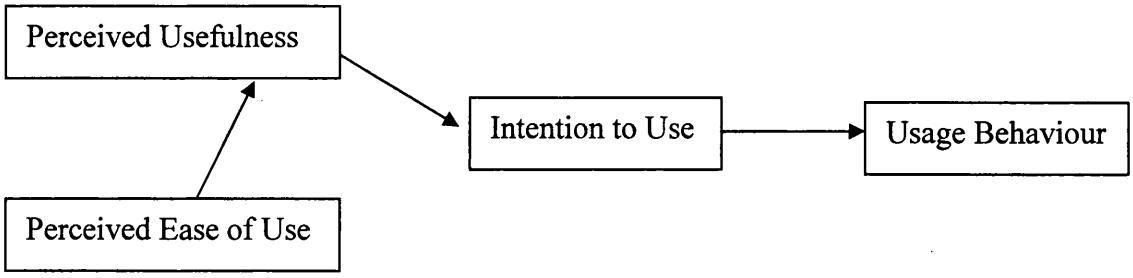

Figure 2.6 - The Technology Acceptance Model (Davis, 1985)

Since Davis developed TAM, many papers have tested, expanded, and compared it with other models (see for instance, Davis, 1989; Davis *et al*, 1989; Mathieson, 1991; Adams *et al*, 1992; Taylor and Todd, 1995a; Chau, 1996; Davis and Venkatesh, 1996; Gefen and Straub, 1997; Morris and Dillion, 1997; Venkatesh 1999; Venkatesh and Davis, 2000; Legris *et al*, 2003). Overall, there is a general consensus that TAM is a good predictor of technology acceptance.

Davis *et al* (1989) proposed that organisational support is an important variable that is likely to influence both perceived usefulness and perceived ease of use. Organisational support has consistently been found to be associated with high system usage (Rogers, 1983; Fuerst and Cheney, 1992; Trevino and Webster, 1992). Thompson *et al* (1991) found that in organisations where computers are widely used, individuals are likely to perceive the use of computers as the norm and to be favourably disposed toward them. Venkatesh and Davis (2000) found that social influence-processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) significantly influence user acceptance.

Although some of the above references are now somewhat dated and have been taken from a time when computers were only just beginning to be ubiquitous, there is no reason to suggest that the fundamentals have really changed.

Venkatesh and Morris (2000) have maintained that, along with social influence, gender plays a potentially critical role in understanding technology acceptance. Venkatesh and Morris (2000) expanded TAM to include subjective norm and gender, hypothesising that gender and experience would moderate the relationships between perceived usefulness, perceived ease of use, and subjective norm with behavioural intention (see Figure 2.7).

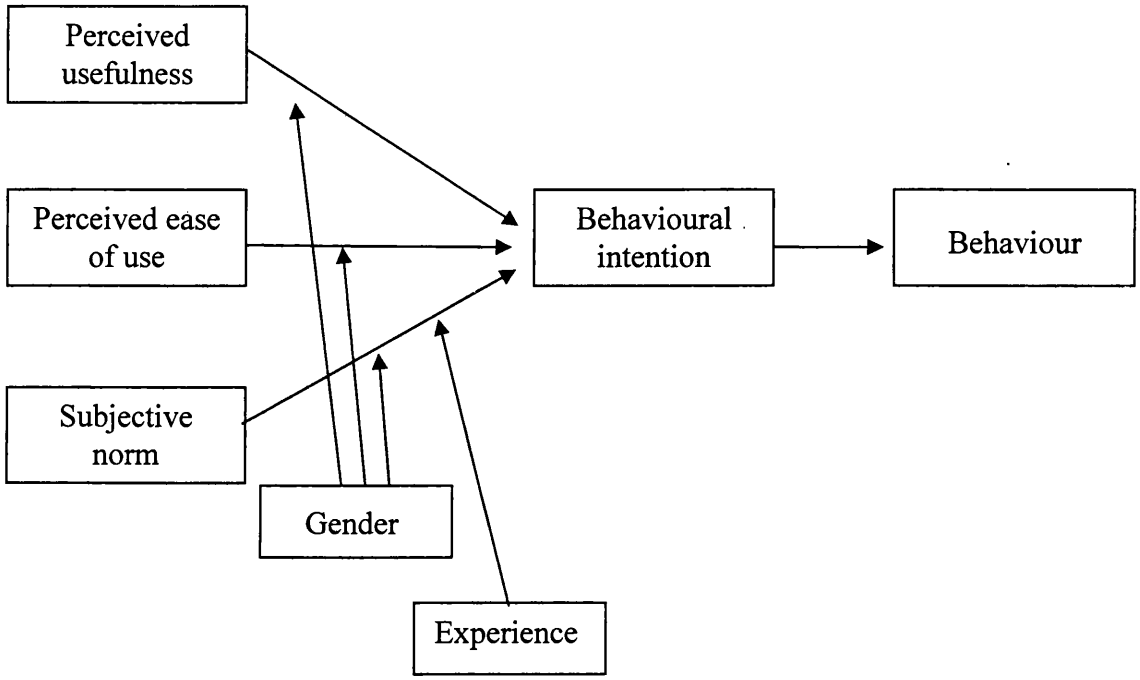

Figure 2.7 - Proposed extensions to the technology acceptance model (Venkatesh and Morris, 2000)

They found that men's technology-usage decisions were more strongly influenced by their perceptions of usefulness, while women were more strongly influenced by perceptions of ease of use and subjective norm (although the effects of subjective norm were found to diminish over time).

Taylor and Todd (1995b) conducted a study to see if TAM is equally valid for inexperienced and experienced users, and whether the determinants of ICT usage such as perceived ease of use and perceived usefulness are the same for both groups. They found that the path from behavioural intention to behaviour was stronger for the experienced users, something which was expected given that

experienced users are more likely to make use of knowledge gained from their prior experiences, thus informing their intentions (Fishbein and Ajzen, 1975). Inexperienced users' intentions were better predicted by the antecedent variables than were the intentions of experienced users. Unexpectedly, however, perceived usefulness was the strongest predictor of behavioural intention for inexperienced users, with experienced users placing more emphasis on perceived behavioural control. Inexperienced users tended to discount control information in the formation of intentions, relying instead primarily on perceived usefulness.

Fagan *et al*'s (2003) model of computer usage was developed using three different strands of research: social cognitive theory, theory of interpersonal behaviour, and the computer anxiety literature. They found that computer usage was determined directly by computer self-efficacy, computer experience, and computer anxiety, and determined indirectly (through computer self-efficacy) by organisational support. Obviously, this study focuses on computer experience however it is probable that many of the variables used in this study are highly correlated. For example, employees who have considerable experience with computers are likely to have higher levels of self-efficacy and lower levels of computer anxiety, as a result do not add much to the study.

The validity of TAM has been shown to hold across different technologies, as well as persons, settings and times. It has been suggested that culturally induced beliefs play an important role in influencing technology acceptance (Veiga *et al*, 2001). This idea is based on the premise that beliefs and values shared by a group of people (their culture) affect their behaviour in a number of ways. Veiga *et al* (2001), building on the work of Straub (1994), have explored the relationship between culture and ICT acceptance, using TAM as a framework. Although comparatively little work has been done in testing the validity of TAM across cultures (but see Straub *et al*, 1997), there is some evidence both for and against the notion that culture is a significant influencing factor. Rose and Straub (1998) found overall support for the validity of TAM, but that study was conducted only using Middle Eastern countries, where it might be thought that cultural differences would be less than, say, between countries that are more culturally

diverse. So it would be advantageous if this model was tested using countries such as in Asia and in the US so to help confirm the validity of this model. Straub *et al* (1997) found TAM to be a poor fit when testing over a broader range of cultures: in a study involving three countries, the model held for USA and Switzerland, but failed to be valid for Japan.

Hofstede (1980) identified five cultural dimensions:

1) Power distance. The extent to which people of a country show a propensity to accept unequal distributions of power, such as between senior managers and rank-and-file workers.
2) Uncertainty avoidance. The extent to which people of a country show a propensity to maintain the status quo when feeling uneasy or threatened by situations that are uncertain or ambiguous.
3) Individualism. The extent to which people of a country show a propensity to see themselves as self-sufficient individuals (individualists) as compared to a propensity to see themselves primarily as an integral part of a social group (collectivists).
4) Long-term orientation. The extent to which people of a country show a propensity to take a long-term perspective that primarily emphasises doing things that improve the future as opposed to a short-term perspective that primarily emphasises the present or the success of the past.
5) Masculinity. The extent to which the dominant values in society are "mascline" – that is, assertiveness, the acquisition of money and things, and not caring for others, the quality of life, or people.

Veiga *et al* (2001) have attempted to broaden TAM so as to allow for variations in cultural dimensions. They propose that four of Hofstede's cultural dimensions would influence attitudes indirectly through perceived ease of use and perceived usefulness, and highlight the fact that this research will help ICT training companies tailor their courses to take account of cultural differences (see Table 2.3).

Table 2.3: Cultural influences of TAM (Veiga et al, 2001)

Culturally Induced Belief	**Implementation Issues**
Individualism/collectivism	Performance benefits for individuals vs. workgroups
	Individual vs. collective self-efficacy
	Focus of training and rewards for ICT learning: individuals vs. workgroup, encourages least skilled vs. most skilled
Uncertainty avoidance	Rate of ICT skill acquisition
	Involvement in system design process
	Perceptions of its reliability and track-record
Short/long term orientation	ICT linked to immediate benefits vs. future work needs
	ICT's fit with traditional practices and strategic plans
Power distance	Top-down initiative vs. sense of participation in choice

As has already been discussed, social determinants, such as subjective norms, can affect general training performance and training transfer. Although little research has been conducted in this area, it has been proposed that social determinants influence ICT usage (Robertson, 1989). A surrounding social group makes up a major part of the social determinants of the use of ICT. Robertson distinguished two ways in which a social group can effect: (1) by affecting how the individual interprets a system, and (2) by the social pressures and demands from the group on the individual using the system. Thus, the usage of ICT is determined by the features of the system and those of the social group. This notion would seem, however, to be too simplistic, since, as we have seen, there are many other influences on usage, such as culture, age, previous experience, self-efficacy, and situational constraints. Moreover, the general impact of social influences on behaviour is well known, and subjective norms are incorporated into the theory of reasoned action and theory of planned behaviour models, although as Davis *et al* (1989) explained, social influences such as subjective norms were not included in

their model given some theoretical and measurement problems. The evidence pertaining to the importance of including subjective norms in behavioural change models is somewhat mixed. Some studies have found the variable to be significant (Hartwick and Barki, 1994; Taylor and Todd 1995b), while others have found otherwise (Davis *et al*, 1989; Matheison, 1991), and yet others have omitted the variable completely (Adams *et al*, 1992; Szajna, 1994, 1996)

2.4.4. Social learning theory

Bandura (1977) established a number of steps that he believed were involved in the modelling process, which can be applied to training transfer. Bandura is famous for his insight into social learning theory through his bobo doll studies experiment. He made a film of one of his students, beating-up a bobo doll (an inflatable, egg-shape balloon creature with a weight in the bottom that makes it bob back up when it is knocked down). Bandura showed this film to groups of young children who, after watching the film during their lunch break, shouted at, punched and kicked the bobo doll which had been left in the playground. In other words, they imitated precisely the person in the film. Bandura called the phenomenon observational learning or modelling, and his theory is usually called social learning theory. Bandura (1977) steps are as follows.

1. Attention. Anything that distracts an employee's attention will decrease learning, including observational learning. This can clearly be a problem when training is conducted at the employees' premises: employees are often distracted by tasks that need to be done in the workplace.

2. Retention. Again, employees must be able to retain what they have paid attention to. Bandura believes that *"we store what we have seen the model doing in the form of mental images or verbal descriptions. When so stored, you can later 'bring up' the image or description, so that you can reproduce it with your own behaviour.*"

3. Reproduction. Employees have to translate course content into actual behaviour, and (again obviously) thus have to have the ability to reproduce the behaviour in the first place.

4. Motivation. An employee may have paid attention to the training, retained the information, and have the capability to reproduce it, yet not transfer it, unless and until there is some reason for doing it.

Very little has been mentioned of the study by Bandura (1977) in the training transfer literature, although the general principles he discussed (for example motivation and attention) have been consistently mentioned in the literature. Although, Yi and Davies (2001, 2003) looked at how observational processes (attention, retention, production and motivation) impacts on training outcomes - that is, immediate task performance and delayed task performance. In their study of 95 students being trained on Microsoft Excel, they found that the observational processes had a significant impact on training outcomes (indirectly though software self-efficacy and declarative knowledge).

2.4.5. MASS

Yelon (1992) developed a model that attempts to improve training transfer. He described his model using an acronym, MASS, to facilitate recall of the chief components, as follows.

M. Motivation

Yelon (1992) repeats that for trainees to learn and to apply new behaviour, they need to be motivated before, during and after training. He proposes a number of questions which he argues need to be answered before engaging in training for transfer, including:

- Is there a real priority need in the organisation to use what is to be taught?
- Do trainees perceive the need as one of their priorities?

- Does the motivation to meet the perceived need exceed the pressure from organisational norms to maintain the status quo?
- Do the trainees perceive that they will be able to counter the norms and to apply what is taught?
- Will the ideas and skills to be taught make a significant difference to the individual, as well as to the organisation?
- Do the trainees perceive that applying the ideas and skills to be taught will make them appear effective?

A. Awareness

Trainees must be mindful of the use of the skill, including awareness not only of the general value of the new skill, but also exactly when to use it. Yelon (1992) insists that trainers must first assess the level of trainees' awareness by asking a series of questions:

- Are you aware of the actions required to meet your high priority needs?
- Are you aware why your past performance was not successful?
- Are you aware of what ideas and skills you need to learn to change your performance?
- Are you aware of when and where to use the ideas and skills to be learned?
- Are you aware of the cues denoting the time to use certain ideas and skills?
- Are you aware of why you are to use certain ideas at certain times?

S. Skill

Yelon (1992) emphasises the importance of cognitive approaches to teaching a skill and making trainees aware of its use at appropriate times. Attempts to match training conditions to those encountered in the real world of work are important. *"Trainers need to have an extensive repertoire of skills and knowledge about effective learning procedures and how to teach learning-to-learn and problem solving approaches."*

S. Support

Support in the work environment, so that transfer of skills that have been learned and trained for becomes easier and assisted, is recognised by Yelon (1992) as of great importance. "*All staff must learn not to discourage transfer. These staff include top leaders, line supervisors, and co-workers, since trainees need time and opportunity to perform and perfect skills through practice and feedback.*"

2.5. Summary

This chapter has analysed in detail the literature in the field of training transfer and the areas closely related to it. Whilst a fair amount of research has been conducted on training effectiveness (see section 2.4), it is more limited in the area of training transfer (see section 2.6), and even more so in the area of ICT training transfer (but see Machin and Fogarty, 2003). More research needs to be conducted into the main factors influencing the transfer of ICT training to the workplace and to examine the extent to which training is transferred to the workplace; as well as the impact such training has on company performance. South Wales is of particular interest because it has been allocated a significant amount of money from the European Social Fund for SMEs to train their employees in ICT. It is possible that ICT training transfer is not as high as some training providers and employers believe. If that turns out to be the case, this present research will draw their attention to it, as well as suggesting ways of improving the situation.

The following chapter begins by outlining the main objectives of the study (which follow from this literature review) and discussing, how the main investigation has been conducted, considering in particular how the questionnaires were designed and administered.

Chapter 3. Methodology

"The measurement problem remains. Most studies still use surveys as the preferred method for measuring transfer" (Salas and Cannon-Bowers, 2001)

3.1. Introduction

The aim of this chapter is to provide a discussion of the methods used for the main investigation with respect to the individuals involved in the process of the transfer of training, namely ICT training providers, employees, and employers.

The overall objectives for this thesis were mentioned briefly in chapter 1. Each of these objectives are now discussed in more detail below.

1. To determine the extent to which ICT training is transferred back to the workplace.

If ICT training is going to be successful, it has to actually be transferred back to the workplace, and, as was identified in section 2.1, training transfer is perhaps not as high as some may believe. In section 1.2, the initiatives that have been set-up by both the Welsh Assembly Government and the European Commission were discussed, through which a significant amount of money has been invested. Therefore, if this study finds that the majority of employees do transfer their ICT training, it will provide support for the resources spent by the Government; and vice-versa if it is found that employees do not transfer their ICT training.

2. To establish if different employee groups transfer the training to different degrees.

From the literature review, it is clear that not all employees transfer training to the same degree (for example, see section 2.4.1). Employees with different characteristics will transfer the training back to the workplace more than others. If employers and training providers are aware of the factors influence training

transfer, it will enable them to tailor various parts of the training process, possibly down to the individual level.

3. To determine the situational factors associated with transfer.

A fair amount of research has been conducted on the impact of situational factors on training effectiveness and training transfer in a range of industries, see section 2.4.2. Generally, research indicates the importance of the employer/company in the success or otherwise of training transfer. This study will determine what situational factors impact on ICT training transfer; this will also be of assistance to employers in increasing their employees ICT usage.

4. To establish the extent to which ICT is beneficial to the company.

If it is found that, in general, ICT training is not being transferred back to the workplace, and that companies are not reaping any rewards as a result of providing ICT training for their employees, it then suggests an apparent waste of resources. If this is the situation, it will draw employers' attention to the fact and it will allow them to make changes to either increase transfer, or to reduce training provision.

5. To establish best practice for employers and training providers when providing and offering ICT training.

The findings from this study will detail what training providers and employers need to do to increase training transfer. Whilst a number of studies have developed models for maximising training effectiveness, this current study will focus on ICT training transfer in South Wales, which to my knowledge, has yet to be investigated. It will provide recommendations for both employers and training providers wishing to increase transfer and ICT usage.

3.2. Definition and measure of training transfer

Baldwin and Ford's (1988) definition of training transfer (see p1) has been slightly modified for this study. The modified definition is *"the extent to which the use of skills acquired in a training programme are generalised and* ***increased*** *over time in the job environment"*. In other words, the extent to which employee ICT usage increases as a result of attending an ICT training course. For positive transfer of training to occur, the learned behaviour must be generalised to the job context and maintained over time on the job. Whilst only a slight difference exists between the two definitions – a difference does exist (a discussion of which can be found in chapter 6).

In the past, training transfer has often been measured as the difference between trainees' pre and post-test scores – that is, the difference between employees knowledge before and after training (for example see Mathieu *et al,* 1992). However, this measure of training transfer is flawed to some extent. For example, employees may have been found to have learned a lot during the training course, but if they have learned material that is not relevant to their jobs, this does not constitute as effective training – although because the way the measure of transfer has been designed it would show that the training was effective. Moreover, some studies have only used post-test scores as a measure of training effectiveness (See for example Chiaburu and Tekleab, 2005) – but if the trainee already had a good knowledge of the training content before attending the training and therefore scored highly on the post-test score, this again should not count as effective training. What is more, this measure of transfer does not take a number of other factors into account such as workplace constraints hindering transfer, for example, available resources at the workplace.

The approach taken to measure training effectiveness in this study attempts to include all the factors present in the transfer process and provide a reliable measure for Government, employers, employees and training providers. Training transfer is measured as the difference between employees reported usage of ICT at work pre-training and their reported usage of ICT post-training. It is believed

that this is the best measure of training effectiveness and transfer. A further discussion of the scales used can be found in section 3.5.1.

3.3. Data collection

The subsequent section outlines the processes followed in the collecting and analysing of the data.

3.3.1. Population

The target population was any SME who had provided ICT training for their employees between 2000 and 2004. It was decided not to choose companies who attended training earlier than 2000 because respondents may struggle to recall information needed to complete the survey. Due to logistical and financial constraints, it was decided to restrict the study to South Wales.

3.3.2. Research design

There are three recognised standard research methods, *viz*: survey, observation and experiment. Given the target population, the latter two methods were considered impractical. Obtaining companies' permission to allow a researcher to observe their employees was found to be out of the question, as determined once some initial approaches showed. The same applied to conducting an experiment with employees over a period of time. Surveys therefore, represented the only workable research method to conduct the main study. However, additional case studies were used for a small longitudinal study and a discussion of these can be found in chapter 7.

3.3.3. Sample and Sampling Frame

A sample is a subset of a population. Since it is usually impractical to test every member of a population, a sample from the population is typically the best approach available. Pinsonneault and Kraemer (1993) believe that the most critical element of the sampling procedure is the choice of the sample frame that

constitutes a representative subset of the population from which the sample is drawn. It was therefore vital that an appropriate sampling frame was used, and this was acquired through an ICT-training provider's customer database. Computeraid are a successful ICT-training company serving the whole of South Wales, with offices in Cardiff and Swansea. The company has been operating since 1988, and has a database of over 5,000 companies in South Wales that have received ICT training since the year 1998. However, given financial restrictions, the maximum sample available was 750 companies, although this number was still regarded as more than sufficient for the purposes of the research. Inferential statistics generally require that sampling be random although some types of sampling seek to make the sample as representative of the population as possible by choosing the sample to resemble the population on the most important characteristics. The 750 were chosen using stratified sampling which is defined as a "*probability sample that is forced to be more representative through simple random sampling of mutually exclusive and exhaustive subsets*" (McDaniel and Gates, 2002), because the sampling frame contained fewer larger companies than smaller ones. The sample was split into small (n=325), medium (n=325) and large SMEs (n=100), with companies with less than 10 employees being classified as small, between 10 and 50 as medium and 50 or more employees classified as large. There are various set definitions for what constitutes a small, medium and large company. The European Commission states that a small company is one with less than 50 employees, a medium company with between 50-250 and a large company with more than 250. However, given that there are very few companies with more than 250 employees that have received external ICT training in South Wales it would have meant this group would have not been well represented. As a result, it was decided to use the above bands so all groups would be adequately represented.

3.3.4. Data collection method

A number of popular surveying methods are available for collecting quantitative data, for example, telephone, face-to-face interviews, postal surveys, e-mail surveys and web-based questionnaires. We consider the suitability of each method for our research briefly below.

Telephone

Collecting the data via the phone is a relatively inexpensive surveying method. However, given the sample size of 750 companies and the need to speak to the employer and at least one employee from each company, it would have been infeasible to contact every potential respondent. Besides, it may have been necessary to contact companies several times if employees were busy, so were unable to complete the survey in one call. An additional problem noted in the literature with telephone surveys (see, for instance, McDaniel and Gates, 2002) is that they are limited with respect to the depth and length of questions: respondents may find it difficult to absorb long questions without visual stimuli, so that the interviewer either has to repeat the question or the respondent has to give an answer without fully understanding the question.

Face-to-face

Administering the survey face-to-face allows the interviewer to probe the respondent on their responses, and explain any questions that the respondent does not understand. However, respondents are more likely to give socially desirable answers (McDaniel and Gates, 2002) and this, coupled with the length of time it would take to visit 750 companies throughout South Wales, meant that conducting the survey face-to-face would prove difficult.

Postal Surveys

The main advantages of self-administered surveys are that they allow a larger sample size to be contacted, and that responses cannot be led by the interviewer. The major disadvantage, however, is that the interviewer is not present to answer any queries the respondent may have, for example, once again, relating to the meaning of a question. Furthermore, self-administered surveys typically produce low response rates, 10% being generally considered to represent an acceptable penetration (depending on the content, length, sample, and mode of delivery) (see Reed, 2004). Administering a postal survey can also be moderately expensive (printing and postage). This cost can be cut essentially to zero if the questionnaire is sent via email, but with the ever-increasing amount of spam, and fear of viruses, response rates can be very low.

Email surveys and web-based questionnaires

Survey participants can be contacted at a minimal cost and the responses automatically downloaded to an Access file then transferred to SPSS for analysis. However, it does discriminate against companies without web access or with limited computer knowledge, possibly leading to biased results. Moreover, surveys conducted via email and the web, suffer from poor response rates (McDaniel and Gates, 2002).

3.4. Choice of data collection method

After weighing up the advantages and disadvantages of each data collection method, it was decided that a self-administered postal survey would be used. Even though, as noted above, postal surveys suffer from low response rates, it was thought that due to the highly targeted sample the response rate would be adequate for the purposes of this study.

3.5. Qualitative vs. quantitative

In addition to deciding on the basic research method, a choice had to be made as to a balance between quantitative or qualitative research. It was considered that relying solely on either qualitative or quantitative data would be insufficient for study such as this. While a quantitative approach alone would have made it easier to achieve a large sample size, it would perhaps not have highlighted certain small differences which qualitative research might reveal, but using just qualitative data would have made it very difficult to achieve a large sample. As a result, it was decided that combining the ability of quantitative research to provide large sample sizes, and the ability of qualitative research to provide subjective interpretive data, would give the most in-depth and useful results.

Whilst it was decided that both quantitative and qualitative data collection would be needed, a further consideration was deciding on the split between quantitative and qualitative data in terms of sample size. It was considered that the bulk of the data should be collected should be of quantitative in nature. This would allow a larger subset of the population to be targeted and produce hard data that could be

compared with previous research and provide statistical results from which the stakeholders involved with the ICT training process could use to improve and modify training provision. It was thought that a smaller sample would be used for the qualitative data collection, this is because more time could be spent with each person, so more in-depth data could be collected. A full discussion of the qualitative data collection can be found in chapter 7.

3.6. Questionnaire design

Given the diversity of the information required from the two groups of respondents – employees and employers – two separate questionnaires were designed and administered with regards to the main study. Whilst in theory the two questionnaires could have been amalgamated into one, many of the questions would not have been relevant to the respective groups, and would have increased the length of the questionnaire significantly. A third longitudinal survey was used to collect additional qualitative information from employees - this is discussed further in chapter 7.

3.6.1. Employees' questionnaire

An objective measure of the extent to which employees transfer the training to the workplace would have been ideal, but is impracticable using a self-administered survey approach. A self-reported measure was therefore used. The reliability of using such a measure has received some attention in the literature, with the general conclusion that whilst objective measures may be more accurate, self-reported measures are satisfactory (see Salas and Cannon-Bowers, 2001).

In gathering the information, a distinction needed to be made between usage and transfer. This thesis is primarily concerned with transfer, that is, in essence, the difference in employees' usage of ICT before and after training. Post-training usage alone can not provide any reliable measure of transfer. For this reason the transfer item consisted of two separate questions as displayed in Figure 3.1. Two 7-point Likert scales were used to measure the training transfer item. Generally, Likert-scales have five, six, or seven points (Jamieson, 2004). It was decided that

an odd number of points should be used, so as to give a middle point that respondents could select. A 7-point scale was used because it was deemed that a 5-point scale would not distinguish as much between responses.

1) If you had already used any software programs prior to receiving training on them, to what extent had you already used them?

Very little						A great deal	Don't know / unsure
1	2	3	4	5	6	7	8

2) Since attending the training, to what extent do you now use ICT at work?

Very little						A great deal	Don't know / unsure
1	2	3	4	5	6	7	8

Figure 3.1 - Likert Scales used to measure training transfer

Transfer was measured as the difference between employees' ICT usage before training, and after training. However, it was believed that using only these two items to measure transfer would be insufficient, with the main problem being that the questions are not as simple as they may seem at first. For example, it may well have been that some employees had attended more than one training session covering multiple applications, giving rise to the possibility that they may have transferred the knowledge of the applications to varying degrees, subsequently distorting the results. In this case, respondents might either have tried to take an average figure of the extent to which they had transferred the training over all of the applications on which they have received such training, or they may have relied only on the most recent training received. For this reason, a further set of questions was added: towards the end of the questionnaire, respondents were asked to list the applications on which they had been trained (up to a maximum of four), and, for each application entered, they were asked to assess their pre-

training usage, their post-training usage and the level to which they had been trained.

The rest of the survey predominately consisted of 7-point Likert-scale items with 1 = Don't agree to 7 = Strongly agree, and a Don't know/unsure option. These Likert-scale items were used to measure variables that had been highlighted in the training transfer literature as possible predictors of training transfer and technology acceptance. For example, the item 'working with computers makes me nervous' was used to measure computer anxiety 'ICT training has increased my productivity in my job' was included to measure perceived usefulness; and 'I feel motivated to use at work the knowledge gained during my ICT training' was used to measure employees' transfer motivation. A full list of employee survey items measured in the survey can be found below.

Employees' experiences and general thoughts about ICT training

- Past experience with ICT
- Importance placed on a successful career
- ICT competency
- Quality of e-learning
- Motivation to attend training
- Enjoyment of ICT training

The quality and effectiveness of their ICT training

- Impact of ICT training on productivity
- Impact of ICT training on performance
- Importance associated with applying the training at the workplace
- Ease to which the training was applied
- Ease to which the training was understood
- Usefulness of the training
- Impact of the training on their knowledge
- Motivation to the apply the training
- How closely the training is related to the job
- Subjective norms

Employees work environment and its impact on the use of their ICT training

- The supportiveness of the organisation
- Incentives within the organisation to encourage training transfer
- Supervisory support in helping employees transfer the training
- Perception of the importance of attending ICT training
- Amount of choice of training courses
- Amount of e-learning provided

In addition, the survey included demographic questions, such as: age, sex, company position, job description, and location of where training had taken place. Questions requiring discursive answers were kept to a minimum to aid analysis and to improve response rates. It was thought that any further information required could be collected through follow-up structured interviews, as reported in chapter 7. The final version of the employees' questionnaire can be found in appendix A1.

3.6.2. Employers' questionnaire

The employers' questionnaire was designed in conjunction with the employees' questionnaire. Several questions were common to both, to allow comparisons between the two groups, and to determine if any differences in perception existed between employees and employers, in particular if there was any disparity between perceptions of how much training had actually been transferred to the job environment. The items in question were:

Q2a) How far would you say that the ICT training your employees have had has increased their knowledge?

Q2b) How far would you say that the training your employees have had has affected their efficiency?

Q2c) How proactive are you in encouraging employees to use what they have learned from their ICT training?

Q2f) To what extent do you provide incentives to your employees for using their IT training at work?

Again, the employers' questionnaire consisted predominately of 7-point Likert-scale items, thus allowing for comparative analysis. The following four open-ended questions were included for items which proved too difficult to incorporate into closed questions.

Q6) What specific difficulties, if any, have you come across regarding employees failing to use their IT training at work?

Q7) What qualities do you look for in a training provider?

Q8) What factors do/did you take into account when deciding on an IT training provider?

Q13) Briefly describe your attitude towards e-learning as a method of employees' training.

A full list of employee survey items measured in the survey can be found below.

ICT training at the workplace

- The employees increase in ICT usage
- The extent to which they encourage employees to transfer the training
- Measures put in place to ensure training transfer
- Choice of training offered to employees
- Incentives offered to encourage transfer
- Amount of ICT training provided
- Difficulties with employees applying the training
- Feedback given to employees
- Problems with employees not accepting new technology
- The superiority of informal training

- Importance of employees attending training

Effectiveness of ICT training

- Increase in employees ICT knowledge
- Impact on company performance/efficiency
- Extent to which their expectation have been met
- Usage of e-learning
- Quality of e-learning
- Quality of course material

Their employees and their ICT training

- Their employees motivation to apply the training
- Their employees perceived usefulness of the training
- Their employees previous ICT experience
- Support provided enabling employees to transfer the training
- Their employees motivation to attend the training

The final version of the employers' questionnaire can be found in appendix A2.

3.7. Pilot study

A pilot study was conducted with both the employees' and the employers' questionnaires using a sample of 20 participants who were 10 days through a 25-day advanced ICT-training course. It was chosen not to survey the subjects at the start of the course because then they would not have the knowledge to complete the majority of the questionnaire, so the 10th day through the course was arbitrarily chosen. There is no set definition for an advanced ICT training course, since 'advanced' means different things to different companies. Here, however, the term has been used to indicate that the course followed a previous 25-day course. All participants in the pilot study had attended this basic 25-day course in the 12 to 28 weeks previous. While the respondents completed the survey, the author of this thesis was present to answer any questions and to speak to them afterwards to discuss the survey and any problems they had found with it. Ideally a larger pilot study would have been administered; however, given the limited

sample size of the study, it was deemed that having a larger pilot study would perhaps have a negative impact on the main study, as the data could not be included in the analysis. Moreover, no serious or obvious problems were arising. For example -

- all subjects were in the target population;
- the subjects were happy with the length of the questionnaire;
- no important segment of the population was being left out;
- the subjects did not provide no answers for any of the questions;
- the subjects understood the questions;
- no one turned down the opportunity to participate in the study;
- a range of responses were being given for each question

As a result of that pilot study, a small number of changes were made to the employees' questionnaire. Firstly, it was thought that the question 'overall, how do you rate the quality of the ICT training you have had?' was too broad, incorporating too many possible variables, and as a result with respondents finding it difficult to answer. This item was therefore expanded in an attempt to include the various aspects of ICT training quality. The question was changed to 'how do you rate the quality of the following during the ICT training you received' with five variables, namely, trainer, ICT facilities, training environment (light, temperature, furniture), course material, and course content. In addition, it was found that some questions overlapped and were getting essentially the same results, with the consequence that some were removed, making the questionnaire shorter but equally useful. A few minor structural changes were also made mostly concerned with the order of the questions. With regards to the employers' questionnaire, a couple of questions were slightly reworded after talking to a group of employers, but the structure stayed mostly the same.

3.8. Methods of increasing response rates

In the words of Pinsonneault and Kraemer (1993),

> *"Poor response rates are particularly troublesome for descriptive statistics because their usefulness lies in their capacity to generalise the findings to a population with high confidence. Such low response rates jeopardise any attempts to generalise findings in an adequate way".*

Studies conducted in an SME setting have reported response rates as low as 3% (Schuldt and Totten, 1994), which, even with a sample size such as the one in this study (750 companies) would be insufficient for any detailed statistical analysis.

Researchers have suggested various attention-seeking strategies to help the survey pass through the 'recipients filter' (Diamantopoulos *et al*, 1991). Pre-notification via telephone has consistently proven to be successful (Schlegelmilch and Diamantopoulos, 1991), as has pre-notification by letter or postcard (Albaum and Strandskov, 1989; Duhan and Wilson, 1990; Murphy *et al* 1990; Murphy *et al* 1991). However, it was decided that it would not be feasible to use any of the above methods because of limited financial resources.

The questionnaires were kept to a minimal length using double-sided printing. Using double-sided printing rather than single-sided printing, and short rather than long questionnaires, has been shown to have an impact on response rates (Jobber, 1989) moreover, the savings on printing and postage costs were considerable. Prepaid monetary incentives have also been shown to increase response rates (James and Bolstein, 1990; Faria and Dickinson, 1992; Angur and Nataraajan, 1995). However, cost constraints rendered this option impractical.

The covering letter accompanying the questionnaires (see appendix A3) was printed on University departmental paper, a tactic which has been found to increase response rates (Faria and Dickinson, 1992; Greer and Lohita, 1994; Shchneider and Johnson, 1995). Assurances of anonymity have also generally proved to be successful in terms of response rates (Kanso, 2000) so that the

sentence "*naturally, all completed questionnaires will be treated in the strictest confidence, and the results will be disseminated only in a summary form*" was included in the covering letter.

In total, 2,250 questionnaires were sent to 750 SMEs, each company receiving one employers' questionnaire and two employees' questionnaires. In addition to the covering letter, a free-post reply envelope was included. All letters were sent out on the same day (October 15th 2004). Although it was not mentioned in the covering letter, the cut-off date for receiving completed questionnaires was set at the 12th January 2005.

3.9. Statistical tests

The data collected from the employers and employees' questionnaires will be analysed using various statistical tests. The results tables found, from this point on, have all been produced by SPSS (Landau and Everitt, 2003).

3.9.1. Hypothesis testing, significance levels and p-values

Throughout the statistical analysis a number of hypotheses will be tested, with the null hypothesis being a statement concerning the value of a population parameter, and is usually the reverse of what is actually believed. The feasibility of the null hypothesis is then determined. For example, a null hypothesis might be that "sales of ice-cream do not vary throughout the year", then depending on the data, the null hypothesis either is or is not rejected. However, failure to reject the null hypothesis is not the same thing as accepting the null hypothesis. In hypothesis testing, the significance level is the measure used for rejecting the null hypothesis.

The probability value (p-value) is the probability of obtaining a statistic at least as different from the parameter specified in the null hypothesis as the statistic obtained in the experiment. If the p-value is below the significance level then the null hypothesis is rejected. The significance level used in this thesis has been set at the usual 0.05 level (5% level). The lower the significance level, the more the data must diverge from the null hypothesis to be significant.

There are two kinds of errors that can be made in hypothesis testing:

Type I error: incorrectly rejecting a true null hypothesis; and

Type II error: failing to reject a false null hypothesis.

A Type II error is only an error in the sense that an opportunity to reject the null hypothesis correctly was lost. Therefore, Type I errors are generally considered more serious than Type II errors. The probability of a Type I error is the significance level, so for this study will be 5%. However, this does mean that there is a trade off between Type I and Type II errors. The lower the significance level is set (to protect against Type I errors), the greater the chance of a Type II error (see Table 3.1). As a result it requires very strong evidence to reject the null hypothesis and makes it very unlikely that a true null hypothesis will be rejected.

Table 3.1: Type I and Type II Errors

		Decision	
		Reject H_0	**Don't reject H_0**
Truth	**H_0**	Type I Error	Right Decision
	H_1	Right Decision	Type II Error

An important decision to make is whether the level of data collected is classed as interval or ordinal. This decision will impact on what statistics can be used for analysis; that is, parametric or non-parametric tests. As we have seen, the majority of the data produced by the two surveys in this thesis were generated by responses on 7-point Likert-scales. Traditionally data collected via Likert-scales is classified as ordinal data, although, it has also been argued that it can actually be classified as interval. For example Fife-Schaw (1995) has said in relation to using parametric statistics on Likert-scales, *"most of the time, providing you have a good quality ordinal measure, you will arrive at the same conclusions you would have using more appropriate tests*". Although the consensus is that non-parametric tests should be used (see for example McDaniel and Gates, 2002), it was decided to present both parametric and non-parametric side by side, and, as

will be seen throughout the analysis, there are very few material differences between the results obtained from the data throughout the analysis.

For every statistical test reported in the main body of the text, the p-value generated from a parametric test will be represented by p, and that from the corresponding non-parametric test by p'.

3.9.2. Correlation analysis

Correlation is a measure of association between two variables. The variables are not designated as dependent or independent. Correlation coefficients range in value from –1 (a perfect negative relationship) to +1 (a perfect positive relationship), with a value of 0 indicating no linear relationship whatsoever. The two most common correlation coefficients are: Spearman's correlation coefficient rho and Pearson's product-moment correlation coefficient. When there is a positive correlation between two variables, as the value of one variable increases, the value of the other also increases. When there is a negative correlation, as the value of one variable increases, the value of the second variable decreases. The p-value of the correlation coefficient is determined from a t-statistic based on the correlation. The associated p-value of the t-statistic indicates whether the observed correlation coefficient occurred by chance, if the true correlation is zero (Black, 2001). In other words, it assess whether the correlation is significantly different than zero. The Person's variant usually used when calculating a correlation coefficient for interval or ratio-type data ordinal data, and Spearman's variant is used for ordinal level data. When interpreting the results it is important to understand it may not be impossible to draw any cause and effect conclusions due to a statistically significant correlation, only that the variables are related in some way.

Several authors have offered guidelines for the interpretation of a correlation coefficient, for example, Cohen (1998) has labeled correlation coefficients either small, medium or large dependent on their size – see Table 3.2. Cohen's (1998) categorization of correlation coefficients will be used when analysing data throughout this thesis. When two variables are perfectly linearly related, the

points of a scatter graph would fall on a straight line. However, with behavioural data, as is the case in this study, there is rarely a perfect linear relationship between two variables. The more the points tend to fall along a straight line the stronger the linear relationship.

Table 3.2: Interpretation of the size of a correlation coefficient (Cohen, 1998)

Correlation	Negative	Positive
Small	-.29 to -.10	.10 to .29
Medium	-.49 to -.30	.30 to .49
Large	-1.00 to -.50	.50 to 1.00

Correlation analysis will be used frequently throughout the data analysis to help determine what factors are related to training transfer. Correlations that are accompanied by a p-value between that of .01 and .05 will be flagged with a single asterisk, and those below that of .01 level with two asterisks, as set by SPSS.

3.9.2.1. Correlation example

Table 3.3 displays a data set on interest rates and the futures index, which has been taken from Black (2001). Let's assume that we want to look at the relationship between interest rates and the futures index, over a 12 day period. The null hypothesis is that the true correlation between the two variables is zero; in other words, high interest rates are not associated with high levels of the futures index, and vice versa.

Table 3.3: Data for the correlation example from Black (2001)

Day	Interest Rate	Futures Index
1	7.43	221
2	7.48	222
3	8.00	226
4	7.75	225
5	7.60	224
6	7.63	223
7	7.68	223
8	7.67	226
9	7.59	226
10	8.07	235
11	8.03	233
12	8.00	241

Once collected, the data can be analysed. Table 3.4a shows the layout of a Pearson's correlation table, as produced by SPSS. The correlation table displays correlation coefficients and significance values. The correlation coefficients on the main diagonal are always 1.0 (because each variable has a perfect positive linear relationship with itself). The table shows that there is a statistically significant relationship between the two variables, because the p-value is <.05 (p=.001), and that the correlation between the two variables is large (correlation coefficient = .815) – see Table 3.2. Therefore, we are able to reject the null hypothesis, concluding that there is a positive correlation between interest rates and the futures index, in other words, when interest rates are high, the futures index is often also high.

Table 3.4a: Example of a Pearson's correlation table as produced by SPSS

		Interest Rate	Futures Index
Interest Rate	Pearson Correlation	1	.815(**)
	Sig. (2-tailed)		.001
	N	12	12
Futures Index	Pearson Correlation	.815(**)	1
	Sig. (2-tailed)	.001	
	N	12	12

Table 3.4b shows an example of a Spearman's correlation table. The same set of data has been analysed, and, unsurprisingly, the results come to the same conclusion because the p-value is <.05 (p'=.002) and the correlation coefficient is large (correlation coefficient = .792).

Table 3.4b: Example of a Spearman's correlation table as produced by SPSS

		Interest Rate	Futures Index
Interest Rate	Correlation Coefficient	1.000	.792(**)
	Sig. (2-tailed)	.	.002
	N	12	12
Futures Index	Correlation Coefficient	.792(**)	1.000
	Sig. (2-tailed)	.002	.
	N	12	12

3.9.3. T-test and Mann-Whitney

The independent-samples t-test assess whether the means of two groups are statistically different from each other. The usual null hypothesis for this test would be that the means of the two groups are equal, with the alternative being that the means of the two groups are different. The primary assumptions for the t-test are:

- Population data from which the sample data are drawn are normally distributed.
- The variances of the populations to be compared are equal.

The Mann-Whitney *U* test is a non-parametric test for assessing whether two samples of observations come from the same distribution. Therefore, when

conducting a Mann-Whitney test, the null hypothesis would be that the two samples are drawn from a single population, and therefore that their probability distributions are equal. It does, however, require that the two samples are independent and the observations to be ordinal or continuous measure. In order to apply the Mann-Whitney test, the raw data from the two samples must be ranked from lowest to highest.

3.9.3.1. T-test example

Let's assume we are trying to investigate whether the price of milk differs between Seattle and Atlanta. 30 local stores were randomly chosen in each city and the price of four pints of milk was recorded (see Table 3.5) – this data has once again, been taken from Black (2001). The null hypothesis is that the mean price of four pints of milk in Seattle and Atlanta are equal.

Table 3.5: Data for the t-test and Mann-Whitney example from Black (2001)

Seattle			Atlanta		
2.55	2.36	2.43	2.25	2.40	2.39
2.67	2.54	2.43	2.30	2.33	2.40
2.50	2.54	2.38	2.19	2.29	2.23
2.61	2.80	2.49	2.41	2.18	2.29
3.10	2.61	2.57	2.39	2.59	2.53
2.86	2.56	2.71	2.26	2.38	2.19
2.50	2.64	2.97	2.19	2.25	2.45
2.47	2.72	2.65	2.42	2.61	2.33
2.76	2.73	2.80	2.60	2.25	2.51
2.65	2.83	2.69	2.38	2.29	2.36

The t-test can then be run, the results of which are shown in Table 3.6. The first table displays the descriptive statistics. It shows that the mean price in Seattle is slightly higher than that of Atlanta.

The second table consists of two stages. Firstly, Levene's test is used here to test if the two groups have equal variances. The null hypothesis is that the variances of

the two groups are equal. If the significance value for Levene's test is > .05, the results that assume equal variances for both groups should be used. If the significance value for the Levene test is anything <.05, then the results that do not assume equal variances for both groups are used. The second stage is used to determine whether the difference between the means of two groups is statistically significant. A low significance value for the t-test (<.05) means that the null hypothesis of equal means should be rejected; a significance value of ≥.05 meaning the null hypothesis should be accepted.

Using the example in Table 3.6, the data in the top row of the second sub-table should be used, because equal variances can be assumed (since Levene's test allows us to accept equal variances because the p-value is >.05). The second significance value shows whether the difference between the two group means is statistically significant. As the p-value is <.05 (p'<.001), we can safely say that there is a statistically significant difference in the means of the two groups. Thus, it appears that the price of milk in Atlanta is lower than that in Seattle.

Table 3.6: Example of an independent-samples t-test as produced by SPSS

	City	N	Mean	Std. Deviation
Price of Milk	Seattle	30	2.6373	.17215
	Atlanta	30	2.3547	.12401

		Levene's Test for Equality of Variances				
		F	Sig.	T	Df	Sig. (2-tailed)
Price of Milk	Equal variances assumed	2.267	.138	7.297	58	.000
	Equal variances not assumed			7.297	52.712	.000

3.9.3.2. Mann-Whitney example

Table 3.7 shows the layout of a Mann-Whitney test, as produced by SPSS – the same data set has been used. In the first of the two tables, mean rank lists the average ranks for each group. If there is little difference in the price of milk in

these two cities, these values should be similar – however it is clear that that the mean rank of the price of milk in Seattle is higher than that of in Atlanta. As the p-value in the second table is less <.05 (p'<.001), the null hypothesis can be rejected; therefore, we can conclude that that the two samples are unlikely to be drawn from a single population.

Table 3.7: Example of a Mann-Whitney test as produced by SPSS

	City	N	Mean Rank	Sum of Ranks
Price of Milk	Seattle	30	42.98	1289.50
	Atlanta	30	18.02	540.50

Price of Milk	
Mann-Whitney U	75.500
Wilcoxon W	540.500
Z	-5.539
Asymp. Sig. (2-tailed)	.000

3.9.4. ANOVA and Kruskal-Wallis

Analysis of variance (ANOVA) is an extension of the t-test to account for when there are $K \geq 3$ groups. Therefore, it tests the null hypothesis that the means of all the sub-groups are equal. Say, for example, you are looking to compare the means of 5 groups; it is possible to compare each mean with each other mean using t-tests. However, conducting multiple t-tests increases the Type I error rate. ANOVA can be used to test differences among several means for significance without increasing the Type I error rate (Black, 2001). ANOVA is robust to departures from normality, although the data should ideally be symmetric. The three assumptions of ANOVA tests are –

- Independence of cases
- Normality
- Homogeneity of variances

The Kruskal-Wallis one-way analysis of variance is a non-parametric method for testing equality of population medians among groups. Intuitively, it is identical to a one-way analysis of variance with the data replaced by their ranks. It is an extension of the Mann-Whitney test to 3 or more groups. Since it is a non-parametric method, the Kruskal-Wallis test does not assume a normal population, unlike the ANOVA test. However, the test does assume an identically-shaped distribution for each group, except for any difference in medians.

3.9.4.1. ANOVA example

Table 3.8 shows the data set which has been taken from McDaniel and Gates, (2002). Say for example, a company wants to explore whether profit at their garages differ dependent on what special offer they advertise – wheel alignment, oil change or tune up. An ANOVA test can be used to help investigate this. The null hypothesis is that mean profit of the 3 sub-groups is the same.

Table 3.8: Data for ANOVA and Kruskal-Wallis example from McDaniel and Gates (2002)

Wheel alignment		**Oil change**		**Tune-up**	
310	318	314	321	337	310
315	322	315	340	325	312
305	333	350	318	330	340
310	315	305	315	345	318
315	385	299	322	320	322
345	310	309	295	325	335
340	312	299	302	328	341
330	308	312	316	330	340
320	312	331	294	342	320
315	340	335	308	330	310

Table 3.9 shows the results generated from the ANOVA test. The descriptive table shows the mean profit for each group. It also displays the number of cases in each group, standard deviations and 95% confidence interval for the means.

The ANOVA table tests whether this is actually a statistically significant difference. It displays the sum of squares, degrees of freedom, F-statistic and the accompanying p-value. The p-value indicates the significance level of the F-test. Small significance values (<.05) indicate group differences. In this example, the significance level is <.05 (p=.004), therefore, at least the mean of one of the sub-groups, differs from the others. In this case, the group which differs from the rest can easily be found using the descriptive table; it is apparent that is the oil change promotion that is statistically different to the other two promotions. Therefore, we can conclude, that if the company wants to generate the largest profit, they should either use wheel alignment or tune-up. However, it should be noted that it is not always as easy to locate the group that is statistically significant to the rest, only by referring to the descriptive table. In such cases there are a number of tests that can be used, the most popular of which is Duncan's multiple range test.

Table 3.9: Example of an ANOVA table as produced by SPSS

Service	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Wheel alignment	20	323.000	18.699	314.248	331.751
Oil change	20	315.000	15.075	307.944	322.055
Tune-up	20	328.000	10.930	322.884	333.115
Total	60	322.000	15.919	317.887	326.112

	Sum of Squares	Df	F	Sig.
Between Groups	1720	2	3.705	.004
Within Groups	13232	57		
Total	14953	59		

3.9.4.2. Kruskal-Wallis example

The same data set will be used for this Kruskal-Wallis example. Table 3.10 shows the results from the Kruskal-Wallis test. The first table lists the number of cases in each group and the mean rank for each of those groups. If the groups do not differ, the mean ranks will be similar to each other. Looking at the table it is clear that one of the groups (oil change) is considerably different to that of the others. The second table displays the p-value. P-values levels <.05 indicate that the group

locations differ; as is evident from this test, at least one of the groups is statistically different to that of the others (p'=<.010), and it again appears to be oil change.

Table 3.10: Example of a Kruskal-Wallis test as produced by SPSS

Service	N	Mean Rank
Wheel Alignment	20	35.50
Oil change	20	22.70
Tune-up	20	39.30
Total	60	

	Sales
Chi-square	9.162
Df	2
Asymp. Sig.	.010

3.9.5. Regression

Regression is defined as "*the process of constructing a mathematical model or a function that can be used to predict or determine one variable by any other variable*" (Black, 2001). The most basic regression model, referred to as simple regression, is bivariate linear regression. In simple regression analyses, only a straight line relationship between two variables is examined. Multiple regression is "*regression analysis with one dependent variable and two or more independent variables or at least one nonlinear independent variable*" (Black, 2001). The regression coefficient for an independent variable represents the increase that will occur in the value of the dependent from a 1 unit increase in the independent variable if all other variables are kept constant. The object of multiple regression analysis is to obtain a model to predict the changes in the dependent variable in response to changes in the independent variables. The null hypothesis when conducting regression analysis is that – the dependent variable is not explained by a combination of all the independent variables in the together.

3.9.5.1. Example of a regression analysis

Say for instance, a company is interested in predicting annual sales of their convenient stores which are located around the country. The company believes that – average daily traffic, population of local area and the average income of residents in the area – will predict the annual sales at each store. Table 3.11 shows the data set which has been taken from Black (2001).

Table 3.11: Data for regression example from Black(2001)

Store ID No.	Annual sales (thousands of $)	Average daily traffic	Population of area	Average income in area
1	1,121	61,655	17,880	$19,910
2	766	35,236	13,742	$14,731
3	595	35,403	19,741	$8,114
4	899	52,832	23,246	$15,324
5	915	40,809	24,485	$11,438
6	782	40,820	20,410	$11,730
7	833	49,147	28,997	$10,589
8	571	24,953	9,981	$10,706
9	692	40,828	8,982	$23,591
10	1,005	39,195	18,814	$15,703
11	589	34,574	16,941	$9,015
12	671	26,639	13,319	$10,065
13	903	55,083	21,482	$17,365
14	703	37,892	26,524	$7,532
15	556	24,019	14,412	$6,950
16	657	27,791	13,896	$9,855
17	1,209	53,438	22,444	$21,589
18	997	54,835	18,096	$22,659
19	844	32,916	16,458	$12,660
20	883	29,139	16,609	$11,618

Table 3.12 shows the layout of a regression table as produced by SPSS. The first table displays information about the variation accounted for by the model, from which the R^2 figure is used. Therefore, in the example model below, 60.50% of the variation is explained. The F-value is the Mean Square Regression (131367.040) divided by the Mean Square Residual (16059.114), yielding F=8.180. The p-value associated with this F value is <.05 (p=<.001), therefore, we are able to confirm that the independent variables reliably predict the dependent variable. Note that this is an overall significance test assessing whether the group of independent variables when used together reliably predict the dependent variable, and does not address the ability of any of the particular independent variables to predict the dependent variable. The ability of each individual independent variable to predict the dependent variable is addressed in the final table below, where each of the individual variables are listed.

This final table displays the coefficients. These estimates show the relationship between the independent variables and the dependent variable. These figures estimate the amount of increase in the dependent value that would be predicted by a 1 unit increase in the dependent variable. The p-values in the final column indicate whether the variable on its own is significant.

In the example below, the estimated model is:

Annual Sales = 257.869 + Average daily traffic 0.11+ Population of area 0.002 + Average income in area 0.004.

However, as the final table indicates, one of the variables is not statistically significant (population of area) because the p-value is >.05 (p=.764).

Table 3.12: Example of a Regression table as produced by SPSS

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.778	.605	.531	126.724

a Predictors: (Constant), Av. Income in area, Population of area, Av. daily traffic

ANOVA(b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	394101.1	3	131367.040	8.180	.002
	Residual	256945.8	16	16059.114		
	Total	651047.0	19			

a Predictors: (Constant), Constant), Av. Income in area, Population of area, Av. daily traffic
b Dependent Variable: Annual sales

Coefficients(a)

Model		Unstandardized Coefficients		Standard Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	257.860	132.894		1.940	.070
	Average daily traffic	.011	.003	.699	3.448	.003
	Population of area	.002	.007	.060	.306	.764
	Average income in area	.004	.006	.132	.764	.005

a Dependent Variable: Annual sales

A second regression model was run without the non-significant variable – see Table 3.13. This shows, the model as a whole is still statistically significant (p=<.001), as are both of the remaining independent variables, and the R^2 remains high (60.3%). As a result, the annual sales of the convenience stores can be estimated by using the average income of the local residents, and average daily traffic.

Table 3.13: Example of a reduced regression table as produced by SPSS

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.777	.603	.556	123.29939

a Predictors: (Constant), Av. Income in area, Av. Daily traffic

ANOVA(b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	392600.4	2	196300.190	12.912	.000(a)
	Residual	258446.6	17	15202.739		
	Total	651047.0	19			

a Predictors: (Constant), Av. Income in area, Av. Daily Traffic
b Dependent Variable: Annual sales

Coefficients(a)

Model		Unstandardized Coefficients		Standard Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	279.198	110.031		2.537	.121
	Average daily traffic	.012	.003	.735	4.601	.000
	Average income in area	.004	.005	.116	.724	.003

a Dependent Variable: Annual Sales

3.10. Reliability and validity issues

Ideally, a research study provides information that is accurate, precise, lucid and timely. Accurate data implies accurate measurement, but, in any type of research, a study with no measurement error is rarely, if ever, achieved. Such errors can either be random or systematic. Systematic error results in a constant bias in the measurements caused by faults in the measurement instrument or process. Random error also influences the measurements but not systematically, thus is transient in nature.

Reliability is the degree to which measures are free from random error and, therefore, provide consistent data. The less error there is, the more reliable the observation is, so a measurement that is free of error is a correct measure. A reliable measurement, then does not change when the concept being measured remains constant in value.

Validity addresses the issue of whether what the researcher is trying to measure is actually being measured. The validity of a measure refers to the extent to which the measurement instrument and procedure are free from both systematic and random error. Thus, a measuring device is valid only to the extent that differences in scores reflect true differences on the characteristic being measures rather than systematic or random error.

For every construct measured in a survey, there are normally at least two items that make up the scale; for a scale to reliable, it should have internal consistency.

The items should all measure the same thing, so they should be correlated with one another. A useful coefficient for assessing internal consistency is Cronbach's alpha (McDaniel and Gates, 2002). Cronbach's alpha measures how well a set of items measures a single unidimensional construct. Cronbach's alpha will generally increase when the correlations between the items increase. A lack of correlation of an item with other items in the scale is evidence that item does not belong in the scale and should be omitted (McDaniel and Gates, 2002). If the inter-item correlations are high, then there is evidence that the items are measuring the same underlying construct (Cronbach, 1951). Alpha coefficients range in value from 0 to 1 and as a rule of thumb, researchers look for a value of $\alpha > 0.70$ or higher (obtained on a substantial sample size) before they will use a scale.

For example, one construct that Chiaburu and Marinova (2005) measured in their study of skills-transfer was supervisory support. They used a 5-item scale that consisted of items such as -'my supervisor views employee development as an important aspect', 'my supervisor provides me with the time I need to practice the skills learned in training,' and 'my supervisor provides me with constant reminders on how to apply the acquired skills.' They found Cronbach's alpha for the scale was 0.95, as the value was >.70, the scale was included in the study.

Factor analysis is a statistical data reduction technique used to explain variability among observed random variables in terms of fewer unobserved random variables called factors. In other words, it seeks to discover if the observed variables can be explained largely or entirely in terms of a much smaller number of variables (factors). McDaniel and Gates (2002) use the example of a company assessing the response to a new car. Respondents were asked to rate the car on four characteristics – smooth ride, quiet ride, acceleration and handling. The results showed that the respondents who gave higher ratings on 'smooth ride' also tended to give higher ratings on 'quiet ride'. A similar pattern was evident in the ratings of 'acceleration' and 'handling'. As a result, the four measures were combined into two factors, namely, luxury and performance.

The above, then, dictates the objectives of the study and gives an outline of the research methods used in this investigation. The next chapter examines the relevant analyses and application of methodologies to the collected data.

Chapter 4. Employees Survey Analysis

This chapter presents the results from the employees' questionnaire, of which 163 valid ones were returned (a response rate of 10.9%). Where appropriate, the data was analysed using SPSS.

4.1. Reliability

A number of constructs are measured in the survey. The constructs that were tested for reliability, the associated Cronbach's alphas and example items from the scale are displayed in Table 4.1. Table 4.2 shows an example of the output generated from the analysis.

Table 4.1: Reliability of scales

Construct	Cronbach's Alphas	Number of items	Example Item
Past ICT experience	.675	2	I have had significant experience in the past with computers
Motivation	.449	2	I am highly motivated to attend IT training sessions
Perceived usefulness	.466	2	I have found IT training to be useful in my job
Perceived ease of use	.797	2	I found the training easy to understand
Effectiveness at work	.765	3	IT training has improved my work performance
Training quality	.955	5	How do you rate the quality of the course content
Company support	.859	4	My supervisor encourages me to attend IT training sessions

Table 4.2: An example of the output from the reliability analysis

Effectiveness at work		N	%
Cases	Valid	163	100
	Excluded	0	0
	Total	163	100

Cronbach Alphas	N of items
.765	3

It was mentioned in chapter 3 that researchers generally look for Cronbach's alphas of $\alpha > .70$, before using a scale. Four of the seven scales meet the guideline, a fifth nearly does, and the two that fall short are based on only two

items. So, given that it is not unusual for Cronbach's alphas to be low when a study has a small sample size (Merkel, 1984), and when there are limited items in each scale (Castro, 2003), the scales are satisfactory.

It also needs to be noted that there are some variables in the study that could not be tested for reliability because only one item was used for measurement. These included – choice of training offered by employer, support from colleagues, career progression and subjective norms. This is by no means ideal, if the survey was to be designed again, extra items would be included for measuring these constructs, so the scales could be tested for reliability. In spite of this, there is no reason to suggest that the data collected on these constructs is not valid.

4.2. Participants

Of the 163 respondents, the split between males (n=83) and female (n=80) was relatively equal. The ages of the respondents were not as evenly distributed, with no respondents falling into the less than 20 age group, although the rest of the age groups were well represented (see Figure 4.1).

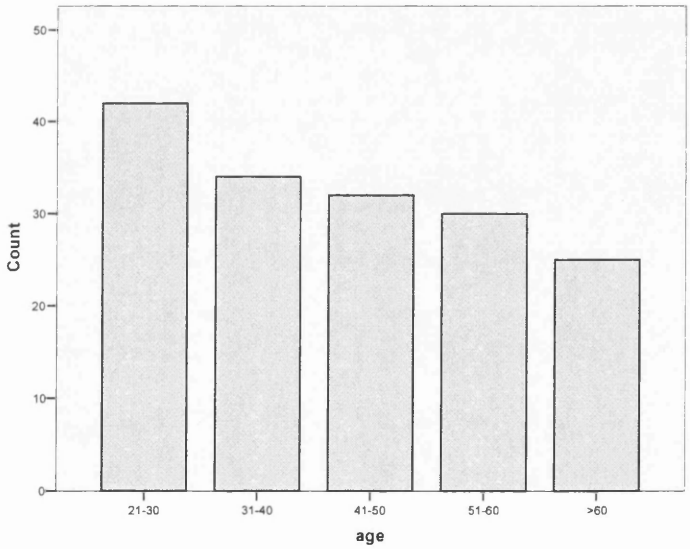

Figure 4.1 - Age distribution of respondents

4.3. The transfer of training

The central purpose of this thesis is to determine the extent to which ICT training is transferred to the workplace. While it was initially considered that this would be a relatively straightforward process, it turned out not to be the case. Table 4.3 shows the descriptive statistics for the respondents' reported use of ICT at work before training, after training, and the associated transfer rate. As discussed in chapter 3, training transfer was measured as the difference between employees reported usage of ICT before training, and reported usage after training. The data in the table suggests that employees, who attend ICT training courses, do on average use ICT more than they did prior to undertaking the training.

Table 4.3: Group descriptive statistics of ICT use before, ICT use after, and transfer rate

	Use before training	Use after training	Transfer rate
N	163	163	163
Mean	3.47	5.35	1.88
Std. Deviation	1.94	1.43	2.17

Figures 4.2 to 4.4 show the results in graphical form, which support the conclusion of a general positive transfer rate. Figure 4.2 (use of ICT pre-training) indicates that there is a considerable mix of employees at training sessions, with varying degrees of ICT usage at work. Nearly 34% of respondents indicated that they used ICT very little before attending the training (that is, marking 1 or 2, on the 7-point Likert scale), although this is unsurprising given that many of these employees attended introductory ICT courses.

The post-training results, which are shown in Figure 4.3, show that employees reported post-training usage is considerably different to that of their pre-training usage, with no employees reporting that they used ICT very little post-training, and 52% reporting that they used ICT a great deal.

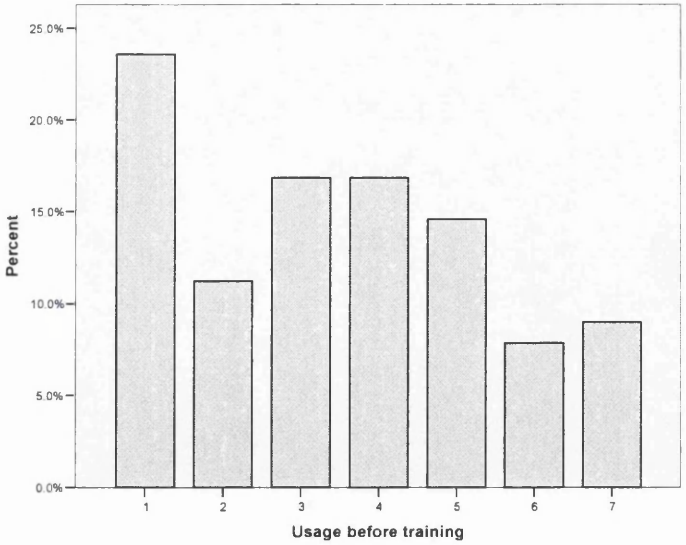

Figure 4.2 - Employees reported use of ICT at work pre-training

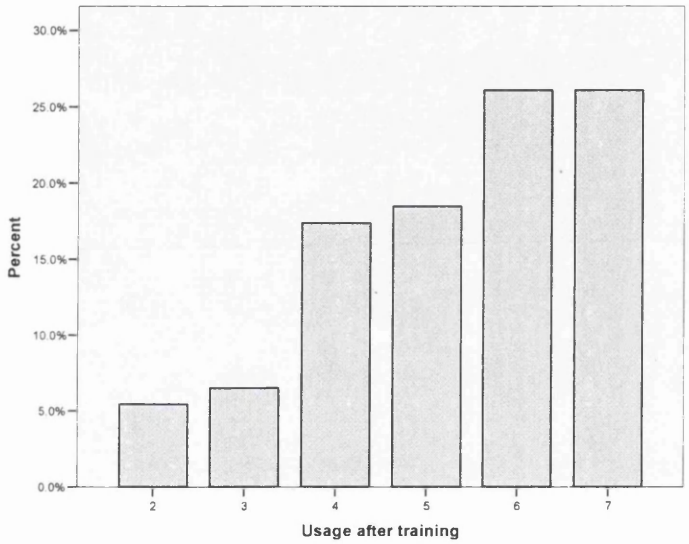

Figure 4.3 - Employees reported use of ICT at work post-training

It comes as no surprise to find that Figure 4.4 shows that a fair proportion of employees transfer the training to some degree, although there are some trainees who reported that they had not transferred the training at all. This does raise the question whether the trainees that reported high transfer rates, differ in some way, to those who reported low transfer rates; this led to further research into whether this is actually the case.

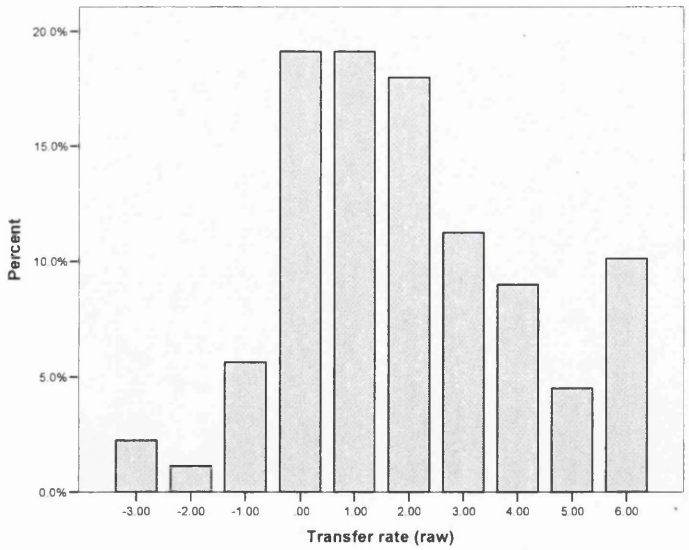

Figure 4.4 - Transfer rate of employees

One such difference was found between employees who said that they had used ICT very little before training, and those who said that they had used it to a moderate, or greater extent.

As a result, the respondents were spilt into two sub-samples for further investigation.

1) Low users of ICT pre-training (those who marked 1 or 2 on the Likert-scale) (n=59) and,
2) Medium to high users of ICT pre-training (3 or more on the Likert scale) (n=104).

Table 4.4 shows the descriptive statistics for the low pre-training users. As the table shows, the mean transfer rate is more than double that of the mean transfer rate for the whole sample.

Table 4.4: Descriptive table of transfer rate for low users of ICT (pre-training)

	N	Mean	Std. Deviation
Transfer rate	59	3.9355	1.36891

Table 4.5 shows the descriptive statistics for medium to high users, where the transfer rate is considerably lower than that of the low pre-training ICT users. This demonstrates a considerable difference between employees who had a low

usage of ICT before training, and those who had a medium to high usage, this is discussed further in chapter 6.

Table 4.5: Descriptive table of transfer rate for medium to high users (pre-training)

	N	Mean	Std. Deviation
Transfer rate	104	.8621	1.12693

A t-test and a Mann-Whitney can be used here to determine whether there is a statistically significant difference in the means (transfer rates) of the two groups (low and med-high pre-training ICT users). In section 3.9.3, it was explained that when conducting these tests, the null hypothesis is that – the means of the two groups are equal (with regards to the t-test) and, that the two samples are drawn from a single population (with regards to the Mann-Whitney test). It is apparent from the first table - see Table 4.6, that both the mean transfer rate, and mean rank of the low-users group, is much higher than that of the med-high users group. In respect of the t-test, the second table first uses Levene's test to determine whether the two groups have equal variances, with the null hypothesis being the variances of the two groups are equal. As the p-value is >.05 (p=.201), the null hypothesis can be accepted. The second p-value tests whether the difference in transfer rates between the two groups is statistically significant; and, unsurprisingly, a statistically significant difference was found between the two groups (p<.001). The p-value in the Mann-Whitney table is also <.05 (p'<.001), therefore, we can reject the null hypothesis and conclude that the two samples are unlikely to be drawn from a single population.

Table 4.6: T-test and a Mann-Whitney of training transfer for med-high and low users

	Pre-training usage	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
Training transfer	Med-High Users	104	.9327	1.10915	61.98	6445.50
	Low Users	59	3.8136	1.26937	117.30	6920.50

Independent samples t-test

Levene's Test for Equality of Variances					
		F	Sig.	t	Sig. (2-tailed)
Training Transfer	Equal variances assumed	11.049	.201	-11.193	.000
	Equal variances not assumed			-10.047	.000

Mann-Whitney

Training Transfer	
Mann-Whitney U	985.5
Wilcoxon W	6445.5
Z	-7.320
Asymp. Sig. (2-tailed)	.000

The transfer rates of the two groups are shown graphically in Figures 4.5 and 4.6, where a clear difference can be easily observed. Whilst over 40% of medium to high users reported either a negative or zero transfer rate, only around 3% of low users reported the same. However, it should be noted that having such a high proportion of employees with a zero transfer rate is hardly surprising, given that this sub-group includes respondents who reported that they used ICT a great deal before training (7 on the 7-point Likert scale), and therefore, were unable to record a positive transfer rate. Nevertheless, the significant difference in transfer rates should be noted.

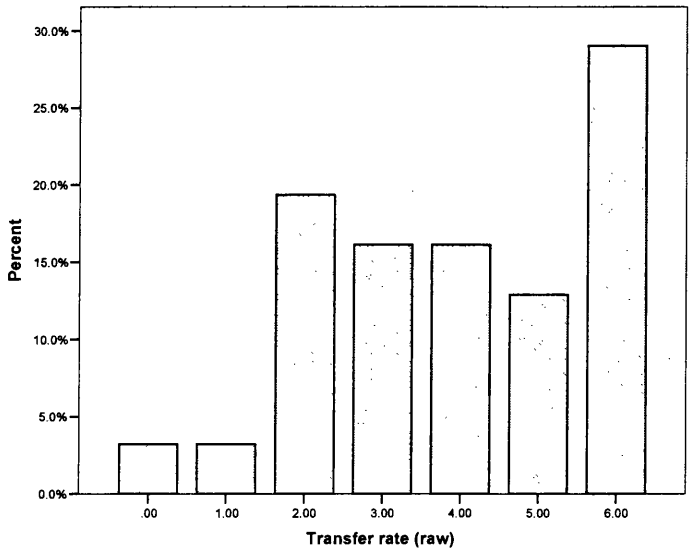

Figure 4.5 - Transfer rates for low users of ICT

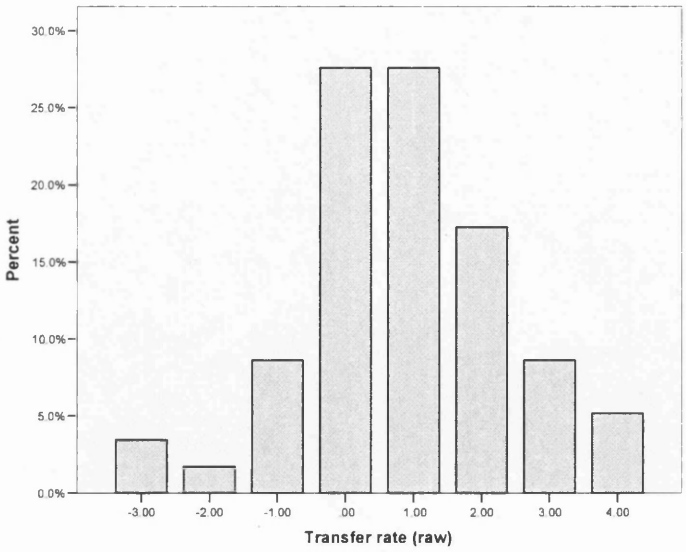

Figure 4.6 - Transfer rates for medium to high users of ICT

Given these findings, it is likely that there is indeed a relationship between pre-training ICT usage and transfer rate, something which is supported in Figure 4.7, which shows a clear negative relationship between the two variables. Correlation analysis can be used to test whether the two variables are related. Correlation analysis was discussed back in section 3.9.2 and is used to analyse the degree of association of two variables. When conducting correlation analysis, the null hypothesis is always that the true correlation between the two variables is zero. Table 4.7 displays the results from the correlation analysis. As the p-values are $<.05$ ($p<.001$, $p'<.001$), the null hypothesis is rejected. The correlation coefficients then show how well correlated the two variables are. As the coefficients are $>.50$ we can conclude that they are large (see Table 3.2), therefore, the two variables are strongly correlated. As a result, we can safely say that, in general, employees who have only limited experience with ICT at work, have higher transfer levels than more experienced employees.

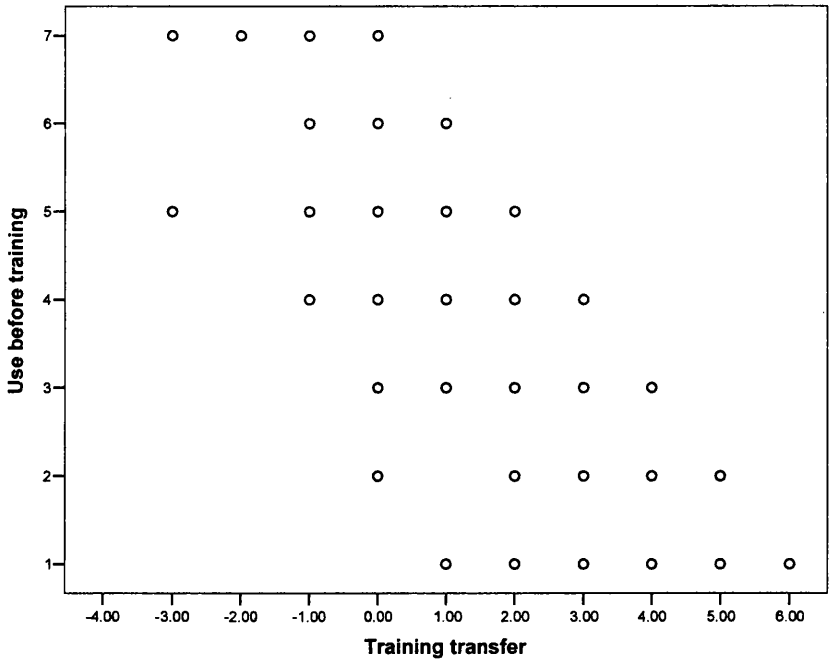

Figure 4.7 - Employees transfer rate by use of ICT before training

Table 4.7: Correlation analysis using ICT usage before training and training transfer

		Training transfer	Use before training
Training transfer	Pearson Correlation	1	-.776(**)
	Sig. (2-tailed)	.	.000
N = 163	Spearman's rho	1	-.728(**)
	Sig. (2-tailed)	.	.000

4.4. Gender differences in training transfer

So far, it has been established that ICT training does in general lead to moderate levels of training transfer. It has also been established that there is a negative relationship between the extent to which employees have used ICT at work prior to attending the training, and the transfer rate. Subsequently, the relationship between gender and transfer rate was examined. The transfer rates were recoded into low (those who had transfer rates of 0-2), medium (those who had transfer rates of 3-5), and high (those who had transfer rates of 6-7). Marginally more females reported a high transfer rate, although the difference was not statistically significant, as confirmed by the t-test and the Mann-Whitney (p=.540, p'=.566) - see Table 4.8. Although, this came as no surprise, given there is not much in the

way of past research to suggest that any difference would exist, nevertheless, it was still worth investigation.

Table 4.8: T-test and a Mann-Whitney of training transfer for male and females

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
Training transfer	Female	80	1.7725	1.30896	83.41	6194
	Male	83	1.4611	1.52620	79.54	6686

Independent Samples Test

Levene's Test for Equality of Variances					
		F	Sig.	t	Sig. (2-tailed)
Training Transfer	Equal variances assumed	.377	.540	-1.000	.319
	Equal variances not assumed			-1.001	.318

Mann-Whitney

Training Transfer	
Mann-Whitney U	3034
Wilcoxon W	6194
Z	-.574
Asymp. Sig. (2-tailed)	.566

However, when the sample was divided into two sub-samples (low, and medium to high users), a clearer distinction was detected between the two groups (male and females) - see Figures 4.8 and 4.9. Figure 4.8 shows the results from the low pre-training ICT users, where nearly 70% of females reported to have transferred their training to a high degree, whereas less than 50% of males reported the same. Moreover, no females in this sub-group reported to have transferred their training to a low degree, while over 10% of males reported the same. Thus, in this sub-sample, women who have limited experience using ICT at work pre-training, transfer their training to a greater degree than men. Whilst there are no obvious reasons why this is the case, it could be that what females in this sample perceive

as an increase in usage, may be different to that of men; although, there is no evidence to support this in the literature. However, one must be careful in making too many generalisations given the relatively small sample size of this group. Whilst it appears that a true difference does exist, more research with a larger sample is needed to confirm this.

For employees who had used ICT to at least a moderate degree before training, there was only a modest difference between males and females, the most notable difference being that no males reported to have transferred their training a great deal, whereas nearly 10% of females reported the same - see Figure 4.9.

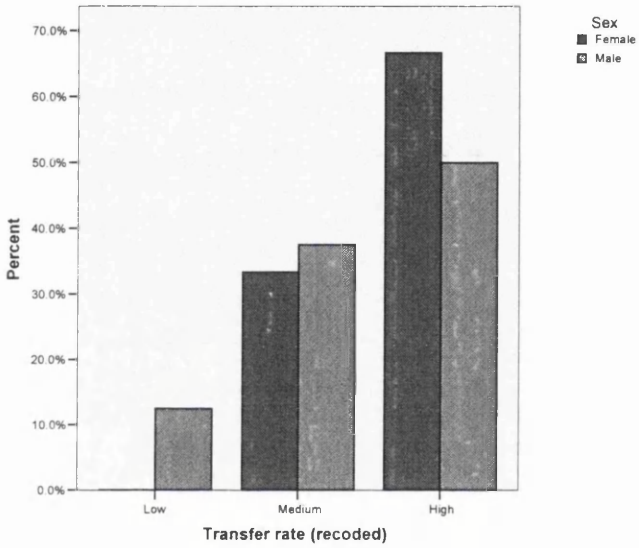

Figure 4.8 - Degree of transfer by gender for low ICT users

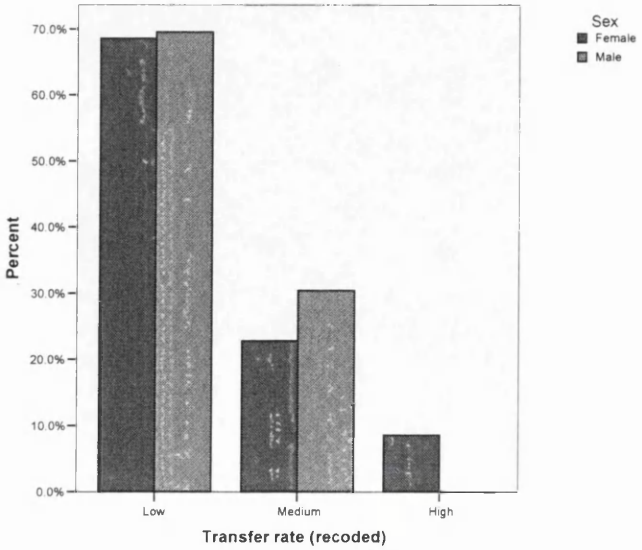

Figure 4.9 - Degree of transfer by gender for med-high users

The extent to which males and females differ in the level of training transfer is therefore, at best, modest, since while a slight difference was found between male and females when the sample was split into two, it was still only small.

4.5. Age differences in training transfer

Whereas it was not surprising to have found that the transfer rate did not vary significantly with gender, it was believed that employees' age would show a highly significant discrepancy, with a probable inverse relationship between age and transfer. The literature review in chapter 2, revealed that the majority of studies found this to be the case (for example, see Morris *et al*, 2005) therefore, there was no reason to expect this study to be any different. However, contrary to what was believed, this did not turn out to be the case. As Table 4.9 shows, whilst there are differences in transfer rates between the groups, they are by no means large. The 31-40 age group has the largest mean transfer rate, while also being the only group to have a mean transfer rate of greater than two. The groups with the lowest transfer rates are the 51-60 and 60+ groups, with mean transfer rates of 1.62 and 1.75 respectively. The relationship between age and transfer rate was tested using correlation analysis, but was found to be non-significant (p=.584, p'=.698), this indicating that age and transfer are not correlated – see Table 4.10.

Table 4.9: Mean transfer rate by age category

	N	Mean	Std. Deviation
21-30	42	2.0259	1.48584
31-40	34	2.1500	1.56810
41-50	32	1.7571	1.23189
51-60	30	1.6200	1.37669
>60	25	1.7500	0.90783
Total	163	1.6432	1.58857

Table 4.10: Correlation analysis using training transfer and age

		Training transfer	Age
Training transfer	Pearson Correlation	1	-.159
	Sig. (2-tailed)		.584
N=163	Spearman's rho	1	-.131
	Sig. (2-tailed)		.698

This unexpected finding was investigated further. This result could indeed be a true reflection, however, it was thought there was some other underlying issue causing this result; this in fact proved to be the case. It was found that transfer rate and post-training usage are not the same. Employees can have a high transfer rate, yet a low post-training usage, alternatively they may have a low transfer rate but high post-training usage (Eaglen and Jacobs, 2005). For example, an employee may not have used ICT before attending the training (recording 1 on the 7-point Likert-scale) and reported a small increase as result of attending the training (perhaps 3 on the scale), this is recorded as a positive transfer rate, but it must be borne in mind that this employee still only has a relatively low level of post-training ICT usage. Likewise, a respondent may have reported a low transfer rate, yet make significant use of ICT post training, this appears to what has happened with the over sixties group. As Figures 4.11 and 4.12 show, the reported use before and after training for the over sixties, is considerably lower than that of the other groups. What is also very interesting is that there is little variation in the responses given by this group; the 95% confidence intervals are small in comparison to the age groups, therefore, making it easier to estimate the over sixties responses. Whilst the over the sixties sample is relatively small, it is still worth noting because of the distinctive result. So, whereas initially at first look, it was thought that there was no difference in training effectiveness between age groups, after further investigation, it has been found that older employees use training at work less than their younger colleagues. Thus, supporting previous findings that older workers struggle in transferring the training; the difference between transfer and post-training usage cannot be over-emphasised.

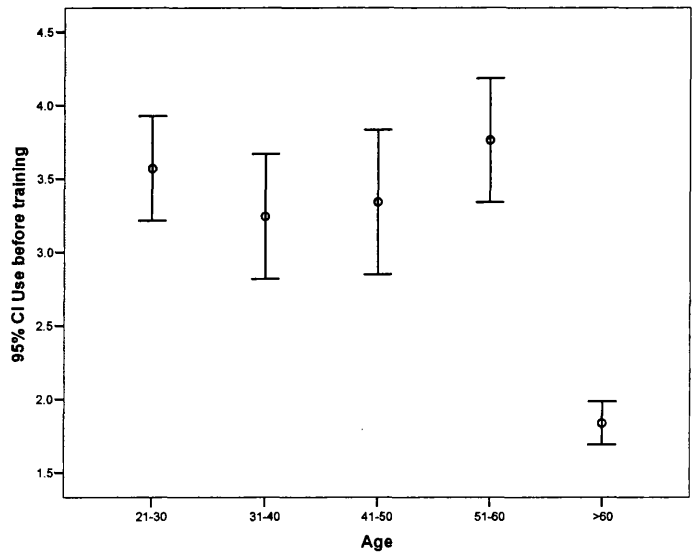

Figure 4.10 - Employees mean usage by age category (pre-training)

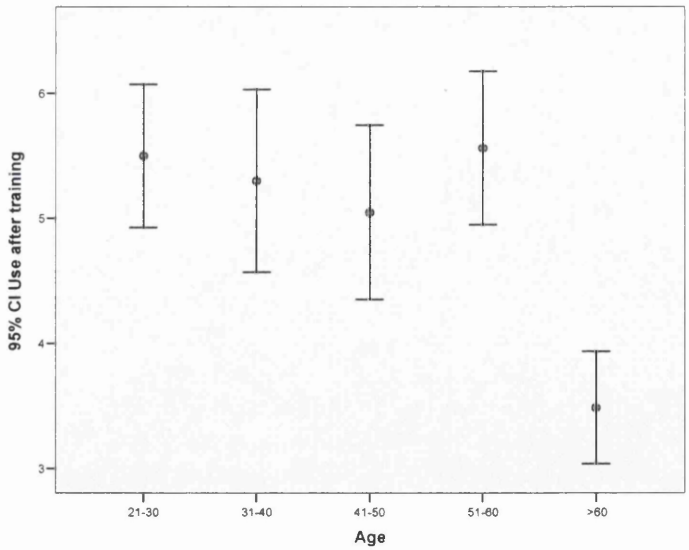

Figure 4.11 - Employees mean usage by age category (post-training)

4.6. Variances in training transfer between different applications

The above sections have looked at transfer, and how it is influenced by gender and age. This section will look to see if transfer varies dependent on the application the employee has been trained on. Only very limited research has been conducted on this (but see Agarwal *et al, 2000)*, especially with respect to the Microsoft package. The latter section of the employee questionnaire allowed respondents to list each application on which they had been trained, to what level, and the extent to which they had used the application before, and after training. This allowed for an investigation to determine if the combined transfer rate was being mediated by individual program transfer rates; that is, were some applications being transferred to the workplace more than others? The 163 survey respondents filled in information (level of training, use before training, use after training), for a total of 368 individual applications, and the results obtained from this section of the survey are shown in Figures 4.12 to 4.14. If there was no variation in the transfer rates between applications, you would expect the histograms to be similar to that of the histograms from the combined transfer rates (see Figures 4.2 to 4.4), but this is not the case. The transfer rates of the individual applications are shown in Figure 4.14. Around 30% of the programs were found to have either a negative, or zero transfer rate, and only 6% to have a maximum transfer rate. This is somewhat different from the results of the combined transfer rate, therefore, it is likely that there is a variance in the

individual application transfer rates. For example, some employees may be using a number of programs in the workplace, each to a different degree.

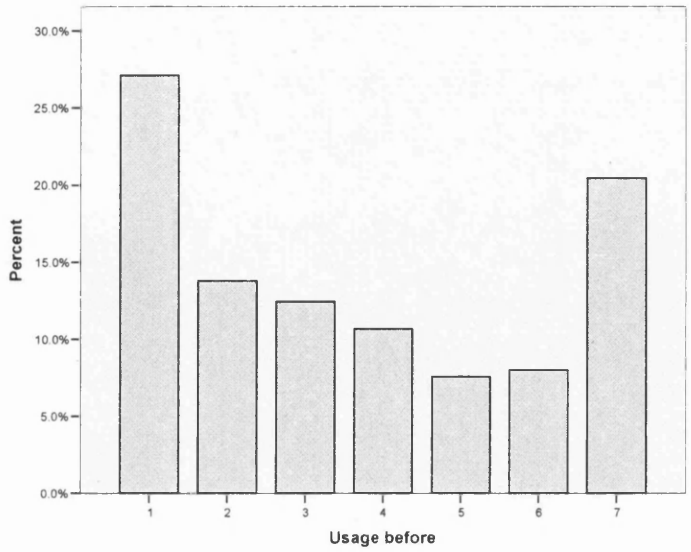

Figure 4.12 - Employees reported use reported pre-training for individual programs

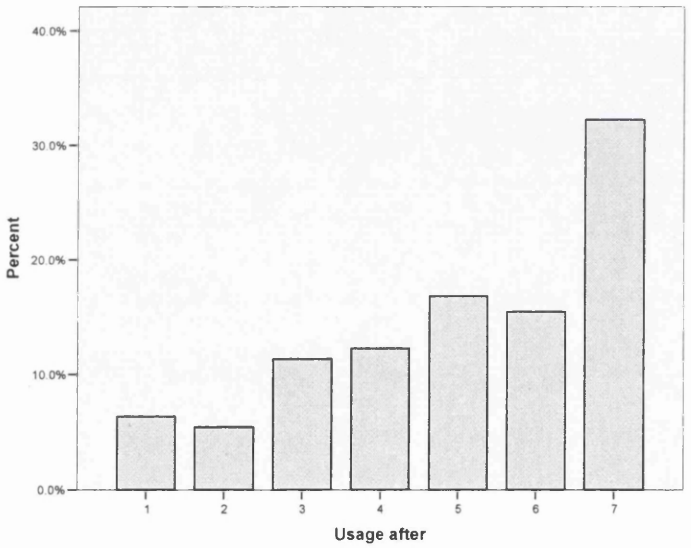

Figure 4.13 - Employees use post-training for individual applications

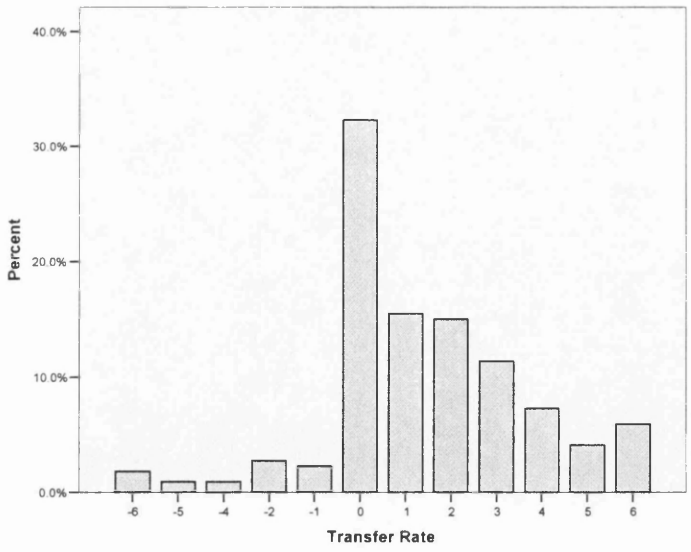

Figure 4.14 - Employees reported transfer rate for individual applications

It has been shown, that there is some variation in the degree to which respondents transfer the various programs, on which they have been trained. To aid further analysis, responses were recoded into six categories, namely the four main Microsoft applications (Word, PowerPoint, Excel, Access), job specific (e.g. SAGE), and other. Figure 4.14 shows that a large percentage of the applications either reported a negative or zero transfer rate, a negative transfer rate indicating that respondents actually used the application less after the training than before! While the resulting zero transfer rate for 32% of respondents is in itself somewhat surprising, suggesting the comparative failure of the training from the employers' viewpoint, it is nevertheless explainable, something which can hardly be said for the negative difference with respect to almost 9% of the respondents.

It was hypothesized that applications categorized as job-specific (thus not belonging to the standard Microsoft Office suite) would have the highest transfer rate, because employees are trained in these software packages specifically to use at work. However, as is evident from Figure 4.15, this turned out not to be the case. Although, admittedly only marginally higher than that of job-specific applications, the highest transfer rate was that of PowerPoint, while Word proved to have the lowest.

From these results, one might at first be tempted to conclude that the most beneficial ICT training for the job environment is training in PowerPoint, while being trained to use Word is the least beneficial. And such a conclusion would

appear all the more surprising in view of Word's undoubted general popularity in modern workplaces compared with PowerPoint's more specialist nature. However, when the transfer rates of Word and PowerPoint were separated into two – usage before, and usage-after, training, quite different results were generated (Figures 4.16 and 4.17). The reported usage post-training was not significantly related to the transfer rate; that is to say, a high transfer rate did not necessarily translate into a high post-training usage. Indeed, whereas PowerPoint had the highest transfer, it had by far the lowest post-training usage, while Word which had the lowest transfer rate had the highest post-training usage. The obvious reason for this is that Word is already used by many trainees before attending a training course, and thus starts from a higher baseline than that of PowerPoint, a program which many employees rarely or never use because their job seldom calls for it.

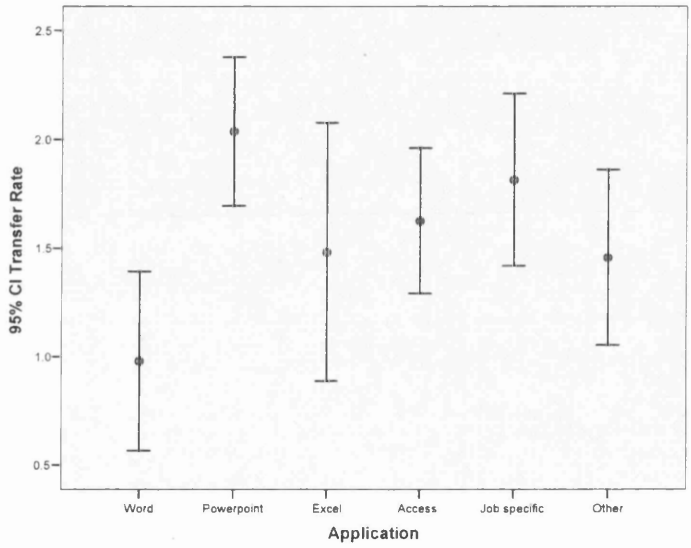

Figure 4.15 - Mean transfer rate by application

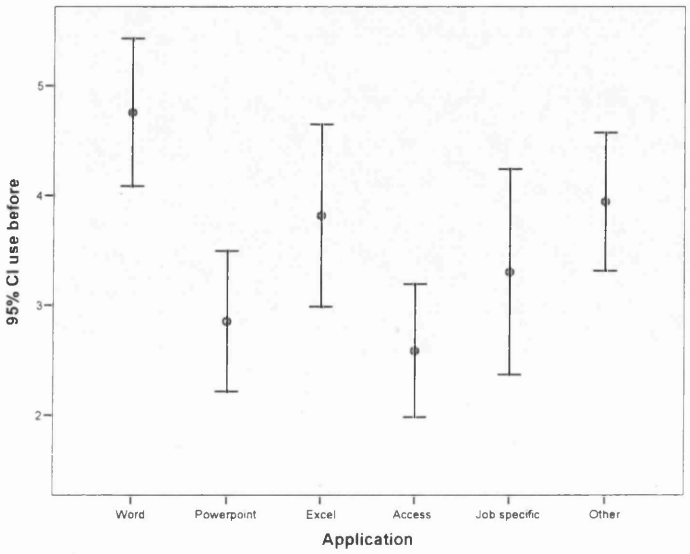

Figure 4.16 - Mean usage (Pre-training)

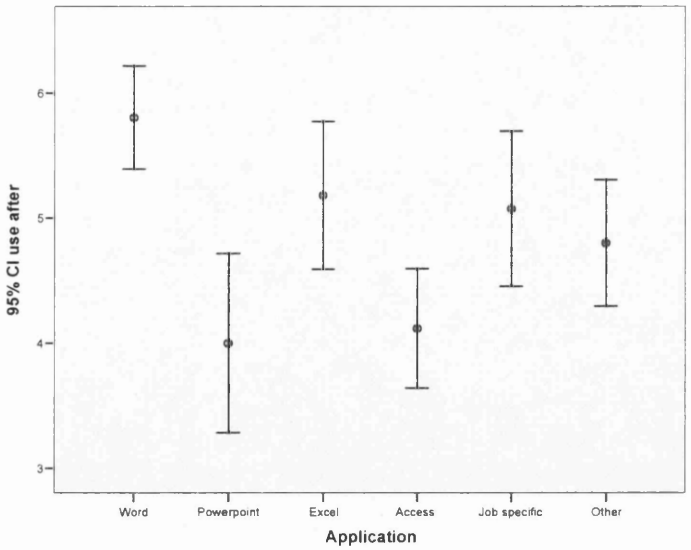

Figure 4.17 - Mean usage (post-training)

4.7. The level of training and its relationship with training transfer

The survey also required respondents to indicate to what difficulty level they had been trained to (beginner, intermediate or advanced) on each of the applications mentioned. A difference in the mean transfer rate between the level of training can be observed in Figure 4.18, from which it is clear that, in terms of increased usage in the workplace, advanced training should be reviewed by employers. The mean transfer rate of those employees who received training at a beginner's level (2.11) was over five times that of those employees who received advanced training (.46). This result may, of course, be due to a number of factors, including possibly poor training and/or training which did not meet job specifications. It appears that the training sessions have a wide range of trainees, with varying degrees of experience and skill, which causes difficulty for the trainer in setting the difficulty and pace of the course – this will be discussed in chapter 6. It is nevertheless worth noting at this point that the result may be a generalised one with important effects for employers.

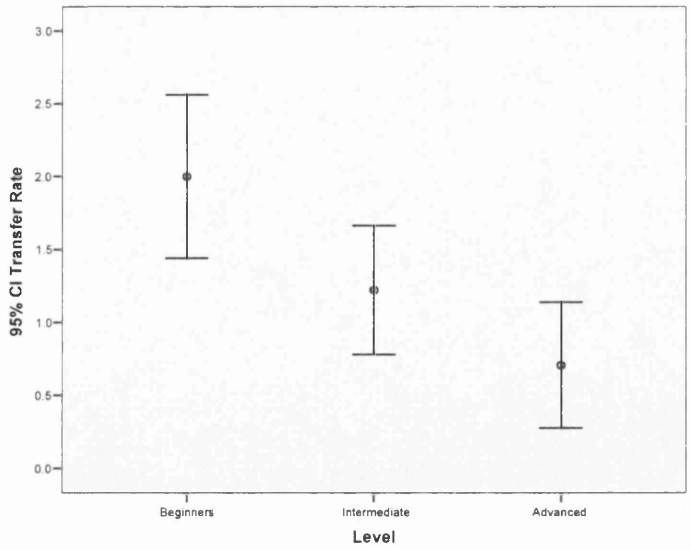

Figure 4.18 - Mean transfer rate by level of training received

4.8. Analyses of questions

Whilst, the previous sections have mainly focused on how age and gender impacts on transfer and usage, the following section will analyse the other variables that were measured in the survey.

4.8.1. Past ICT experience

Respondents were asked to what extent they had experience using ICT at work, prior to attending training. A t-test and a Mann-Whitney were used to investigate whether males and females differ with regards to their ICT experience. There is no reason to suggest that there would be a difference, and indeed no statistically significant difference was found (p=.190, p'= .322) - see Table 4.11.

Table 4.11: T-test and a Mann-Whitney of past experience with ICT for male and females

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
Past experience with computers	Female	80	4.80	1.458	84.61	6768.50
	Male	83	4.37	1.368	79.44	6272.50

Independent Samples Test

Levene's Test for Equality of Variances					
		F	Sig.	t	Sig. (2-tailed)
Past experience with computers	Equal variances assumed	2.220	.138	1.317	.190
	Equal variances not assumed			1.319	.189

Mann-Whitney

Past experience with computers	
Mann-Whitney U	2951.5
Wilcoxon W	6272.5
Z	-.990
Asymp. Sig. (2-tailed)	.322

Whilst it was not a surprise to discover that there was no statistically significant difference between males and females, it was thought that there may be a difference between age groups. As was mentioned in section 3.9.4, it is possible to use multiple t-tests to compare each mean with each other mean, although this increases the Type I error rate. Therefore, it is often better to use ANOVA and Kruskal-Wallis tests when there are 3 or more groups, as is the case here. When using these tests, the null hypothesis that, all the sub-groups are equal. It is apparent from the first table in Table 4.12, that the mean and the man rank of the over sixties is much lower than the others. As the p-values in the second table are <.05 (p=.002, p'=<.001), the null hypothesis is rejected, therefore, meaning that all the sub groups are *not* equal. It is apparent from the descriptive table, that it is the over sixties group generating the significant result.

Table 4.12: ANOVA and Kruskal-Wallis tests using age and past ICT experience

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Mean Rank
				Lower Bound	Upper Bound	
21-30	42	3.53	1.071	4.14	5.32	87.78
31-40	34	3.92	1.305	4.49	5.89	94.32
41-50	32	3.09	1.360	4.00	5.39	72.23
51-60	30	3.47	1.476	4.19	5.74	83.05
>60	25	1.40	1.673	2.26	4.14	8.5
Total	163	3.12	1.677	4.29	4.94	

ANOVA

	Df	F	Sig.
Between Groups	4	4.052	.002
Within Groups	155		
Total	159		

Kruskal-Wallis

Chi-square	25.810
Df	4
Asymp. Sig.	.000

Correlation analysis was used to investigate the relationship between employees' past ICT experience, and transfer rate. The null hypothesis is that the true correlation between past ICT experience and transfer rate is zero. However, whilst the null hypothesis is rejected because the p-value <.05 (p=.005, p'=.005), the correlation coefficients were only small – see Table 4.13.

Table 4.13: Correlation analysis using training transfer and past experience with computers

		Training transfer	Past experience with computers
Training transfer N=163	Pearson Correlation	1	-.207(**)
	Sig. (2-tailed)		.005
	Spearman's rho	1	-.210
	Sig. (2-tailed)		.005

4.8.2. Motivation

The relationship between motivation and training transfer/effectiveness has been examined extensively in the literature (see section 2.3.1). As a result, it was considered that it could not be overlooked in this study. The survey took into account two forms of motivation: 1) motivation to attend the training, and 2) motivation to apply the training back at the workplace.

Correlation analysis was used to investigate the relationship between employees motivation to attend ICT training and the extent to which they believe their level of ICT knowledge increased, as a result of attending the training. Naturally, it was hypothesised that if employees' were highly motivated to attend the training, they would learn more, and indeed the correlation tests found the relationship to be statistically significant (p=.001, p'=.001), but only moderately correlated – see Table 4.14. Whilst a stronger correlation was expected between the two variables,

there are a number of factors that could explain why this was not the case. For example, the employees may be motivated to attend the training, but if the training was not adequate in terms of content, they will not learn a great deal.

Table 4.14: *Correlation analysis using motivation to attend training and increase in ICT knowledge*

		Motivation to attend training	Increase in ICT knowledge
Motivation to attend training	Pearson Correlation	1	.472(**)
	Sig. (2-tailed)		.000
N=163	Spearman's rho	1	.422(**)
	Sig. (2-tailed)		.000

It was also hypothesised that there may exist a relationship between motivation to attend ICT training and age, with motivation and age being negatively correlated. Whilst there is no evidence to support this, it is considered here, that training is often associated with career enhancement, and older employees may be less driven by this. Figure 4.19 seems to support this hypothesis, which shows a clear negative relationship between the two. However, it is clear that the over sixties mean motivation to attend ICT training, is significantly lower than that of the younger groups. ANOVA and Kruskal-Wallis tests were used to determine whether the difference between the groups was statistically significant, and unsurprisingly, this was found to be the case ($p=.001$, $p'<.001$) – see Table 4.15. Once more, it is apparent that it is the over sixties group that is statistically different to the rest. We must be careful in making generalisations based in these findings, because of the size of the sample, however the difference between the over sixties and the other age groups is considerable, and therefore there is a good chance that this is indeed a true difference.

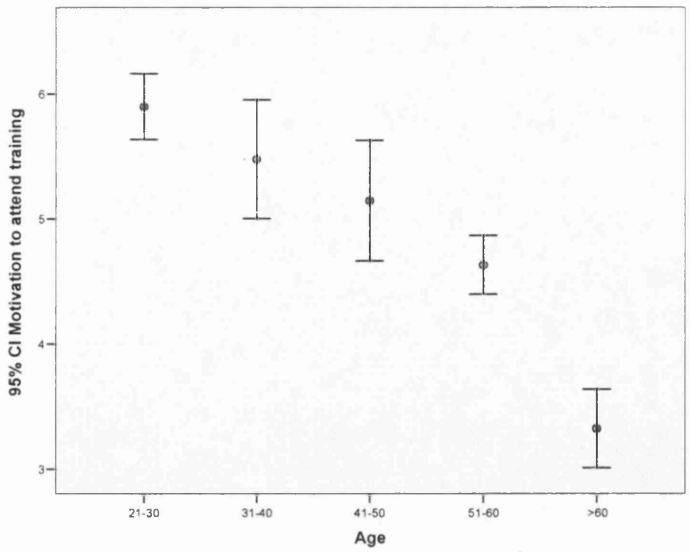

Figure 4.19 - Mean motivation to attend training by age

Table 4.15: Mean motivation to attend training by age

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Mean Rank
				Lower Bound	Upper Bound	
21-30	42	5.90	1.171	5.71	6.27	91.72
31-40	34	5.48	1.805	4.98	5.93	88.56
41-50	32	5.17	1.860	4.67	5.63	84.30
51-60	30	4.72	1.076	4.39	4.86	62.83
>60	25	3.38	1.673	3.07	3.68	9.45
Total	163					

ANOVA

	Df	F	Sig.
Between Groups	4	9.072	.001
Within Groups	155		
Total	159		

Kruskal-Wallis

Chi-square	83.650
Df	4
Asymp. Sig.	.000

Furthermore, a t-test and a Mann-Whitney were used to determine whether the mean motivation to attend training of males and females are statistically different from each other (t-test), and whether the two samples of observations come from the same distribution (Mann-Whitney). From the first table in Table 4.16, it is clear the females seem to have reported higher motivation levels than that of males. The second tables show whether this difference is statistically significant (see section 3.9.3). The p-values from both the t-test and the Mann-Whitney were both <.05 (p=.002, p'=.014). Therefore, we can conclude that the difference between the two groups is statistically significant, with females claiming to be more motivated to attend training sessions than males.

Table 4.16: T-test and Mann-Whitney of motivation to attend training for males and females

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
Motivation to attend training	Female	80	5.36	1.505	90.93	7365.50
	Male	83	4.80	1.351	73.18	6000.50

Independent samples test

Levene's Test for Equality of Variances					
		F	Sig.	T	Sig. (2-tailed)
Motivation to attend training	Equal variances assumed	1.372	.243	2.167	.002
	Equal variances not assumed			2.166	.002

Mann-Whitney

Motivation to attend training	
Mann-Whitney U	2597.50
Wilcoxon W	6000.50
Z	-2.453
Asymp. Sig. (2-tailed)	.014

It was naturally assumed that an employee's motivation to apply the training to the job, would be strongly related to transfer. That is to say, you would expect that if an employee returns from the training wanting to transfer the training, they are likely to do so; yet the correlation analysis suggested otherwise. The null hypothesis, which is that the true correlation between the two variables is zero, could not be rejected based on the p-values (p=.330, p'=.984), see Table 4.17, suggesting that even if employees are motivated to apply the training they have received, this does not necessarily mean that it will be applied. Whilst this result may be seen as unusual, it could be that some employees want to transfer the training, but are unable to because of situational constraints in the workplace.

Table 4.17: Correlation analysis using motivation to apply training and training transfer

		Motivation to apply the training	Training transfer
Motivation to apply the training	Pearson Correlation	1	.105
	Sig. (2-tailed)	.	.330
N=163	Spearman's rho	1	-.002
	Sig. (2-tailed)	.	.984

Given the unexpectedness of this finding, it was investigated further. The correlation analysis was run again, using the same variables, but only with employees who had a low pre-training usage of ICT. This time, the relationship was found to be statistically significant ($p<.001$, $p'=.004$), and the correlation coefficients, moderate – see Table 4.18. The is no obvious reason why is the case, although, it may be that ICT training is seen as a novelty to this sub-group of employees, however, there is no evidence in the literature to support this.

Table 4.18: Correlation analysis using motivation to apply the training and training transfer for low users

		Motivation to apply training	Training Transfer
Motivation to apply training	Pearson Correlation	1	.472(**)
	Sig. (2-tailed)		.000
N=59	Spearman's rho	1	.432(*)
	Sig. (2-tailed)		.004

Given that it was found in Table 4.15, that the over sixties were less motivated to attend the training than the younger age groups, it was not surprising to find that this group, were also not motivated to apply the training either. Once again, given the small sample size of this group the variation in the data is remarkably small, and as Figure 4.20 shows, the mean motivation of the other age groups, are relatively similar.

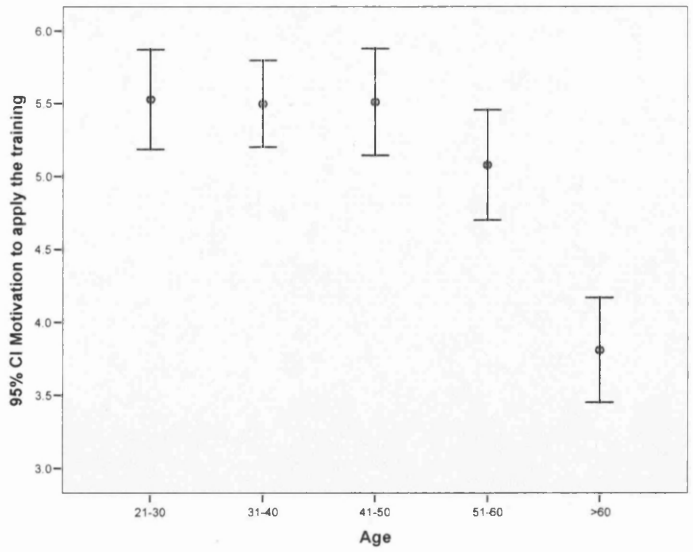

Figure 4.20 - Mean motivation to apply the training by age

4.8.3. Amount learnt during training

Learning theory has received much attention in the training literature (for example see Baldwin *et al*, 1991), and although the main focus of this thesis is the actual transfer of training to the workplace, learning theory must be taken to into account, given its importance in the transfer process. As depicted in Figure 4.21, over 75% of employees reported that they learned a great deal as a result of attending training, while only around 10% reported having learned very little, indicating that in general, employees believe that the ICT training has increased their ICT knowledge. Ideally, an objective measure of learning would have been used, i.e. an exam administered before and after the training; this was deemed impractical for a number of reasons, but it would be interesting to compare how the results correlate with that from the results in this study.

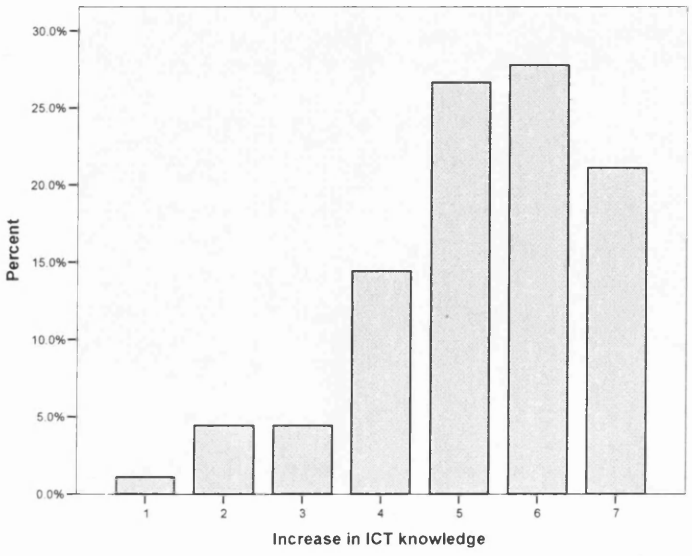

Figure 4.21 - Employees' reported increase in ICT knowledge as a result of training

A t-test and a Mann-Whitney were used to investigate whether employees' perceptions of their increase in ICT knowledge varied between male and females -see Table 4.19, with the null hypothesis being the means of the two groups are equal (t-test), and, that the two samples are drawn from a single population (Mann-Whitney) – see section 3.9.3. Interestingly, a statistically significant difference was found between the two groups ($p<.001$, $p'<001$), indicating that women perceive that they learn more than men during training. Although, again, there is little evidence to support this in the literature and is once more difficult to explain.

Table 4.19: T-test and Mann-Whitney of increase in ICT knowledge for males and females

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
Increase in ICT knowledge	Female	80	5.78	1.845	88.63	8756
	Male	83	4.02	1.046	70.81	4145

Independent Samples t-test

Levene's Test for Equality of Variances					
		F	Sig.	t	Sig. (2-tailed)
Increase in ICT knowledge	Equal variances assumed	4.535	.255	3.716	.000
	Equal variances not assumed			3.727	.000

Mann-Whitney

Increase in ICT knowledge	
Mann-Whitney U	2258
Wilcoxon W	5744
Z	-3.612
Asymp. Sig. (2-tailed)	.000

It was also hypothesised that older employees may report they had learnt less during training than younger employees. However, the ANOVA and Kruskal-Wallis tests failed to reject the null hypothesis ($p=.196$, $p'=.199$) - see Table 4.20, as a result suggesting that all the sub-groups are equal (see section 3.9.4). It should be noted, that this finding is no doubt influenced by respondents' varying

perceptions as to what constitutes a significant increase: learning a task as simple as how to cut and paste in Word, may be evaluated quite differently, by different individuals. Given the previous responses from the over sixties groups, it was expected that their reported score would be lower than that of the other groups.

Table 4.20: ANOVA and Kruskal-Wallis using increase in ICT knowledge in age groups

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Mean Rank
				Lower Bound	Upper Bound	
21-30	42	5.33	1.137	4.92	5.75	92.45
31-40	34	4.88	1.187	4.40	5.37	76.57
41-50	32	5.03	0.950	4.62	5.45	79.84
51-60	30	5.07	1.637	4.38	5.75	88.47
>60	25	4.31	1.515	3.61	5.00	66.82
Total	163	4.97	1.300	4.74	5.20	

ANOVA

	Df	F	Sig.
Between Groups	4	2.004	.196
Within Groups	159		
Total	163		

Kruskal-Wallis

Chi-Square	6.004
Df	4
Asymp. Sig.	.199

The link between learning and transfer is no doubt an important relationship. Naturally, employers hope that the more an employee learns during a training session, the more he or she will transfer that learning to the workplace. Yet when the relationship between learning and transfer was tested using correlation analysis, no such relationship was found (p=.654, p'=.574) – see Table 4.21, suggesting that high increases in learning do not necessarily mean high levels of transfer. This is certainly difficult to explain, because it is assumed that the more the employee learns, the more likely they are to transfer the training. It may be that the employees have learnt a great deal, but perhaps they have learnt material that is not closely related to their job, or it could also be that there are workplace constraints that have inhibited transfer. No doubt more research is needed with regards to the link between the level of learning and transfer, to investigate external factors influencing this relationship.

Table 4.21: Correlation analysis using increase in ICT knowledge and training transfer

		Increase in ICT Knowledge	Training Transfer
Increase in ICT knowledge N=163	Pearson Correlation	1	.351
	Sig. (2-tailed)		.654
	Spearman's rho	1	.109
	Sig. (2-tailed)		.574

4.8.4. Perceived usefulness of the training

It is assumed here, that the degree to which employees believe the ICT training will be of benefit to them at work, will impact strongly on the extent to which the training is transferred to the workplace. Figure 4.22 shows that the majority of respondents perceived that the ICT training they had received proved to be useful in their jobs. Almost 58% of respondents said that they had found it very useful, with only about 7% of respondents reporting it to have been of no use. In some cases employees may have yet to transfer the training but might do so in the future because they feel that it will be useful to them some time down the line.

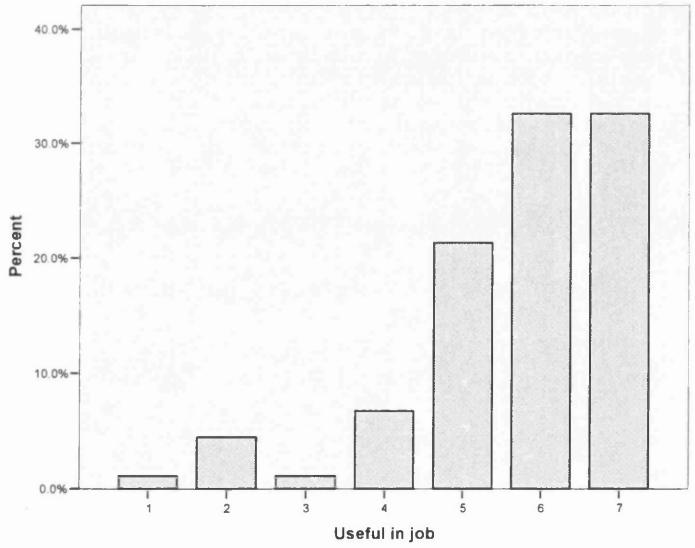

Figure 4.22 - Employees' perceived usefulness of their ICT training at work

A t-test and a Mann-Whitney were used to investigate whether men and women differ in the extent to which they believe the training to be useful. As Table 4.22 shows, the difference between the groups were found to be statistically

significant (p=.002, p'=.002), with women perceiving that find training more useful than men.

Table 4.22: T-test and a Mann-Whitney of the usefulness of training for males and females

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
Usefulness of training	Female	80	5.78	1.092	88.63	7711
	Male	83	5.02	1.503	70.81	5169

Independent Sample

Levene's Test for Equality of Variances					
		F	Sig.	t	Sig. (2-tailed)
Usefulness of training	Equal variances assumed	4.016	.002	3.162	.002
	Equal variances not assumed			3.178	.002

Mann-Whitney

Usefulness of training	
Mann-Whitney U	2468
Wilcoxon W	5169
Z	-2.519
Asymp. Sig. (2-tailed)	.002

ANOVA and Kruskal-Wallis tests were also used to determine whether how useful employees found the training differed dependent their age. As always with these tests, the null hypothesis is that all the sub-groups are equal (see section 3.9.4). Given the results of the over sixties group so far, it was thought that they would not have found the training as useful as the younger employees. As the p-values in Table 4.23 are <.05 (p<.001, p'<.001), the null hypothesis is rejected. As hypothesised, it is the over sixties group that is generating this significant result, as their reported mean usefulness is significantly lower than the other groups.

Table 4.23: ANOVA and a Kruskal-Wallis using usefulness of training in age groups

Age	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Mean Rank
				Lower Bound	Upper Bound	
21-30	42	5.82	1.207	5.48	6.16	128.83
31-40	34	5.52	1.130	5.19	5.86	114.28
41-50	32	5.78	.936	5.49	6.08	120.65
51-60	30	5.29	1.293	4.86	5.71	106.45
>60	25	2.19	.980	1.86	2.53	22.11
Total	163	5.03	1.714	4.80	5.27	

ANOVA

	Df	F	Sig.
Between Groups	4	70.980	.000
Within Groups	159		
Total	163		

Kruskal-Wallis

	Usefulness of training
Chi-Square	90.648
df	4
Asymp. Sig.	.000

4.8.5. Perceived difficulty of the training and the application of the training

It has been found that the extent to which the user believes that the system will be free from effort will have a significant impact on the acceptance of the technology (Davis, 1985). Two items were included in the survey to measure ease of use:

1. How easy did the employee find the training course?
2. How easily was the training applied in the job environment?

Figure 4.23 shows that almost half of the respondents believed that the training they had received was easy to understand, with only around 6% reporting the reverse.

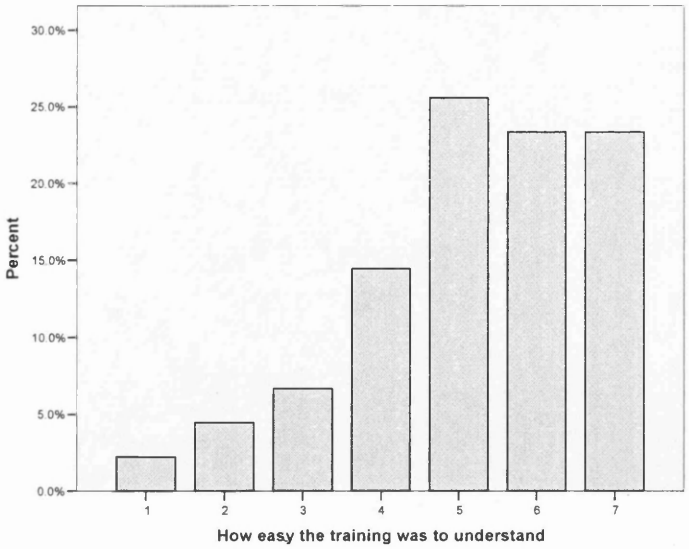

Figure 4.23 - Extent to which trainees found the training easy to understand

The relationship between how easy the training was to understand and level of learning was investigated. It is assumed here, that the easier the trainee finds the training to understand, the more they will learn. Although, it should be noted that if the training is too easy, it may be that the trainees already know the training content and, as a result may not learn anything new. Correlation analysis was used to examine the relationship between the two variables, with the null hypothesis once again, begin that the true correlation between the variables is zero (see section 3.9.2). Table 4.24 shows that the null hypothesis should be rejected based on the p-values ($p<.001$, $p'<.001$), moreover, the correlation coefficients are large; suggesting that employees who had found the ICT training easy to understand, in general perceived that they had significantly increased their ICT knowledge as a result of the training.

Table 4.24: Correlation analysis using how easy the training was to understand and increase in ICT knowledge

		Increase in ICT knowledge	How easy the training was to understand
Increase in ICT knowledge	Pearson Correlation	1	.696(**)
	Sig. (2-tailed)	.	.000
N=163	Spearman's rho	1	.857(**)
	Sig. (2-tailed)	.	.000

It was also hypothesised that older employees would find the training more difficult to understand than the younger employees based on the findings so far in

this study. Figure 4.24 shows that besides the over 60s category, the extent to which the employees found the training easy to understand did not differ significantly between age groups. Once again, the mean score for the over 60s was significantly lower than that of the others. This observed difference was tested using ANOVA and Kruskal-Wallis tests, and as Table 4.25 shows, at least one of the groups is statistically different to the rest ($p<.001$, $p'<.001$); once more, it is clear that it is the over sixties group that is generating this statistical difference.

Table 4.25: ANOVA and a Kruskal-Wallis using how easy the training was to understand in age groups

Age	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Mean Rank
				Lower Bound	Upper Bound	
21-30	42	5.49	1.352	4.93	6.04	85.40
31-40	34	5.55	1.948	4.85	6.23	86.29
41-50	32	5.09	1.950	4.47	5.80	82.91
51-60	30	5.23	1.599	4.61	5.91	84.69
>60	25	3.87	1.071	2.67	4.67	28.98
Total	163	4.94	1.481	3.07	3.77	

ANOVA

	Df	F	Sig.
Between Groups	4	4.035	.000
Within Groups	155		
Total	159		

Kruskal-Wallis

Chi-Square	13.811
Df	4
Asymp. Sig.	.000

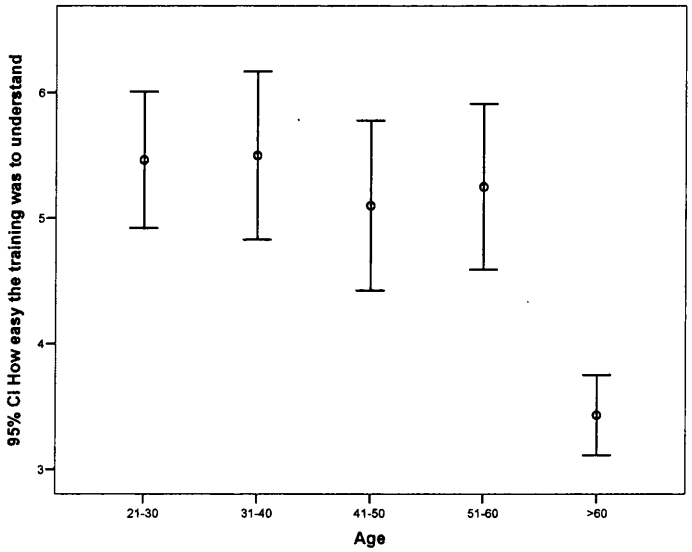

Figure 4.24 - How easy the training was to understand by age of employee

Whereas it was reasonable to assume that older employees might report finding the training less easy to understand than younger employees, such an assumption might well not be justified in the case of any possible difference in this respect between male and females. A t-test was used to test whether the means of the two groups are equal, and a Mann-Whitney to test whether the two samples of observations come from the same distribution (see section 3.9.3). The p-values from both of the tests were <.05 (p=.004, p'=.004) – see Table 4.26, therefore, the null hypothesis should be rejected. The descriptive table shows that women found the training easier to understand than men. Many of the tests so far have found that males and females differ in the responses given so far in the survey, however, there is little in the way of past research that can suggest a reason for this. Whilst there is no evidence to support this, it may that the perceptions of males and females differ. Perhaps if these variables could be measured via an objective scale, different conclusions may be made.

Table 4.26: T-test and a Mann-Whitney of how easy the training was to understand for males and females

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
How easy the training was to understand	Female	80	5.45	1.449	91.92	7353.50
	Male	83	4.81	1.589	72.44	6012.50

Independent samples

Levene's Test for Equality of Variances					
		F	Sig.	t	Sig. (2-tailed)
How easy the training was to understand	Equal variances assumed	.123	.726	2.696	.004
	Equal variances not assumed			2.701	.004

Mann-Whitney

How easy the training was to understand	
Mann-Whitney U	2526.5
Wilcoxon W	6012.5
Z	-2.691
Asymp. Sig. (2-tailed)	.004

It was also hypothesised that there would be a strong relationship between the extent to which employees found the training easy to understand and training transfer; correlation analysis was used to investigate whether this was actually the case. However, contrary to what was believed, no statistical significant relationship between the two variable was found (p=.140, p'=.146) – see Table 4.27. This could be explained by the fact if the training was set at too much of a low difficulty level then some employees would not learn much and this would therefore lead to poor transfer levels.

Table 4.27: Correlation analysis using how easy the training was to understand and training transfer

		How easy the training was to understand	Training transfer
How easy the training was to understand	Pearson Correlation	1	.140
	Sig. (2-tailed)	.	.599
N=163	Spearman's rho	1	.146
	Sig. (2-tailed)	.	.547

However, as in many previous cases, a statistically significant correlation was found between the two variables for the low pre-training ICT users (p=.048, p'=.002), with a large correlation coefficient - see Table 4.28. This could therefore mean that the training was indeed set at a low difficulty level.

Table 4.28: Correlation tests using how easy the training was to understand and training transfer (low pre-training users)

		How easy the training was to understand	Training transfer
How easy the training was to understand	Pearson Correlation	1	.674(*)
	Sig. (2-tailed)	.	.048
N= 59	Spearman's rho	1	.674(*)
	Sig. (2-tailed)	.	.002

The second item used to measure ease of use of use was, how easily or otherwise, respondents felt it was to apply the training to the workplace. It was assumed that the easier the employee felt it was to apply the training, the more he or she would have actually transferred it. This relationship was tested using correlation analysis. The null hypothesis that the true correlation between the two variables is

zero, cannot be rejected based on the p-values in Table 4.29 being >.05 (p=.176, p'=.126) (see section 3.9.2). Why an employee who reports that they find the training easy to apply, but then do not actually transfer it, is once more, difficult to explain. Whilst no obvious explanation exists to explain this finding, it could just be due to the size of the sample size.

Table 4.29: *Correlation analysis using how easy the training was to apply and training transfer*

		Training transfer	How easy the training was to apply
Training transfer N= 163	Pearson Correlation	1	.482
	Sig. (2-tailed)	.	.176
	Spearman's rho	1	.807
	Sig. (2-tailed)	.	.126

Yet again, when the relationship between how easy the training was to apply and training transfer was tested with the low pre-training users using correlation analysis, the null hypothesis was rejected (p=.004, p'=.002), the correlation coefficients were large - see Table 4.30. Given that this group have little experience with using computers, it is no surprise to find this result.

Table 4.30: *Correlation analysis using how easy the training was to apply and training transfer (low pre-training users)*

		Training transfer	How easy the training was to apply
Training transfer N=59	Pearson Correlation	1	.587(*)
	Sig. (2-tailed)	.	.004
	Spearman's rho	1	.533(*)
	Sig. (2-tailed)	.	.002

A t-test and a Mann-Whitney were used to investigate whether the extent to which employees' perceptions of how easy it was to apply the training, differed between males and females. There is no reason to suggest that these two should differ, however, a statistically significant difference was found between the two groups (p=.001, p'=.003) – see Table 4.31, indicating that, in general, women found ICT training easier to apply than men. As with the previous finding, it is once again, difficult to account for. It could be due to the differing job roles of

the employees attending the training, although there is no evidence to support this.

Table 4.31: T-test and a Mann-Whitney of how easy the training was to apply and males and females

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
How easy the training was to apply	Female	80	5.78	1.047	92.27	7381.50
	Male	82	5.11	1.349	70.99	5821.50

Independent samples test

Levene's Test for Equality of Variances					
		F	Sig.	T	Sig. (2-tailed)
How easy the training was to apply	Equal variances assumed	6.081	.015	3.235	.001
	Equal variances not assumed			3.244	.001

Mann-Whitney

How easy the training was to apply	
Mann-Whitney U	2418.50
Wilcoxon W	5821.50
Z	-2.968
Asymp. Sig. (2-tailed)	.003

A further test was carried out to see if there was any difference between age groups in the extent to which employees found the training easy to apply. It was hypothesised based on previous findings in this survey, that the over sixties group would be significantly lower than the rest. However, based on the p-values from the ANOVA and the Mann-Whitney tests, no statistically significant difference between the sub-groups was found (p=.113, p'=.126) - see Table 4.32, a surprising result given some of the previous responses from the over 60s group.

Table 4.32: ANOVA and a Kruskal-Wallis using how easy the training was to apply in age groups

Age	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Mean Rank
				Lower Bound	Upper Bound	
21-30	42	5.49	1.511	4.87	5.95	84.31
31-40	34	5.45	1.350	4.85	6.13	85.03
41-50	32	5.09	1.770	4.38	5.78	81.64
51-60	30	5.23	1.167	4.57	5.38	82.45
>60	25	4.87	1.347	2.55	4.56	77.56
Total	163	5.21	1.254	5.07	5.77	

ANOVA

	Df	F	Sig.
Between Groups	4	4.578	.113
Within Groups	155		
Total	159		

Kruskal-Wallis

Chi-Square	12.811
Df	4
Asymp. Sig.	.126

4.8.6. How closely the training is related to trainees' jobs

It was believed that extent to which respondents believed ICT training to be closely related to their job, would be one of the most significant influencers of transfer. It was assumed that if an ICT training course is designed so as to be directly relevant to an employee's job, it would result in higher levels of training transfer, than, if training was more general in nature. However, results from the correlation analysis which was used to test this relationship failed to support the hypothesis (p=.111, p'=.318) – see Table 4.33, which was unforeseen. Whilst this is difficult to explain, it may be that there were workplace constraints inhibiting transfer.

Table 4.33: Correlation analysis using how closely the training is related to the job and training transfer

		Training transfer	How closely the training is related to the job
Training transfer N=163	Pearson Correlation	1	.128
	Sig. (2-tailed)	.	.111
	Spearman's rho	1	.080
	Sig. (2-tailed)	.	.318

Nevertheless, as has been the case in a number of previous analyses presented here, a statistically significant relationship was found between the two variables for low pre-training ICT users, although the correlation coefficient was only moderate (p=.037, p'<.001,) – see Table 4.34.

Table 4.34: Correlation analysis using how closely the training was related to the job (low pre-training users)

		Training transfer	How closely the training is related to the job
Training transfer N=59	Pearson Correlation	1	.382(*)
	Sig. (2-tailed)	.	.037
	Spearman's rho	1	.333(**)
	Sig. (2-tailed)	.	.000

A t-test and a Mann-Whitney were also used to determine whether males and females differed in the extent to which they perceived that the training was related to their job. Interestingly, a statistically significant difference was found between the two groups (p=.005, p'<.001) - see Table 4.35, with females reporting the training to be more related to their jobs than males. Whilst again there is no evidence to support this it could be due to differing job roles of the males and females in this study.

Table 4.35: T-test and a Mann-Whitney for how closely the training was related to the job and gender

	Gender	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks
How closely the training is related to the job	Female	80	5.24	1.512	92.99	8276
	Male	83	4.51	1.776	64.85	4604

Independent Samples Test

Levene's Test for Equality of Variances					
		F	Sig.	t	Sig. (2-tailed)
How closely the training is related to the job	Equal variances assumed	6.079	.786	2.827	.005
	Equal variances not assumed			2.835	.004

Mann-Whitney

How closely the training is related to the job	
Mann-Whitney U	2048
Wilcoxon W	4604
Z	-3.884
Asymp. Sig. (2-tailed)	.000

Figure 4.25 shows that the mean score for the over 60s with respect to how closely the training was related to their job, is once more significantly lower than that of the other age groups. A slight inverse relationship between age and the extent to which the training is closely related to the job can be observed, although the over 60s score undoubtedly stands out. This could explain why the older employees say that the training is not useful and are not motivated to transfer the training back to the workplace. Whilst the sample size of the over sixties is not large, once more the variance in the results given is small and the results of this are much lower than that of the other groups. Further research should be conducted on this group using a larger sample to investigate to what extent, the results differ.

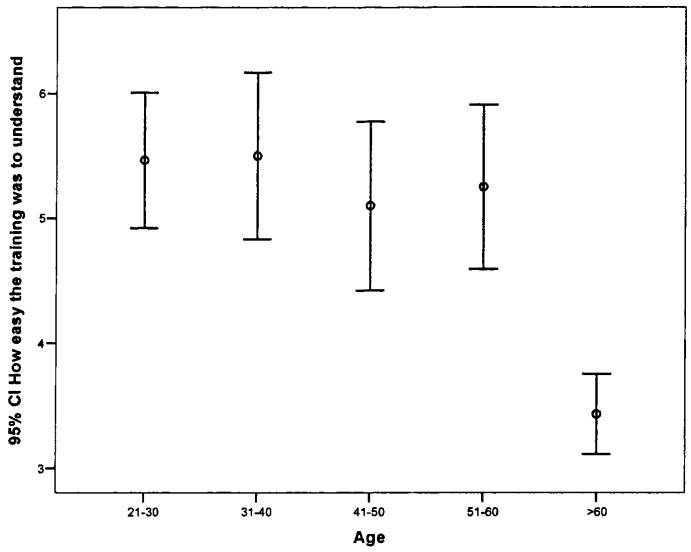

Figure 4.25 - How closely employee believes the training is related to their job by age

4.8.7. Workplace support

Along with individual and training characteristics, workplace factors were the third main group hypothesised to have a sizeable influence on training transfer. The survey took account of a number of workplace factors, all of which had been identified in the literature review. Two such factors were the degree to which the organisation 1) encourages, and 2) supports its employees in the application of ICT training at work. It was naturally assumed that the more employees perceive encouragement and support from their employer, the higher the levels of transfer are likely to be. Figures 4.26 and 4.27 show that the majority of employees believed that their company encourages them to transfer the training and supports them in doing so. Yet, it appears that while their employers actively encouraged and supported them to apply the training, this had not resulted in the transfer of that training. Correlation analysis indicated that neither encouragement (p=.318, p'= .960) nor support (p=.158, p'= .320), were correlated with training transfer – see Table 4.36. However, once again for both variables, this relationship was again found to be statistically significant for the low-pre training ICT user group (p<.001, p'<.001) - encouragement and (p<.001, p'<.001) - supportive, but the correlation coefficients were only small – see Table 4.37. Further research is no doubt needed into these workplace factors to see how the results compare.

Table 4.36: Correlation analysis using encouragement and support from the company and training transfer

		Training transfer	Encouragement from company to transfer the training	How supportive the company is with helping to transfer the training
Training transfer N=163	Pearson Correlation	1	.302	.109
	Sig. (2-tailed)	.	.318	.158
	Spearman's rho	1	.006	.111
	Sig. (2-tailed)	.	.960	.320

Table 4.37: Correlation analysis using encouragement and support from the company and training transfer (low pre-training users)

		Training transfer	Encouragement from company to transfer the training	How supportive the company is with helping to transfer the training
Training transfer N=59	Pearson Correlation	1	.315(**)	.370(**)
	Sig. (2-tailed)	.	.000	.000
	Spearman's rho	1	.223	.330
	Sig. (2-tailed)	.	.000	.000

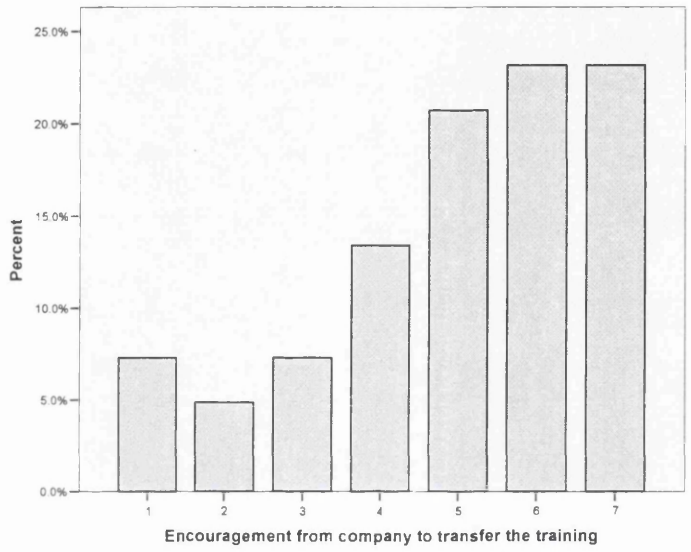

Figure 4.26 - The extent to which the company encourages employees to transfer the training

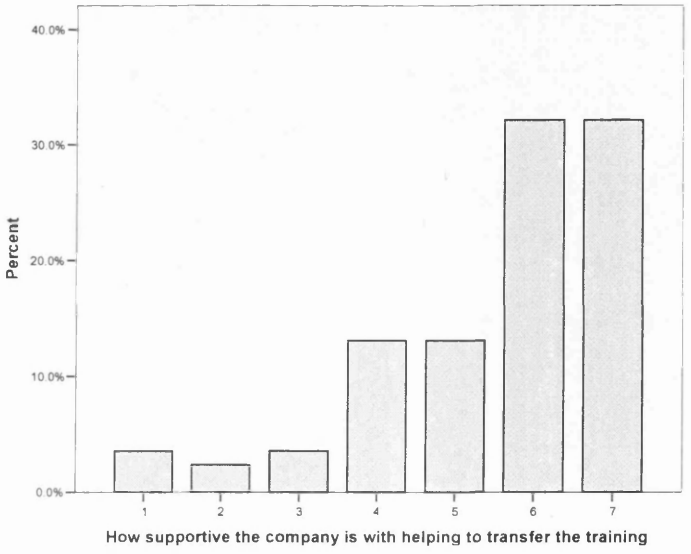

Figure 4.27 - How supportive is your company in helping employees to transfer the training

4.8.8. Transfer incentives

Employers' offering incentives to their employees to encourage them to transfer the training, take many forms, including promotion opportunities and bonuses. Yet the results from the study suggest that incentives are rarely used as a means of encouraging employees to transfer their training. As Figure 4.28 shows, 42% of respondents said that they were offered very few incentives to transfer the knowledge they gained from the ICT training sessions; only 8% said that they were offered worthwhile incentives. Given that the majority of the sample consisted of smaller companies, it is likely that they have limited resources, thus, it was not surprising to find such a result.

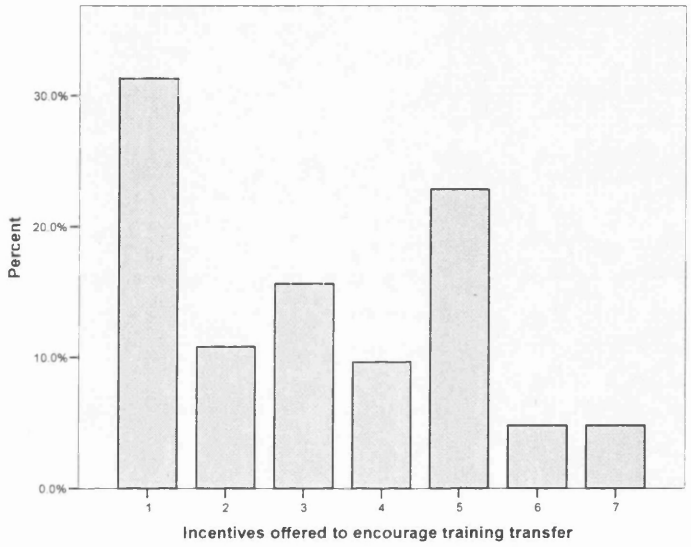

Figure 4.28 - Incentives offered to employees for applying the ICT training

4.8.9. Encouragement by peers

Figure 4.29 indicates that the majority of employees believe that their fellow employees do support them in transferring their training, although some 15% of respondents reported that they were given very little support.

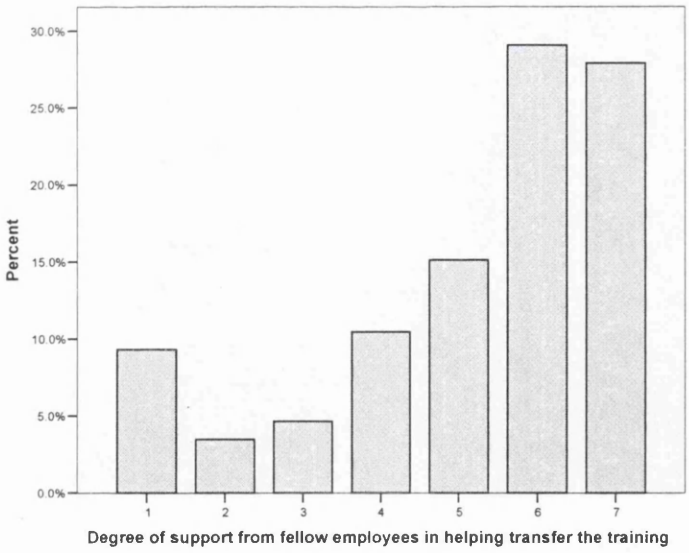

Figure 4.29 - Employees views on the support provided by other employees

It was hypothesised that the more employees believed that fellow employees supported them in the workplace, the more likely they are to transfer the training. The correlation analysis that was used to test this hypothesis showed a statistically significant relationship (p=.003, p'=.003), although the correlation coefficients were only small – see Table 4.38, indicating the two variables are correlated, but only to a small degree.

Table 4.38: Correlation analysis using how supportive the company is with helping to transfer the training and training transfer

		Training transfer	How supportive the company is with helping to transfer the training
Training transfer N = 159	Pearson Correlation	1	.311
	Sig. (2-tailed)	.	.003
	Spearman's rho	1	.211
	Sig. (2-tailed)	.	.003

4.9. Regression model for low ICT users

Regression analysis can be used to predict one variable by other variables. If employers, training providers, and funding agencies know what variables predict transfer; it will allow them to adapt the training, adapt work processes and the allocation of funding.

The results so far have shown that there are considerable differences between that of trainees who had a low usage of ICT pre-training and those who had more experience. The majority of trainees who attended the training sessions in this sample were relatively inexperienced, in terms of ICT usage. As a result it was decided to investigate whether a chosen set of variables would accurately predict training transfer for this group. As was mentioned in section 3.9.5, when conducting regression analysis, the null hypothesis is that the dependent variable is not explained by a combination of all the independent variables in the together.

The four independent variables that were included in model, were done so because of their proposed impact on training transfer. These four variables were -

- How easy the training was to understand

It was thought that employees with only a limited amount of experience would need training that is easy to understand because they will have limited knowledge from which to draw on. Once an employee has been trained on one application, it is often easier to be trained on others.

- Usefulness of training

Whilst not specific to inexperienced users it was proposed that the more trainees believe that the training will be useful to them when they return back to the workplace, the more likely they are to transfer the training.

- How closely the training was related to the job

Employees with less experience will find training easier if the training content and the employees' job at the workplace are similar. This is because they will have less to take in and learn, if they are comfortable with some of the content in the training sessions.

- Encouragement from employers to transfer the training

It is believed that if employers support employees and give them time to adapt to using the knowledge gained from the training and not punish them for making mistakes in the short team they will display higher levels of transfer.

The regression analysis was run and the results are shown in Table 4.39. As is evident from the output, the results from the regression analysis were not as good as was hoped. Whilst the model as a whole explained 59.2% of the variation in training transfer, only one of the four variables in the model - encouragement from employers to transfer the training, was significant. Moreover, the constant in the model is significant and, as a result, it suggests that there is at least one variable that is not present in the model, which could help predict training transfer.

Table 4.39: Regression model using training transfer

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.769(a)	.592	.562	.74134

a Predictors: (Constant), Encouragement from company to transfer the training, How closely the training is related to the job, How easy the training was to understand, Usefulness of training

ANOVA(b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	43.068	4	10.767	19.591	.000(a)
	Residual	29.678	54	.550		
	Total	72.746	58			

a Predictors: (Constant), Encouragement from company to transfer the training, How closely the training is related to the job, How easy the training was to understand, Usefulness of training
b Dependent Variable: Training transfer

		Unstandardized Coefficients		Standard Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.996	.434	.247	2.066	.044
	How easy the training was to understand	.309	.145	-.209	1.436	.157
	Usefulness of training	.364	.140	.182	1.178	.244
	How closely the training is related to the job	.368	.162	.597	1.037	.304
	Encouragement from company to transfer the training	.682	.115	.597	5.060	.000

a Dependent Variable: Training transfer

Following the example in section 3.9.5.2, a reduced regression model can also be applied in this instance. As opposed to simply removing the three non-significant variables straightaway and running a simple regression model with only one

independent variable; further regression models were run, with different variations of the independent variables, to see if more than one variable would become significant – see Table 4.40.

Table 4.40: Reduced regression models

Model	Independent variables	Sig.
1	Constant	.078
	How easy the training was to understand	.258
	Usefulness of training	.189
	Encouragement from company to transfer the training	.001
2	Constant	.100
	How closely the training is related to the job	.378
	Usefulness of training	.238
	Encouragement from company to transfer the training	.000
3	Constant	.354
	How closely the training is related to the job	.439
	How easy the training was to understand	.281
	Encouragement from company to transfer the training	.004
4	Constant	.241
	How closely the training is related to the job	.563
	Encouragement from company to transfer the training	.000
5	Constant	.231
	How easy the training was to understand	.099
	Encouragement from company to transfer the training	.000
6	Constant	.057
	Usefulness of training	.376
	Encouragement from company to transfer the training	.003
7	Constant	.435
	Encouragement from company to transfer the training	.000

However, despite running 7 different regression models, with different variations of the independent variables, only one, had a non-significant constant and significant independent variable(s) (model 7). This was perhaps not surprising,

given the results from the initial 4 variable regression model. The full results of the reduced regression model are displayed in Table 4.41. The R^2 remains relatively high, with the model explaining 55.6% of the variation in training. Having a regression model with only one independent variable is not ideal and one expects that there are probably more independent variables that could fit into the model; this could be investigated further, in the future, perhaps with a larger sample size. A full discussion of the regression model can be found in chapter 6.

Table 4.41: Reduced regression model using training transfer

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.723(a)	.592	.556	1.07095

a Predictors: (Constant), Encouragement

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	103.269	1	103.269	90.039	.000(a)
	Residual	65.375	57	1.147		
	Total	168.644	58			

a Predictors: (Constant), Encouragement
b Dependent Variable: TrainingTransfer

Model		Unstandardized Coefficients		Standard Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.125	.378		.330	.435
	Encouragement from company to transfer the training	.548	.089	.783	9.489	.000

a Dependent Variable: Training transfer

4.10. Summary of employees' results

The results from the employees' questionnaire have produced a significant number of interesting, and somewhat surprising results. The majority of these points will be
discussed in detail in chapter 6.

1. *Transfer and post-training usage*

It was found that a high transfer rate does not necessarily translate to a high post-training usage, and a low transfer-rate not to a low usage.

2. *Individual applications*

It was also found that the various applications within the Microsoft suite are transferred and used to different degrees. Whereas PowerPoint had the highest transfer rate, it had by far the lowest post-training usage; and while Word had the lowest transfer rate, it had the highest post-training usage.

The combined transfer rate and the individual transfer rate histograms were significantly different, suggesting that employees when appraising ICT training sessions as a whole may be reporting an average mark.

3. *Age of employee*

The over sixties group responses were considerably different from that of the younger respondents. While their reported training transfer was comparable to that of the others, their post-training usage was significantly lower. Moreover, they reported:

- to be relatively poorly motivated to attend ICT training;
- to be poorly motivated to apply the training;
- not to find the training to be useful in their jobs;
- to find the training not to be closely related to their jobs;
- to perceive the training not to be useful for their work;

- to find the training not to improve their work effectiveness;
- to find the training difficult to understand; and
- to find the training not to be closely related to their job.

4. Gender

The study found that male and female responses to a number of variables differed significantly, including:

- women who were low ICT users (pre-training) transferred the training more than male low-users;
- women were found to be more motivated to attend ICT training than men;
- women perceive that they learn more at ICT training sessions;
- women find training more useful for their jobs;
- women find the training easier to understand;
- women find the training easier to apply back at the workplace;
- women believe the training to be more closely related to their job.

5. Difference between low users of ICT and medium and high users (Pre-training)

The study found a number of statistically significant differences in the responses given by employees who had little experience with computers pre-training and those who were more experienced. The differences found are listed below:

- Low ICT users in general, transfer the training more than employees who used ICT more pre-training;
- a significant correlation was found between motivation to apply the training and training transfer for low users, but not medium to high users;
- a significant correlation was found between the perceived usefulness of the training and training transfer for low-users, but not medium to high users;

- a significant correlation was found between how easy the training was to understand and training transfer for low users, but not medium to high users;
- a significant correlation was found between motivation to apply the training and training transfer; for low users, but not medium to high users;
- a significant correlation was found between how closely the employees believed the training to be closely related to their job for low-users, but not medium to high-users;
- a significant correlation was found between the extent to which employees believed their employer encouraged and supported transferring the training job for low-users, but not medium to high-users.

6. Other findings

Other interesting findings to emerge from the analysis include:

- 28% of employees reported a zero or negative transfer rate;
- a strong correlation exists between employees pre-training usage and transfer;
- there is no statistically significant relationship between age of employee and training transfer;
- ICT training classes consist of employees with a wide range of abilities;
- there is a strong inverse relationship between level of training (difficulty) and training transfer;
- no statistically significant relationship was found between perceived level of learning and training transfer.

This chapter has analysed in detail the data collected from the employees' questionnaire. The final section has summarised the main findings from the analysis, all of which will be discussed in detail in chapter 6. As was discussed in chapter 3, employers from the SMEs were also surveyed. The following chapter will then present the results obtained from the data on these questionnaires.

Chapter 5. Employers Survey Analysis

This chapter presents the results from the surveys obtained from the employers. 90 valid questionnaires were returned and analysed.

For ease of analysis, the information on the size of the companies was grouped into three categories, namely small (fewer than 10 employees), medium (between 10 and 50 employees), and large (more than 50 employees). 39% of companies were classified as small (n=35), 34% medium (n=31), and the remaining 27% as large (n=24). There are various set definitions for what constitutes a small, medium and large company. The European Commission states that a small company is one with less than 50 employees, a medium company with between 50-250 and a large company with more than 250. However, given that there are very few companies with more than 250 employees that have received external ICT training in South Wales it would have meant this group would have not been well represented. As a result, it was decided to use the above bands so all groups would be represented.

Information was also collected on the location of the companies. The majority were based in either Swansea or Cardiff, with the rest spread along South Wales - from Llanelli to Newport. Again, for ease of analysis the companies were classified as being located in either East or West Wales, with the border between the two sited at Pyle. A third category, 'Other' was used for responses for which the location was either missing or unclassifiable (for example simply 'South Wales' as a response). The number of companies that were located in either East (n=41) or West Wales (n=39) was evenly balanced.

5.1. The transfer of training

The employers were asked to estimate their employees' levels of training transfer, and as Figure 5.1 shows, in general, employers believe that their employees do transfer their training to a reasonable degree, with 81% believing that their employees ICT usage had increased significantly, and only 7% that they

had transferred very little of what they had learned. However, Figure 5.1 also shows a spike in the data, with the percentage of respondents who marked 5 on the 7-point scale being much higher than all the others, indicating that these employers are not fully convinced of their employees' transfer levels.

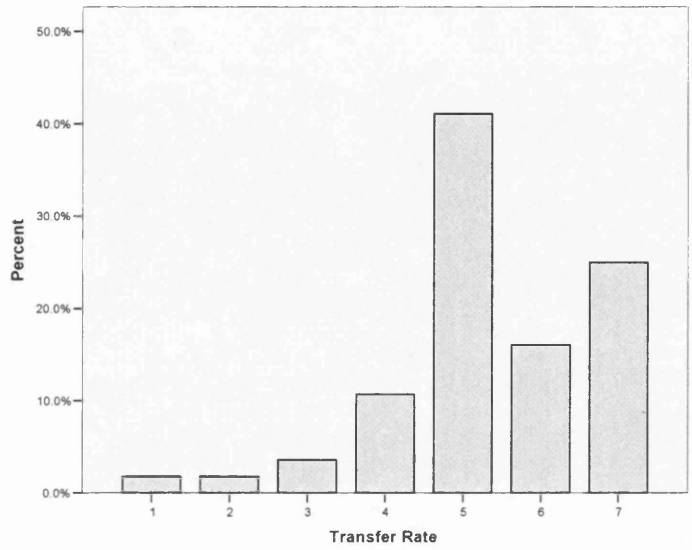

Figure 5.1 - Employers perceived increase in their employees' usage of ICT as a result of the ICT training

To determine whether training transfer differed dependent on the size of the company ANOVA and Kruskal-Wallis tests can be used. It was hypothesised that employees in larger companies would transfer the training more than employees from small companies, based on the findings of Sadler-Smith *et al* (2000). However, the p-values in Table 5.1 (p=814, p'=.924) failed to support this hypothesis. It may be that if a larger sample size was used which included more large companies (>250 employees), a statistically significant result may be generated – this is something that could be looked at in the future

Table 5.1: ANOVA and a Kruskal-Wallis using training transfer in company size groups

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Mean Rank
				Lower Bound	Upper Bound	
Small	24	5.25	1.211	4.61	5.89	41.00
Medium	20	5.35	0.968	4.76	5.94	39.18
Large	15	5.53	0.825	4.91	6.16	40.73
Total	59	5.36	1.023	5.01	5.70	

ANOVA

	Df	F	Sig.
Between Groups	2	.206	.814
Within Groups	56		
Total	58		

Kruskal-Wallis

Chi-Square	.168
df	2
Asymp. Sig.	.920

5.2. Benefits of ICT training to companies

It almost goes without saying, that companies provide ICT for their employees, so as to bring benefits to the company. If employers believe that the training is not improving company performance, they are unlikely to continue providing training for their employees, or so you would expect! To gauge the relationship between ICT training and company performance, employers were asked to what extent they believed that the training had resulted in benefits to the company. The results which can be found in Figure 5.2, seem to suggest that in general, employers perceive that ICT training is indeed beneficial; although only 16% of respondents reported a maximum rating of 7 on the 7-point scale, the majority recording either a 5 or a 6 (combined: 63%).

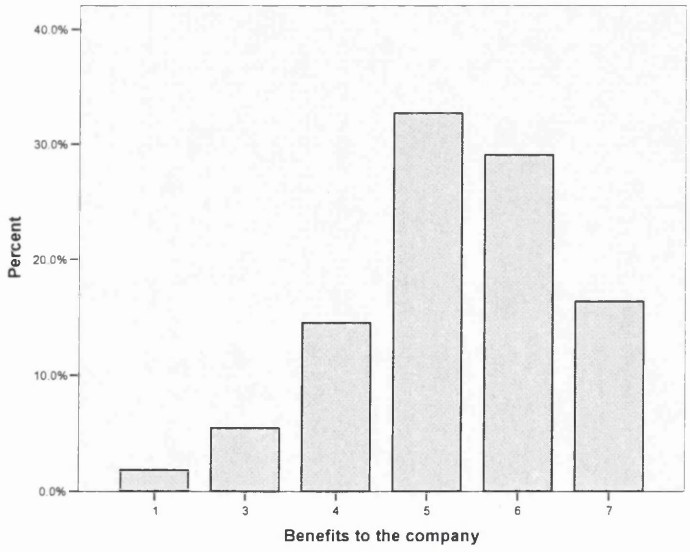

Figure 5.2 - Employers' perceived benefits of ICT to the company

It was hypothesised that there would be strong relationship between training transfer and benefits to the company resulting from the training. It seems sensible

to assume that if training transfer is high, it should improve company performance and vice versa - Figure 5.3 appears to support this hypothesis. This observed relationship was tested using correlation analysis, the null hypothesis of which is that the true correlation between the two variables is zero (see section 3.9.2). The p-values generated from the analysis were <.05 (p<.001, p'<.001), therefore, the null hypothesis was rejected; and the correlation coefficients are also large – see Table 5.2, indicating that correlation between the two variables is strong. It must be noted that, strictly speaking, it is not possible to affirm a definite causal relationship here, although one suspects that there must be one. Whilst this relationship make seen somewhat obvious, it does confirm that if training is transferred to the workplace it can actually lead to company benefits, or at least employers perceive they do!

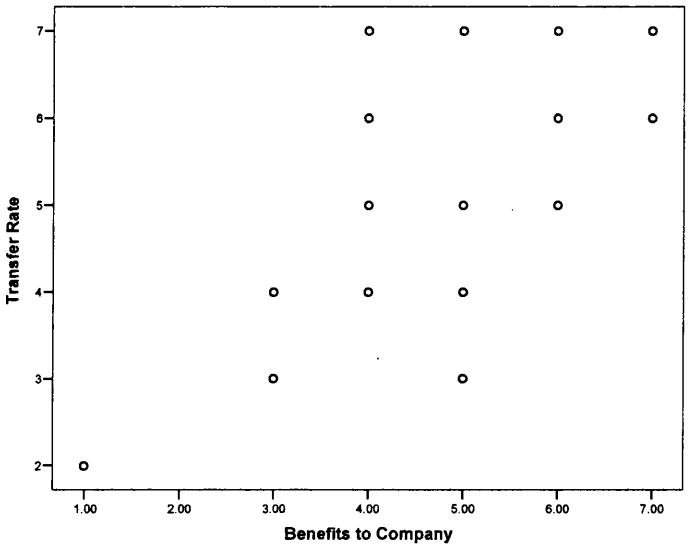

Figure 5.3 - Training transfer against benefits to the company

Table 5.2: Correlation analysis using benefits to the company and training transfer

		Benefits to the company	Training Transfer
Benefits to the company	Pearson Correlation	1	.785(**)
N=90	Sig. (2-tailed)	.	.000
	Spearman's rho	1	.634(**)
	Sig. (2-tailed)	.	.000

5.3. Training and upgrades

Companies often provide ICT training for their employees because they have installed a new or updated computer system, something which could be distorting the findings from the question on the perceived benefits of the ICT training. The perceived company benefits could be a result of the increased efficiency of the new computer system itself. It can, of course, be difficult to distinguish between the two, but some kind of distinction should be nevertheless be attempted. The results from the question 'to what extent do you believe that it is more the installation of new software or hardware as opposed to the actual training that has provided your company with benefits?' are shown in Figure 5.4. It is clear that there is a mixed opinion on whether company benefits have resulted mainly from the training or the installation of new software/hardware, and it must therefore be borne in mind that the extent to which training impacts on company performance could in some cases, be over-estimated. Ideally it would be possible to separate the two, but this was deemed almost impossible.

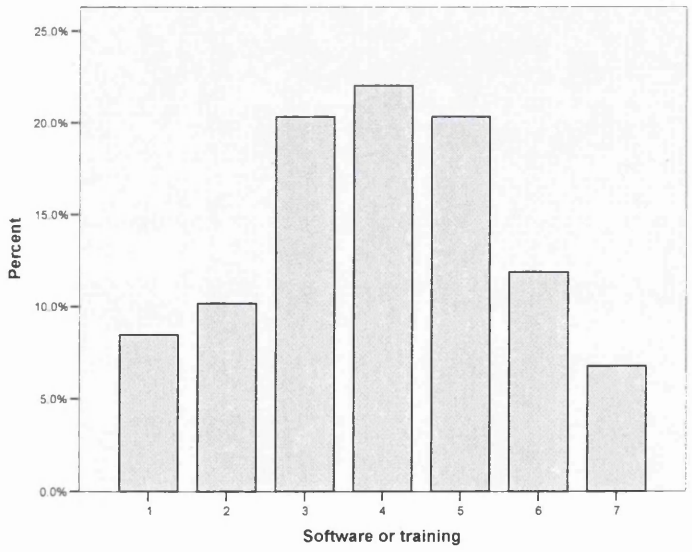

Figure 5.4 - Is it new software/hardware or the actual training that bring the benefits?

5.4. Expectations of ICT training

There undoubtedly exists a perception that if firms invest in ICT training, it will result in increased company performance, and failing to provide training will lead to the company being left behind by the competition. This has arguably resulted

in employers having high expectations with regards to the effectiveness of ICT training. A question was included in the survey in an attempt to measure such expectations - the results are displayed in Figure 5.5. They show that the majority of the employers' expectations had been fairly well met, with 14% having had their expectations very well met (7 on the 7-point scale), and 63% quite well met (5 and 6 on the scale).

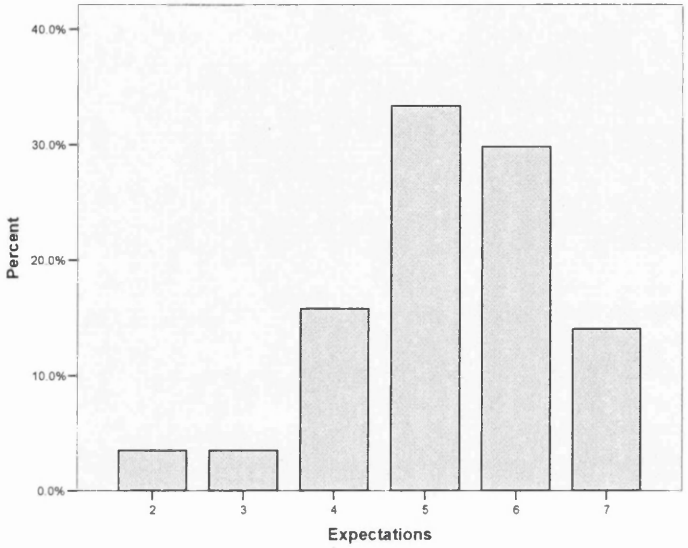

Figure 5.5 - Extent to which employers' expectations have been met

The relationship between the degree to which employers' expectations had been met (as a result of their employees attending the training) and training transfer was tested by using correlation analysis. It was hypothesised that there would be strong correlation between the two variables. The p-values generated from the correlation tests supported this hypothesis ($p<.001$, $p'<.001$) and the coefficients were large – see Table 5.3. The relationship is shown graphically in Figure 5.6. While this relationship may seem fairly obvious, employers may not always be conscious of it, failing to realise that their expectations have not been met because their employees have not transferred the training - instead believing that the ICT training was inefficient. However, it should be noted that given the sample size is only 90, we must be careful in making too many generalisations, therefore, more research should be conducted in the future using larger sample sizes to see how the results compare.

Table 5.3: Correlation analysis using expectations and training transfer

		Training Transfer	Expectations
Training Transfer	Pearson Correlation	1	.715(**)
	Sig. (2-tailed)	.	.000
N = 90	Spearman's rho	1	.718(**)
	Sig. (2-tailed)	.	.000

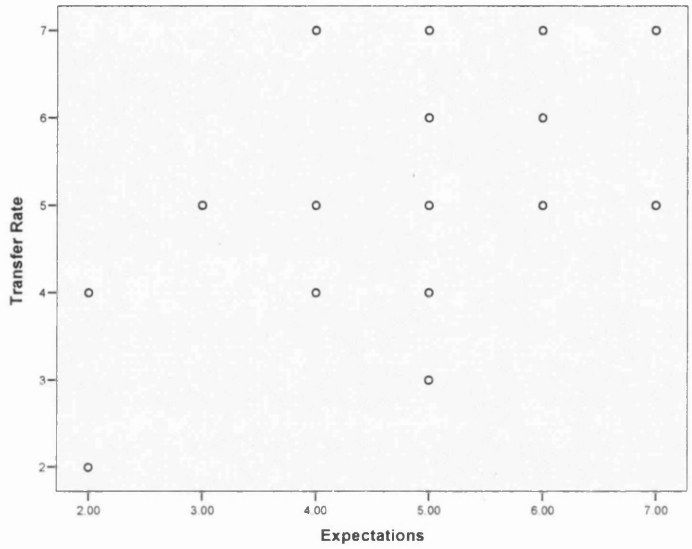

Figure 5.6 - Training transfer against employers' expectations

5.5. If employers had the opportunity, would they design training courses differently?

The employers were asked who decided on the content of the ICT training courses in which their employees were involved. The results are shown in Figure 5.7.

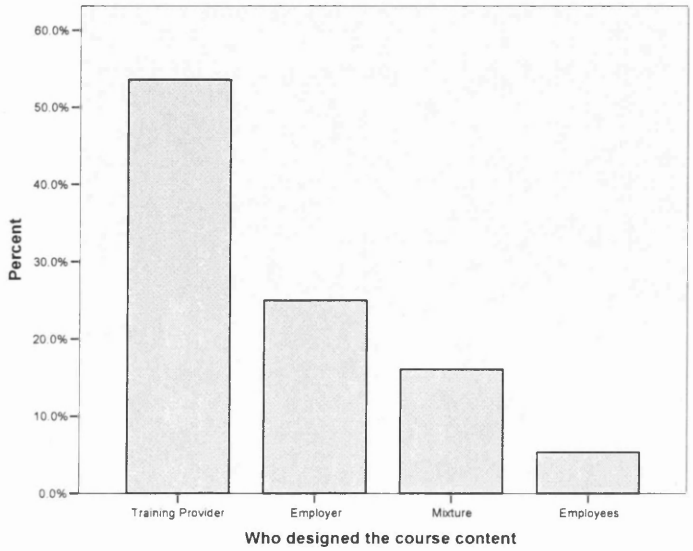

Figure 5.7 - Who decided on the content of the training?

It can be seen that the training provider decided on the content in over 50% of the cases. Given the perceived importance of ICT training, it was thought that the employer and the employees would have had more say in the training content. Training providers are likely to design training material that can be taught to a variety of different companies, as opposed to designing material specific to an individual companies needs. As a result, it was hypothesised that the transfer rate would vary depending on who decided on the training content. However, as Figure 5.8 shows, there is actually very little variation - this issue is discussed further in chapter 6.

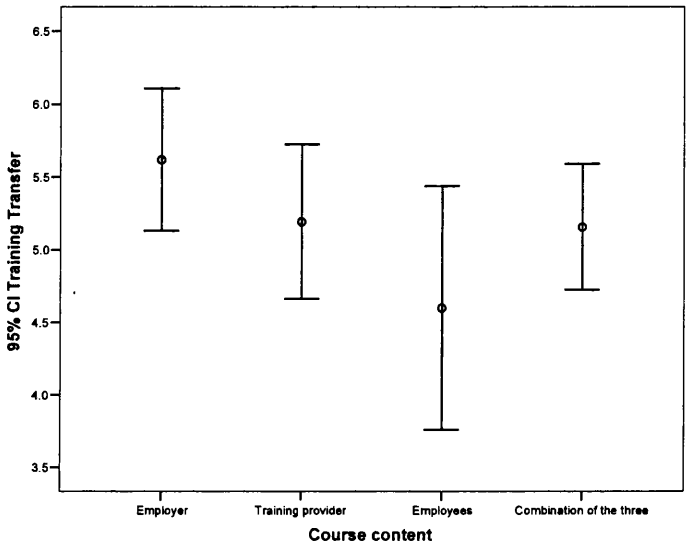

Figure 5.8 - Mean transfer rate by who decided on course content

Employers were also asked, if they had been given the opportunity, whether they would have designed the course differently. Figure 5.9 shows that 44% would not have changed the content at all, and 20% that they would have changed it significantly, from this, you would assume that this means employers are mostly happy with the training content provided by the training providers. Given some of the results from the employees' questionnaire, it was perhaps surprising that more employers did not say they would have designed the material differently. It could be due to the fact that some employers have limited knowledge of ICT, therefore, even though it has not led to significant benefits, they are still unsure how it could be modified to improve effectiveness.

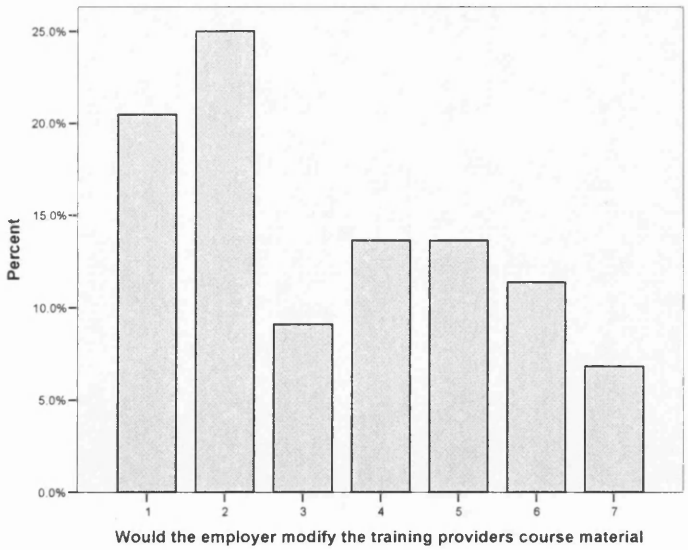

Figure 5.9 - Given the chance, would employers have designed the course differently?

Employers normally have two options when deciding on where ICT training sessions should be held: at the workplace or at the training providers' premises. ICT training differs somewhat from other forms of training due to the need for specialist equipment, and especially the smaller companies may not have access to it. This is reflected in Figure 5.10, with nearly 80% of employers from small companies saying that their ICT training is conducted on the training providers' premises, and not one employer of a small company having held ICT training courses in-house.

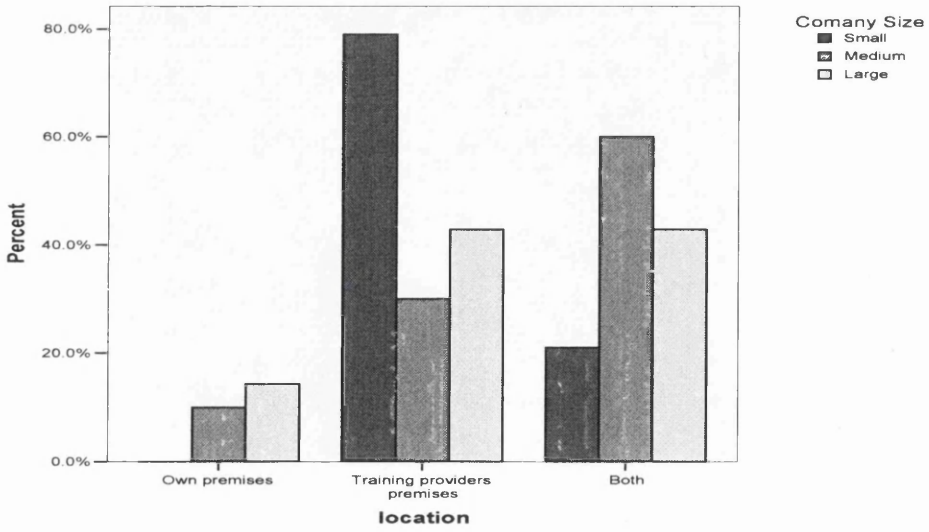

Figure 5.10 - Location of training by size of company

Figure 5.11 reveals a difference in the mean transfer rate depending on the location of the training. Employers who conduct training on their own premises report the highest transfer rate. The fact that small companies may suffer from poor transfer rates because they are unable to offer training on their own premises is discussed in chapter 6.

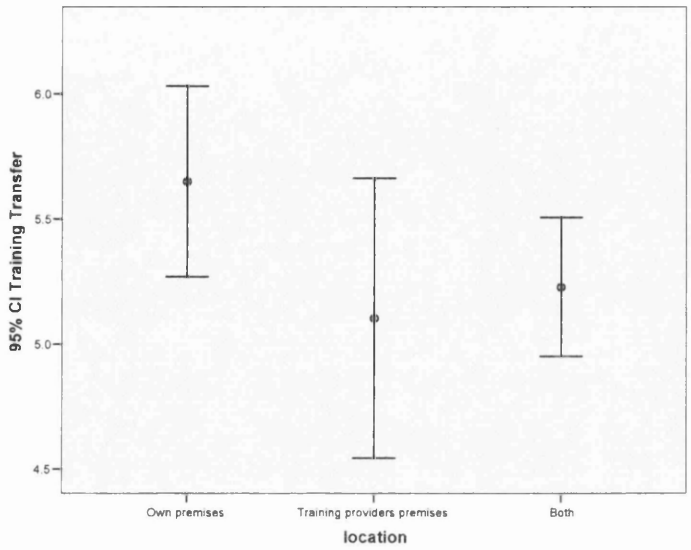

Figure 5.11 - Reported mean transfer rate by location of training

5.6. Employer/company factors

It would have been surprising to find employers admitting to discouraging their employees from transferring the training, yet while most did believe that they encouraged their employees, interestingly some reported otherwise - see Figure 5.12. However, it must be noted that this item measured perceived as opposed to actual encouragement, the latter being for practical purposes un-measurable.

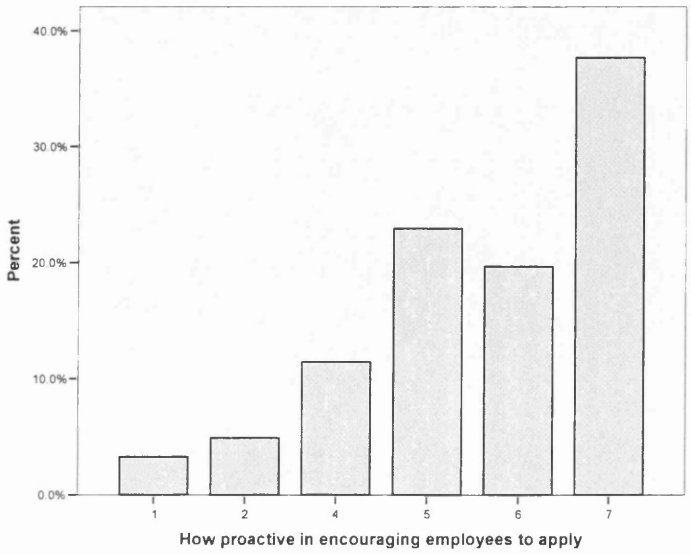

Figure 5.12 - Employers' perceptions on the extent they are proactive in encouraging their employees to apply their training

Based on the regression model that was produced in chapter 4, it was hypothesized that there would be strong relationship between employers' perceptions of the extent to which they encourage their employees, and training transfer. As we can see in Table 5.4, the correlation between the two variable was statistically significant ($p<.001$, $p'<.001$), and highly correlated. This suggests that employers who perceive that they have actively encouraged their employees to transfer the training, in general, also believe that their employees transfer that training. While it is hard to generalize to the whole population because of the small sample size, the relationship should still be noted, especially because it supports the findings from the regression model in chapter 4.

Table 5.4: Correlation analysis using how proactive employers are in encouraging transfer and training transfer

		Training Transfer	How proactive in encouraging employees to apply
Training Transfer N=90	Pearson Correlation	1	.553(**)
	Sig. (2-tailed)	.	.000
	Spearman's rho	1	.553(**)
	Sig. (2-tailed)	.	.000

Employers were also asked to what extent they offer incentives to their employees as a means of increasing transfer levels. As is depicted in Figure 5.13, very few offered any incentives at all, and 27% none whatsoever. Whilst it has been shown that incentives do lead to increased training effectiveness (see for example Facteau *et al*, 1995), it was not a surprise to find the companies in this study not to offer incentives, because the majority of them are SMEs and therefore often have limited resources.

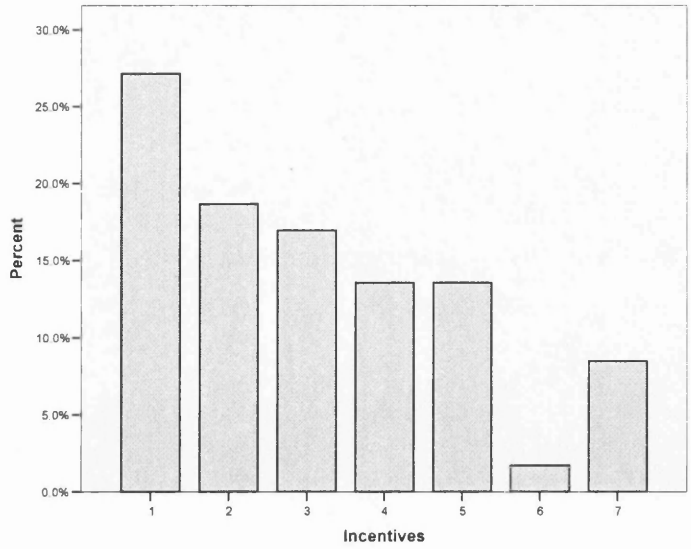

Figure 5.13 - The extent to which employers offer employees incentives as a means of increasing training transfer

It is likely that the extent to which SMEs send their employees on ICT training courses, varies considerably, from companies who offer training only when it is strictly required, such as at the time of the introduction of a new ICT system, to companies who offer regular training. The employers were asked to what extent they offer regular training for their employees, and as Figure 5.14 shows, the scores vary widely.

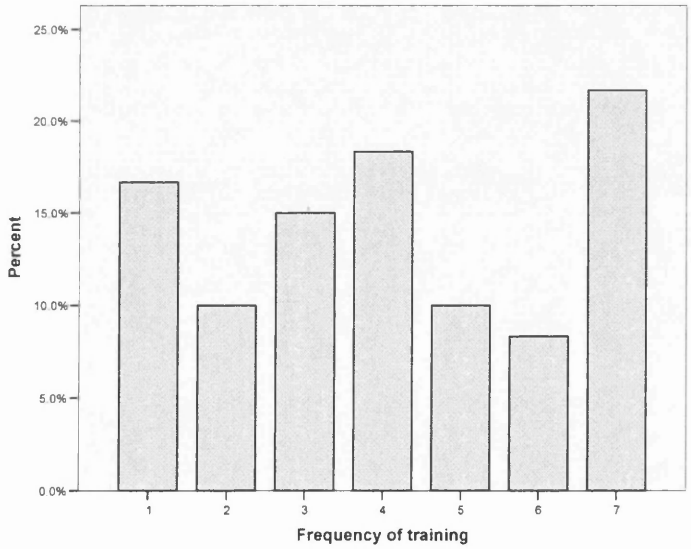

Figure 5.14 - To what extent employers provide regular training for their employees

It was hypothesised that the extent to which employers offer regular training would be correlated with perceived transfer rate. It was assumed that the more

often employees attend training, the more likely that training transfer will be maximised. However, whilst the analysis found the correlation between the two variables to be statistically significant ($p<.001$, $p'=.006$), the correlation between the two variables was only moderate – see Table 5.5. Therefore, it is difficult to conclude anything definitive about the relationship between the two variables. Nevertheless commonsense tells us that there probably is one.

Table 5.5: Correlation analysis using how proactive employers are in encouraging transfer and training transfer

		Training Transfer	Frequency of training
Training Transfer N = 90	Pearson Correlation	1	.386(**)
	Sig. (2-tailed)	.	.000
	Spearmans rho	1	.350(**)
	Sig. (2-tailed)	.	.006

5.7. Problems employers have encountered with their employees not transferring the training

The employers were asked to what extent they had experienced problems with their employees failing to transfer the training, and as is shown in Figure 5.15, the majority reported very few, although it should be noted that the number of employers who did report problems, was a not inconsequential 23% (that is those who market 5, 6 or 7). Problems included employees not having the required knowledge, resources, time or motivation to transfer the training. This is discussed in more detail in chapter 7, where employees were interviewed at the workplace, where some of these factors were discussed.

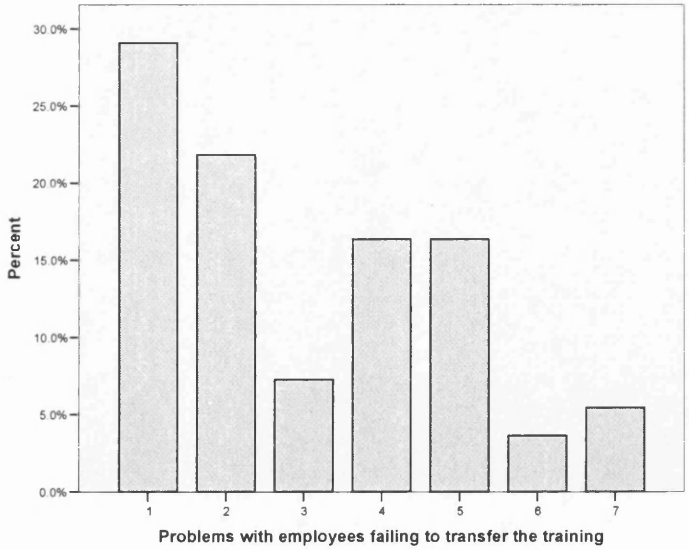

Figure 5.15 - The extent to which employers have experienced problems with employees transferring the training

As might be expect, correlation analysis found a statistically significant relationship between problems with employees transferring the training and the transfer rate ($p<.001$, $p'=.001$) - see Table 5.6, a result which points to some inherent reliability in the scales. Whilst this relationship may seem self-evident, it still needs to be noted.

Table 5.6: Correlation analysis using problems with employees failing to transfer the training and training transfer

		Training Transfer	Problems with employees failing to transfer the training
Training Transfer	Pearson Correlation	1	-.575
	Sig. (2-tailed)	.	.000
N = 90	Spearman's rho	1	-.557(**)
	Sig. (2-tailed)	.	.001

5.8. Formal and informal training

The advantages and disadvantages of both formal and informal training have been discussed in chapter 2 and will also be discussed further in chapters 6 and 7. Significant amounts of money are spent on formal workforce training every year, yet, it is often argued that informal training is more cost effective (Rouiller and Goldstein, 1993). Given this, the employers were asked to what extent they

believed formal training to be superior to that of informal training. Figure 5.16 shows some interesting results. Over 60% of employers said that they found informal training far better than formal training, with a mere 5% believing the reverse. This raises the obvious question: if employers believe informal training to be superior to informal training, why do they carry on sending their employees on courses, rather than concentrating on improving informal training? This is discussed further in chapter 6.

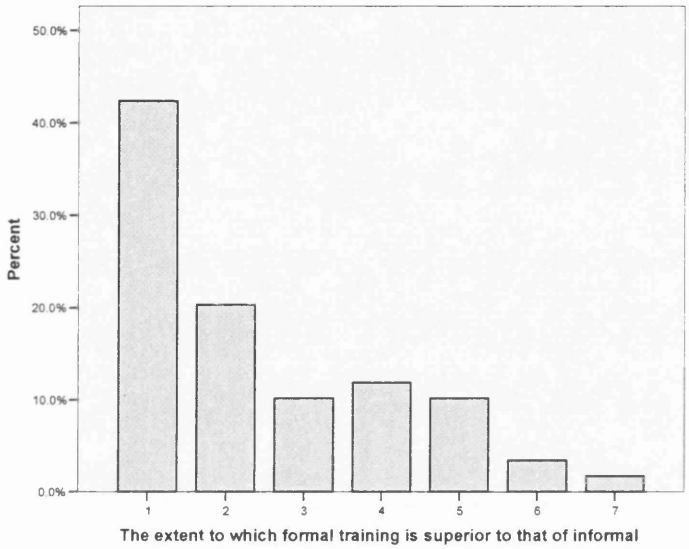

Figure 5.16 - Extent to which employers believe formal training is better that informal training

In addition, employers were asked to what extent they considered it important that their employees attended formal ICT training, and as Figure 5.17 shows, 63% considered it very important. Given it was found that employers perceive informal training to be superior to that of informal training, this result is strange. However, it may be that employers are so used to sending employees on formal training courses that they do not know any different.

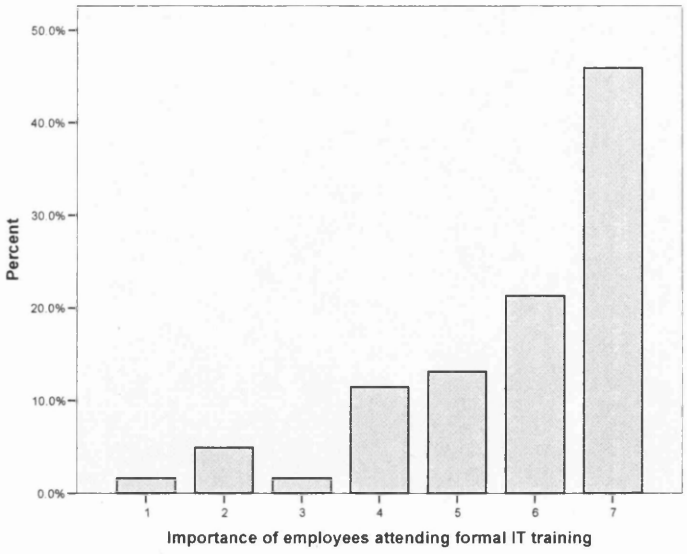

Figure 5.17 - Extent to which employers consider it important to attend formal ICT training

5.9. Employees' characteristics

5.9.1. Motivation

In chapter 4, it was found that the majority of employees are highly motivated to apply their ICT training. Figure 5.18 suggests that the perceptions of the employers, match those of their employees, with the vast majority of employers believing that their employees are highly motivated to apply their training at the workplace. Only 5% of employers reported that their employees are not at all motivated.

Figure 5.18 - Employers' perceptions of their employees' motivation to apply their ICT training

It was hypothesised that there would be a strong correlation between employers' perceptions of their employees' motivation to apply ICT training, and training transfer. Unlike the corresponding results from the employee' analysis (where motivation to apply and training transfer were found not to be significantly correlated), the correlation tests found the relationship between the two variables to be statistically significant ($p<.001$, $p'=.001$) with large correlation coefficients – see Table 5.7.

Table 5.7: Correlation analysis using employees' motivation to apply the training and training transfer

		Training Transfer	Employees motivation to apply the training
Training Transfer N = 90	Pearson Correlation	1	.567(**)
	Sig. (2-tailed)	.	.000
	Spearman's rho	1	.550
	Sig. (2-tailed)	.	.001

With a question similar to the corresponding one in the employees' questionnaire, the employers were asked to what extent they believed their employees were motivated to attend ICT training sessions. The results are shown in Figure 5.20, which suggests, unsurprisingly, that employers perceive that their employees are fairly motivated to attend training sessions. However, it must be noted that 50% of respondents recorded only a 4 or 5 on the 7-point scale. Moreover, Figure 5.19 suggests that employers perceive that their employees are more motivated to apply their training, than to attend training sessions. In other words, employees may not always be enthusiastic about attending training sessions, but when they do, they are often keen to apply at the workplace the knowledge and skills gained, or so employers believe!

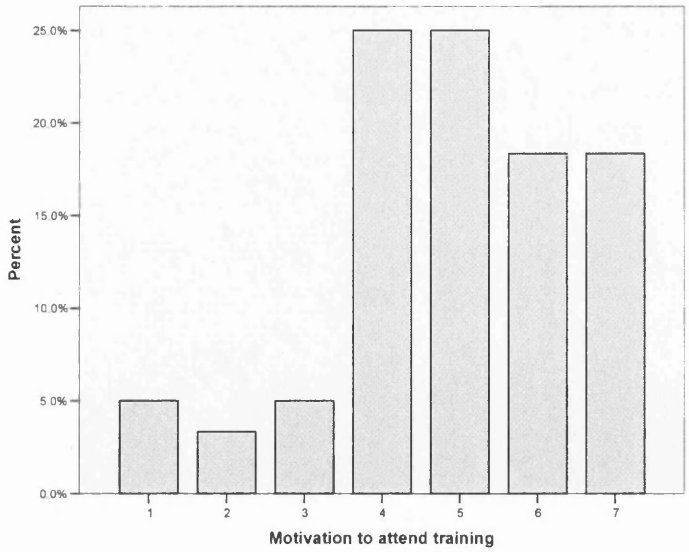

Figure 5.19 - Extent to which employers believe that their employees are motivated to attend training sessions

The relationship between, on the one hand, the employers' perceptions of their employees' motivation to attend training courses, and, on the other, their perceived increase in learning, was examined. A close relationship between the two would naturally be expected: if employees are motivated to attend training sessions, they are likely to be more receptive to the intake of information. It should be noted, however, that there are situations where this may not be the case, such as where the training is not closely related to the job, or if the level of difficulty is too low or too high. Nevertheless, a statistically significant relationship was found between the two variables ($p<.001$, $p'<.001$), and the correlation coefficients were also large – see Table 5.8.

Table 5.8: Correlation analysis using increase in ICT knowledge and motivation to attend training

		Increase in ICT knowledge	Motivation to attend training
Increase in ICT knowledge	Pearson Correlation	1	.648(**)
	Sig. (2-tailed)	.	.000
	Spearman's rho	1	.609(**)
N = 90	Sig. (2-tailed)	.	.000

It was also hypothesised that there would be strong correlation between motivation to attend training and training transfer. Again, the test proved to be statistically significant (p=.001, p'= .009) and moderately correlated – see Table 5.9.

Table 5.9: Correlation analysis using training transfer and motivation to attend training

		Motivation to attend training	Training Transfer
Motivation to attend training	Pearson Correlation	1	.365(**)
	Sig. (2-tailed)	.	.001
N = 90	Spearman's rho	1	.334(**)
	Sig. (2-tailed)	.	.009

5.9.2 Amount learnt during training

Employers were asked to what extent the ICT training their employees had received, had increased their ICT knowledge. The results are displayed in Figure 5.20, where a spike can again be observed in the bar chart. Over 40% of respondents recorded a 5 on the 7-point scale, suggesting that employers do believe that their employees have increased their knowledge, but perhaps not to the extent they had anticipated.

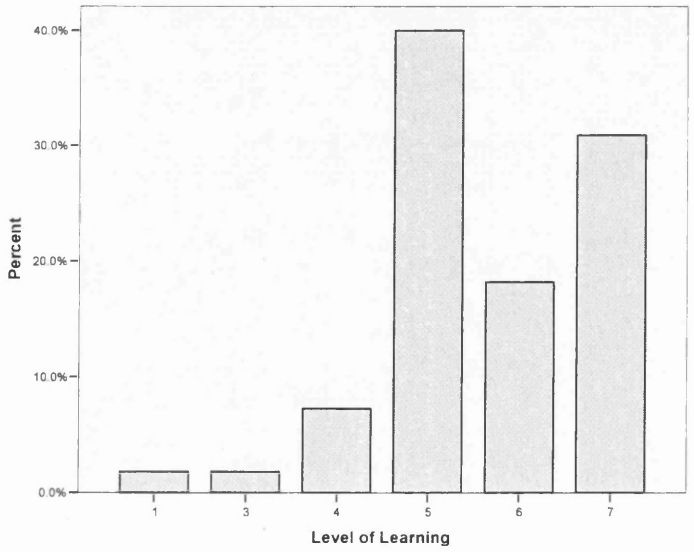

Figure 5.20 - Employers' perceptions of the extent to which their employees increased their ICT knowledge as a result of the training

It was also hypothesised that there would be a strong relationship between the increase in ICT knowledge and training transfer. Many researchers have previously found a relationship between the two (see for example, Kirkpatrick, 1967 and Tan *et al*, 2004), and there is no reason to suggest that this study would conclude anything different. The results from the correlation analysis did indeed find a statistically significant correlation between the two variables ($p<.001$, $p'<.001$), and the correlation coefficients were large – see Table 5.10.

Table 5.10: Correlation analysis using training transfer and increase in ICT knowledge

		Training Transfer	Increase in ICT knowledge
Training Transfer N = 90	Pearson Correlation	1	.665(**)
	Sig. (2-tailed)	.	.000
	Spearman's rho	1	.565(**)
	Sig. (2-tailed)	.	.000

5.10. E-learning

E-learning is currently a buzz word in the training industry, and although the practice is not directly relevant to this present study, in that all the training under consideration was given face-to-face, it is an important aspect of future workforce training. The employers were therefore asked the extent to which e-learning was used as a method of training at their workplace. It was thought that the majority of respondents would report having used e-learning very little for two main reasons: 1. e-learning is still in its infancy; and 2. companies who offer e-learning to their employees are likely to be the larger ones, whereas the majority of companies in this study were SMEs. Figure 5.21 shows the results obtained from the e-learning question. As predicted, it can be seen that the vast majority of employers offer no or very few e-learning opportunities for their staff.

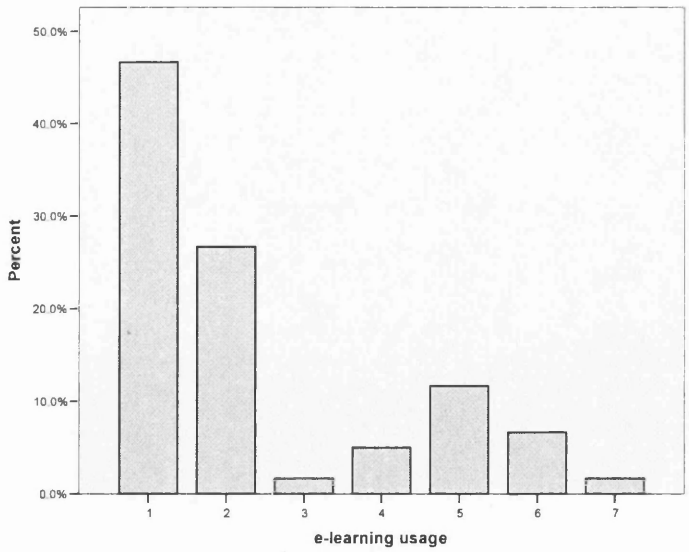

Figure 5.21 - Extent to which the companies offer e-learning

ANOVA and Kruskal-Wallis tests were used to investigate whether the extent to which e-learning is used in companies in South Wales differs according to company size. It has already been mentioned in chapter 1 that past studies have found a positive relationship between the two (Sadler-Smith *et al*, 2000) that is to say, the larger the company, the more likely it is to offer e-learning to employees. The null hypothesis when conducting ANOVA and Kruskal-Wallis tests, is that all sub-groups are equal (see section 3.9.4). Based on the p-values generate from the tests, the null hypothesis can be rejected ($p<.001$, $p'=.001$) – see Table 5.11, although, as can be seen in Figure 5.22, the medium sized companies had the highest mean usage of e-learning (3.46), followed by the large firms (2.25), and the small firms (1.85). Whilst this is somewhat surprising, it may just be due to be the small sample size.

Table 5.11: ANOVA and Kruskal-Wallis using e-learning usage in company size groups

ANOVA

	df	F	Sig.
Between Groups	2	5.417	.000
Within Groups	82		
Total	84		

Kruskal-Wallis

Chi-Square	8.403
Df	2
Asymp. Sig	0.001

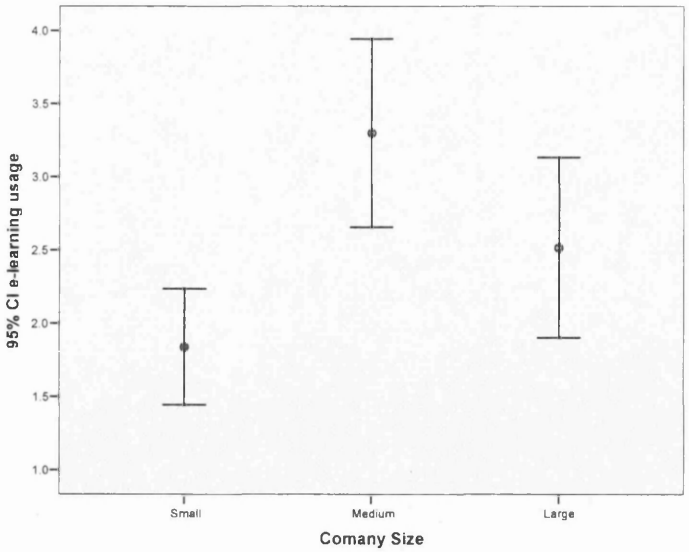

Figure 5.22 - Extent to which e-learning is used by company size

E-learning is a relatively new training aid, and despite its promotion by official sources, there appears to be limited knowledge about its use and usefulness as a training tool. Most employers had fairly strong views on the subject. They were asked whether they considered e-learning to be superior to that of traditional forms of training. Figure 5.23 shows that they generally believe traditional methods of teaching to be superior to that of e-learning methods, although around 20% of respondents did not agree.

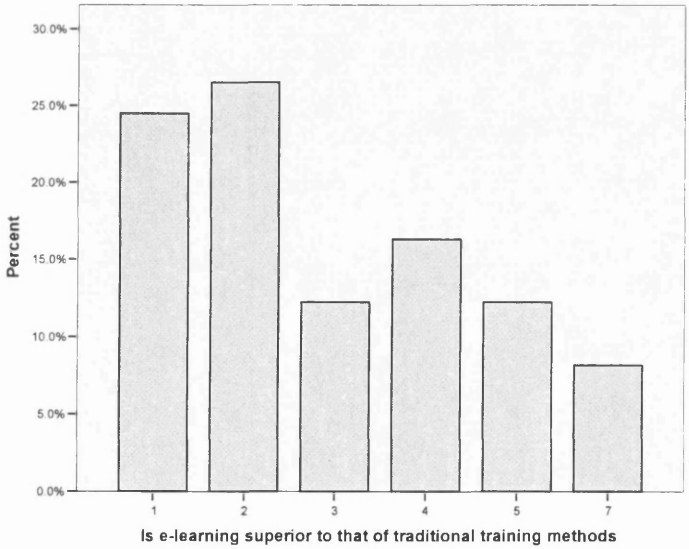

Figure 5.23 - Is e-learning a better method than traditional methods for workforce ICT training?

5.11. Specific difficulties regarding employees failing to use their ICT training at work

The employers were asked to comment on any difficulties they had come across with respect to employees failing to apply their ICT training at work. The most common problem noted was the time-lag between learning the material and actually applying it: according to the employers, much of what is learnt by employees is forgotten by then. Comments included: "*If not applied soon after the training, what was learnt is often forgotten*", "*If the training is not put to use immediately, it can often be forgotten*", "*time gap between training and opportunity to apply*", "*forget what they have been shown*", "*primarily the regularity of the application of the learned skills. Staff take a course to learn a method for meeting a goal but related tasks do not turn up enough for them to retain and practise the skills*" , "*not enough need to use all aspects so that when it is required the material has been forgotten*"

It has not been possible, however, to determine with the available data whether this problem occurs because, for example, the training providers are teaching material that is not directly relevant to the employees' jobs, or because ICT is not the main part of the employees' roles, or for some other reason.

A further interesting comment made by an employer with reference to difficulties faced with employees not transferring the training was "*a lack of transfer of ideas on where and how to use it [the training]*". Another employer said that "*my employees do not need ICT training to look after animals, but the training opportunity was available, so they attended courses!*" It is likely that these two employers were offered government subsidised training, and took advantage even though it was not strictly needed (this turned out to be the case).

A further difficulty cited was the link between theory and practice. If the course syllabus is set by the training provider, it is likely that the same material will be used for employees from different companies, with the likely consequence that it will not directly relate to the employees' jobs. One employer said that his employees have had trouble with "*making the connection between training and*

its practical use", while another said that "*they spend a day on a course, but they ideally need more time put aside to go over their learning and apply it.*" This last statement covers two problems: 1. the theory-practice link, and 2. employees not given enough resources to transfer the training, in this case, time. A further comment made by an employer relating to the theory-practice link was that "*it would be useful if trainees could take samples of their work so what is taught is specific to their personal requirement.*" This would indeed help in linking theory to practice, but if more than one companies' employees are being trained at the same time, or if only one trainer is present in the class, making time to do this would prove difficult.

Comments concerning employees not having the available resources to transfer the training included one telling remark: "*Some supported housing staff have limited access to a computer.*" Another talked of "*not being able to help them with converting their newly acquired ICT skills to the job they have been trained for*", a further example of a resource constraint.

As was discussed in chapter 2, a possible transfer barrier may be employees not having the mental ability to take in and apply the ICT skills and knowledge learned, and certain comments were made by employers that supported this point. One said, directly, that "*some employees do not have the ability to learn new things*", while another said that "*a number of our employees have struggled with the ICT training because they have never used, or even seen, a computer before.*"

Only one respondent reported having had no problems with employees not using their ICT training at work. This employer said, "*we have had none – we all share our ICT skills*" suggesting the effectiveness of informal training as an additional mode. A discussion of this last comment and its relationship to informal training can be found in chapter 6.

A further point discussed in chapter 6 is the problem of employees returning from training sessions without the required knowledge (for whatever reason) and needing extra support back at the workplace to assist them in reaching the required standard. One employer made the comment, "*If employees fail to use*

their ICT training at work, ICT support-staff time is not best utilised i.e. they are held back in performing development and maintenance."

5.12. What qualities employers look for in a training provider

The factor cited most often by employers was related to cost. Over 70% of the comments recorded touched on value for money. The second most cited factor was that of location, with employers saying that they want training that is close to their workplace so that as little time as possible is taken up with travelling to and from the training centre. Interestingly, quality was only mentioned three times as a factor employers look for (out of 70 comments), and training content only five times, a surprising result given that these two factors arguably contribute most to transfer.

The theory-practice link was also mentioned. One employer said that "*familiarity with the actual workplace*" is important, that is to say, training providers should know what it is like to work within a company, taking into account time pressures, and the practical needs of ICT. Similar comments included the phrases "*knowledge of real-world pressures*" and "*experience in industry*".

5.13 How employers locate ICT training providers

The employers were asked how they located the ICT training provider. Figure 5.24 shows that a significant number located the provider via a mail-shot (42%), with only around 17% via the internet. Given the current ubiquity of the internet, this result was unexpected. Whether it is due to the fact that companies are not using online resources or if the training companies do not have a sufficiently strong web presence is unknown, and would be subject to further research.

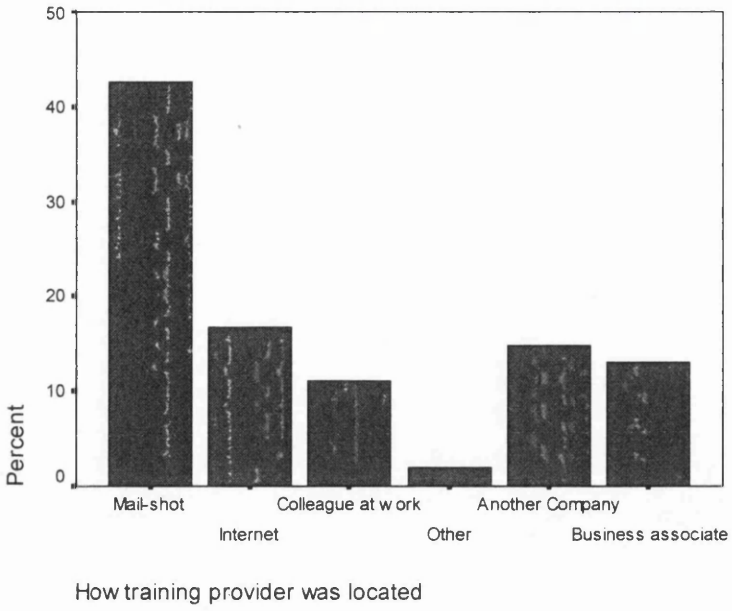

Figure 5.24 - How employers located the training provider

5.14. Provision of ICT training in the future

Employers were asked if they would consider arranging further ICT training for their employees. Almost all (97%) said they would. The figure is perhaps higher than would have been expected given that a number of employers reported having found the training of little use. One of the few who said they would not, gave the explanation, '*Our work is too specialised, so it is very difficult to find appropriate training.*'

5.15. Summary

The following are the main findings from the analysis of the employers' questionnaires:

- in general, employers believe their employees transfer the training to a fair degree, although a spike in the data is observable at point 5;
- in general, employers believe that the training results in considerable benefits for the company, but again a spike in the data is observable at point 5;

- employers are undecided whether it is the actual training of the employees, or the installation of new software/hardware, that is generating the benefits;
- overall, employers believe that expectations have been met with regard to the impact the training has had on company and employee performance;
- in over half of cases, training providers dictated the content of the training, although employers appear to be happy with the content provided by training providers;
- virtually all small businesses conduct training at the training providers' premises, but
- transfer rate is highest when training is conducted at the workplace;
- in general employers do not offer incentives as a way of increasing transfer;
- transfer is greatly improved if employers provide regular training;
- employers believe that informal training is superior to that of informal learning;
- there is a significant relationship between the extent to which the employer believes the training is related to the employees' job and training transfer;
- e-learning is still very little used.
- the most common problem faced with transfer is the length of time between training and application;
- there are positive relationships between motivation to apply, motivation to attend the training sessions, learning, and training transfer.

The following chapter will discuss the results obtained from chapters 4 and 5.

Chapter 6. Discussion

This thesis has drawn on literature from three strands of research, namely the transfer of training, training effectiveness and technology acceptance. Often discussed in isolation, in this thesis they have been taken together. Further, while the results from the investigation described in this thesis are comparable with that of previous research in the area, attention must be drawn to the fact that perceived training transfer has been measured differently from the way in which it has been measured in some other studies. While some studies have used employees increase in knowledge (using pre-training and post-training scores) and post-training usage, as measures of training effectiveness and training transfer, this study has measured transfer by using employees *increase* in ICT usage, which is believed here to give a true measure of training transfer.

The definition of the transfer of training most often found in the literature is:

"The extent to which skills acquired in a training program are applied, generalised, and maintained over some time in the job environment" (Baldwin and Ford, 1988)

However, attention has been drawn in this thesis to the fact that post-training usage and transfer are not always the same thing. That is, high levels of transfer do not necessarily mean high post-training usage, and low transfer does not mean necessarily low post-training usage. As a result, it has been considered necessary to make an apparently minor but in fact important amendment to the usual definition so as to take account of the difference, to wit:

> *"the extent to which the use of skills acquired in a training programme are applied and increased over time in the job environment"*

It is likely that in a significant number of ICT training situations, employees will have had some previous experience of the software in question. Thus, when respondents are merely asked to report the extent to which they have used a given

piece of software since attending training, and if respondents have had previous experience with the software prior to the training, reported usage may be not be as a direct result of the training. The amended definition of training transfer above attempts to take this difference on board.

This is an important factor that needs to be taken into consideration because companies who only use transfer as the measure of training success may not generate reliable findings. They may incorrectly conclude that a particular training is inefficient when it actually is, and vice versa.

6.1. Employees

The main purpose of this thesis has been to determine the extent to which employees transfer their training back to the workplace. From the results in chapters 4 and 5, one may justifiably conclude that training does indeed result in a degree of employee behavioural change (training transfer), and also benefits the company in question, thus suggesting that both employers and the Government's money is being well spent (see sections 4.2 and 5.1). Although, as we have seen, high transfer does not necessarily mean that ICT will be used significantly at the workplace.

The findings also show that the extent to which individuals transfer the training is heavily dependent on employees' ICT usage before attending the training (see section 4.2). Employees who have had little experience with the software, in general, transfer the training to a greater extent than that of more experienced users. This finding is not unexpected, but does raise the issue of how beneficial it is to offer ICT training to employees who already have experience with particular pieces of software, even if, for practical purposes, it would be difficult to determine potential value for any given employee. However, it should be noted that in this study, as in many others, training transfer has been measured using a self-reported scale, so that perceptions of usage may differ with employees' previous experiences. Individuals with little, or no, experience may well perceive any increase in usage as more significant than more experienced users, although this is difficult to determine. Moreover, equally difficult to determine would be

the extent to which it is feasible to only offer training to employees with limited ICT experience. More research needs to be conducted into why the more experienced trainees are failing to transfer the training. Is it due to the quality of the training provided? Is it because they already know what is being taught? Or is it because of a workplace factor? It may be that training needs to be tailored further to the ability of the trainee. However, the practicality of providing different training sessions needs to be addressed; no doubt it would be more difficult for SMEs who may only have a few employees requiring training, to offer multiple training sessions – even if it proves to be more effective.

6.2. Model of training transfer

As was discussed in chapter 4, it was hoped that a model could be developed that would help predict training transfer. Based on their proposed impact on training transfer, four variables were included, namely – how easy the training was to understand, usefulness of the training at work, how closely the training was related to the job, and encouragement from the company. The results were not as good as was expected; only one of the four independent variables in the model was statistically significant, moreover, the constant in the model was also significant. As a result, a reduced regression model was used – see Table 4.42.

Finding a regression model containing only one independent variable is disappointing. It was also disappointing to find that none of the other three independent variables included in the initial regression model, were statistically significant. It is believed here, that in the future, further research should be conducted into the predictors of training transfer, as it is likely there are other independent variables, not included in the model that may explain some of the variation in training transfer. However, the final model of training transfer should not be overlooked. It draws attention to the importance of company support in the extent to which employees transfer the training to the workplace. This variable has been found to be a predictor of training transfer in the past (Cohen, 1990; Tracey *et al*, 1995; Thayer and Teachout, 1995). Lim and Johnson (2002) go as far to say that "*ensuring a supportive work climate may be the single most important requirement for the successful transfer of learning.*" However, whilst

the relationship between employee encouragement and transfer may seem self-evident, some employers may be unaware of this fact. That is to say, they may not realise the importance their actions have on how successful training is. Some companies may not allow employees time to adapt to using their new ICT skills at work, instead insisting that they continue using their old work methods until they are able to use their new ICT skills more efficiently. This was found to be the case during the case studies (see Chapter 7) which leads to skill decay - that is, employees forget what they were taught because they do not practice their new skills soon enough.

Why the three variables that were included in the initial regression model (how easy the training was to understand, perceived usefulness and the extent to which the training is related to the job) were not found to be statistically significant predictors of training transfer is difficult to explain. Perhaps if a larger sample size had have been used, the conclusions drawn from the regression analysis may have been different. A discussion of these variables can be found below.

6.2.1. How easy the training was to understand

Employees who only have limited experience with using computers, will only have a small knowledge base on which to draw on, and so are likely to find the ICT training more difficult than more experienced employees. It was thought that these employees would need training procedures that are not too difficult to understand. Employees with more advanced knowledge and who have experience with applications other than the ones on which they are being trained, will be able to call upon their past knowledge, and as a result, are likely to find the training procedures easier to understand. It would perhaps be advantageous for employees to be separated into different training classes as opposed to joining mixed-ability groups, however, smaller companies may be unable finance such training. There is also a related argument here for e-learning within ICT training, as with all e-learning, since trainees are able to learn at their own pace. E-learning has not been examined extensively in this study but further research is needed to investigate how transfer rates differ between e-learning and traditional ICT

training. Whilst there are many advantages and disadvantages of e-learning, it goes beyond the confines of this study.

6.2.2. Perceived usefulness of the training

Along with perceived ease of use, perceived usefulness has consistently been found to be a significant predictor of training transfer and technology acceptance (Davis, 1989; Taylor and Todd, 1995a; Venkatesh and Morris, 2000; Venkatesh and Davis, 2000). Common sense tells us that if employees consider that the training they have received is useful for their job, they are likely to transfer it to the workplace. Moreover, during the training, trainees are more likely to pay attention during the training if they believe it will help them perform their job. However, this proved not to be the case, as was mentioned above, further research should be conducted on this, to investigate the reasons why this variable was found not to be statistically significant predictor of training transfer. It may be that there were constraints in the workplace that has inhibited transfer, but without further research, this cannot be known for sure

6.2.3. The extent to which the training is related to the job

> "*Irrespective of the actual quality of the training, employees may not be motivated if they perceive training programs as ineffective and irrelevant to their jobs*" (Facteau *et al*, 1995)

It was assumed that employees would be more likely to transfer the training if the training content and the tasks required in the job environment are similar. This is because employees who have less experience with ICT will not be use to the systems and therefore do not want to be worried about the training content at the same time. However, arranging training such that it meshes perfectly with an employee's job can be very difficult and can normally be achieved only on a one-to-one basis, something which is often likely to be infeasible for an SME with limited resources and with employees who may perform a wide range of tasks.

6.3. General discussion

6.3.1. Motivation

One would naturally assume that if employees were motivated to apply the training received, they would apply it, yet this does not seem to be the case. Many researchers have investigated this variable and have found it to be important in the transfer process (Martocchio and Webster, 1992; Mathieu *et al*, 1992; Tannenbaum and Yukl, 1992; Quinones, 1995). There are a number of possible explanations for this result also. For example, trainees may want to transfer the training, but if they are not given the opportunity to apply it, either because the training was not closely related to the job, or they are not given the time to integrate it into their work practices naturally, transfer will be limited. However, it should be noted that motivation to apply the training and training transfer were correlated for the low pre-training users (see section 4.8.2). Why employees with low pre-training ICT usage who are motivated to transfer the training apparently do so, while those who are medium to high-users, do not, is certainly not easy to explain; indeed, the only feasible explanation seems to be related to novelty and enthusiasm at having learned a totally new skill.

The results from this present study also showed a moderately strong negative relationship between employees' age and their motivation to attend ICT training, with the reported motivation of the over sixties category being significantly less than that of the younger employees (see section 4.8.2). There are a number of possible explanations for this relationship. Firstly, employees often associate training with career enhancement; that is, they believe that by attending training courses they will gain extra knowledge and skills, and as a result increase their chances of promotion. It is assumed here (since common experience tells us so, although such an assumption could be challenged) that younger employees place more importance on career enhancement than older employees (over sixties). Further, older workers may see themselves as unsuited to new learning and lack confidence in training situations. Morris and Venkatesh (2000) found that productivity-oriented factors, that is, the degree to which the technology helps them perform the job better is greater for younger workers. In other words, older

employees believe that the work practices they have used previous to the new computing practices are just as efficient, and consequently prefer to use them.

The results from the present study also suggest that the over sixties group are not highly motivated to apply to the job what they have learnt in the training session, possibly for the same reasons as with motivation to attend training (see section 4.8.2).

6.3.2. Learning

The extent to which learning impacts on transfer has received considerable attention in the training literature. Baldwin and Ford (1988) were among the first to propose that learning and retention have a direct impact on transfer, with Tannenbaum *et al* (1991), Holton (1996), and Lim and Johnson (2001) all supporting this finding. Lim and Johnson found, as one would expect, that a high perceived degree of learning was typically associated with a high perceived degree of transfer, and low perceived learning with low perceived transfer. The relationship between learning and transfer seems self-evident: if employees perceive that they have increased their knowledge as a result of attending the training, it is probable that they will transfer it. It is therefore difficult to explain why no such relationship was found in this present study, but there are a few possible explanations. It may be that employees have learnt a great deal about material which was not directly relevant to their jobs. It is also possible that these employees had simply not been given an opportunity to transfer the training. Either way, it proves a blatant waste of resources. It was also interesting to discover that women believe they learn significantly more than men at ICT training sessions. Once again, this is not easy to account for, but could possibly be due to differences in perceptions of what men and women believe to be significant. This could be researched further with an objective measure of learning.

6.3.3. Perceived usefulness

Whilst the relationship between perceived usefulness and training transfer was discussed in reference to the training transfer model for low pre-training training, it is now discussed in relation to the whole sample i.e. including med and high pre-training ICT users. The relationship seems obvious: if employees perceive the ICT training to be useful in their jobs, they are more likely to transfer it back to the workplace, and vice versa. The perceived usefulness of the training did not differ between the 21-60 age groups, yet the over sixties reported having found the training considerably less useful (see section 4.8.4). As mentioned above, Morris and Venkatesh (2000) suggest that older workers may be more accustomed to seeking and applying traditional solutions to job-related tasks, whereas younger workers are more reliant on the use of technology for job accomplishment. Moreover, Posner (1996) suggested that as cognitive abilities decline with age, older individuals may believe that the relative benefits that accrue from learning something new, for example, using a new computer program, may not be worth the incremental effort required. Older workers, in this case the over sixties, may have done the same job, using the same methods, for over forty years. As we have seen, this group were less motivated to attend and to apply it, and found it less useful, so it is hardly surprising that they also reported having found it less useful.

6.3.4. The extent to which the training is related to the job

Training that is strongly related to the employee's job can be called *direct performance training*, and is more appropriate for employees with little experience with the given application, because it teaches them only the directly relevant skills. Employees who are taught only specific tasks will naturally be able quickly to transfer the skills to the workplace. However, the extent to which they will be able to generalise the skills learned (in the literature, this is often referred to as horizontal transfer) at a later point is contentious. Training that is more theoretical in nature and aims to teach employees the general principles of a software package as opposed to individual job tasks can be called *indirect performance training*, and is more suited to employees with some experience

with the software in question. With indirect performance training, employees will have the background knowledge of the software, which as a result will help them transfer their skills horizontally to future tasks, even if more time will be required to transfer such skills.

Providing training that is suited to the employee has been cited as an important antecedent of training transfer (Campbell, 1988; Williams *et al*, 1991). When the diagnosis of employees' strengths and weaknesses is inadequate, many organisations will provide training at the lowest common denominator, resulting in sub-optimisation of training effectiveness (Tannenbaum and Yukl, 1992). This certainly could explain why employees with experience were found not to transfer the training to the extent of those employees with no experience.

However, as already been mentioned providing such training can be very costly and is not always practical for SMEs. What tends to happen is that SMEs buy so called 'off-the-shelf' ICT training courses, that is, courses that have been developed by training providers and taught to all companies, with little or no modification.

6.3.5. Transfer of individual software applications

The results from the present study show that a significant amount of the training offered by ICT companies is on the various applications in the Microsoft suite (Word, Excel, PowerPoint, and Access). The respective transfer rates of the different applications were very interesting, with a fair percentage of employees reporting either a negative or zero transfer rate, a negative difference obviously indicating that respondents actually used the application less after the training than before! While the resulting zero training transfer for 32% of respondents is in itself somewhat surprising, suggesting the comparative failure of the training from the employers' viewpoint, it is nevertheless explicable, something which can hardly be said for the negative difference with respect to almost 9% of the respondents. One possible explanation is that at the training session trainees were introduced to a new application which they found more useful than the one they were already using.

Nevertheless, it was surprising to find that PowerPoint had the highest mean transfer rate, while Word had the lowest. Of the four main Microsoft applications the second largest transfer rate was Access, and the third Excel (although the difference in transfer rate between these two were negligible). From these results, one might at first be tempted to conclude that the most beneficial ICT training for the job environment is training in PowerPoint, while being trained to use Word is the least beneficial. And such a conclusion would appear all the more unanticipated in view of Word's undoubted general popularity in modern workplaces compared with PowerPoint's more specialist nature. However, when the training transfers of Word and PowerPoint were separated into two – usage before, and usage after, training, quite different results were generated. The reported post-training usage was not significantly related to training transfer; that is to say, a high training transfer did not necessarily translate into a high post-training usage. Indeed, whereas PowerPoint had the highest transfer rate, it had by far the lowest post-training usage, while Word, which had the lowest transfer rate, had the highest post-training usage. The most obvious reason for this is that Word is already used by many trainees before attending a training course, and thus the typical trainee starts from a higher baseline than that of PowerPoint, a program which many employees rarely or never use because their job rarely or never calls for it. Although there may be many effects difficult to quantify and not taken into account here (such as increased employee confidence, or increased suitability for moving to new jobs), there must be a question mark over the cost-effective value of formal training in the use of Powerpoint and Word from the standpoint of the actual use of these products once training has been completed. This state of affairs is particularly noteworthy in the case of PowerPoint, since the vast majority of ICT trainees learning to use Microsoft Office products will at some time in their careers use Word, fewer in comparison will use PowerPoint, or at least not extensively, as proven by their post-training usage.

From informal conversations conducted with training agencies in Wales, it is clear that PowerPoint is often included on the training menu for two principal reasons. The first is that it is a highly visible component of the Microsoft Office suite. The second is that employers, unless they have very carefully considered the options – which, it is said almost under the breath, they appear not always

completely to have understood – tend to choose the standard four-application Office training package (i.e. Word, Excel, Access and PowerPoint). Further, if a selection is made, in many cases this is for Word and PowerPoint alone, as the two best known Office programs. This situation is bad enough, but it can be contended that it is made worse by the fact of national Governments pouring money into training subsidies with the aim of creating a more ICT-literate workforce. So for companies to have their workforce trained in the use of PowerPoint when it will likely be comparatively little used, if at all, by many of them. And that is not to mention the indisputable fact that PowerPoint is so easy to learn and use, so self-explanatory, that almost anyone, especially if already acquainted with Word, is able rapidly to create professional-looking presentations. One is therefore led to question whether the number of training hours sometimes devoted to it is generally too high. The results for Microsoft Access are similar to those for PowerPoint: a relatively high transfer rate, yet a low post-training usage. Whereas on the one hand the training has led to increased usage, this ha not been translated into high usage in the workplace.

6.3.6. Age and training transfer

The results have highlighted a number of significant findings, none more so than the impact of employees' age on usage and training transfer. While there has been relatively little research on the influence of age on decisions affecting technology adoption in an organisational context (although, see Morris and Venkatesh, 2000), there is evidence to suggest that age differences in information processing impact on older workers' performance of computer-based tasks (Czaja and Sharit, 1993; Sharit and Czaja, 1994). Yet, from the results seen in section 4.4, it seems that the mean transfer rate does not vary significantly with age. With this result alone, one might conclude that age and the extent to which ICT training is transferred to the workplace are not related. To some extent, this is true, that is, the perceived increase in usage is similar between age groups, but there is further evidence to suggest that the result is not as conclusive as at first it may appear. Given that the transfer measurement item in fact consisted of two items – perceived use before, and perceived use after training, it allowed for further investigation. The employees' reported use before and use after were

similar for all the age categories, except for the over sixties group. Both the reported use before, and use after, of the over sixties were dramatically lower than that of the other age groups. As was concluded in chapter 4, this suggests that although the increase in usage is the same across all age groups, the actual reported post-training usage is dramatically lower for the over sixties category. Whereas this thesis is predominately interested in the rate of transfer of training to the workplace, finding such a variation in post-training usage should not be ignored.

Given previous research, it was unforeseen that perceived increase in learning did not vary with age (see section 4.8.3). Amongst others, Myers and Conner (1992), and Sharit and Czaja (1994) have found that age differences in information processing have an impact on older workers' performance of computer-based tasks. Warr (1990) made the point that older workers are often "out of practice" in understanding how to learn. Although perhaps pushing on an open door, Morris and Venkatesh (2000) found that older workers tend to learn at a slower pace than their younger colleagues. There is a possible explanation for why, in the present study, this was not reflected in the relationship between age and level of learning. It may be that what older employees perceive as a given level of increased learning may not be the same as that perceived by younger employees, but without further investigation this can not be known for sure.

It may well be, in an ICT context, as the first of the 'ICT generation' reach the over sixties group, that such findings may no longer be there in the future. Currently, the older employees do not seem to want to attend training, do not find it useful, and do not believe that it affects their performance at work. This raises the question as to whether it is beneficial to a company to send older employers away on ICT training sessions. Indeed, Maurer and Rause (2001) found evidence to suggest that older employees who are otherwise similar to younger workers are sometimes treated less favourably when it comes to access to training: "*Older workers may not be included in training, perhaps because it is believed that they cannot learn, or do not want to learn, thus reducing returns on investments.*" However, it should be mentioned that recent age discrimination legislation states that it is illegal for employers to discriminate against employees, trainees or job

seekers because of their age and ensure that all workers, regardless of age, have the same rights in terms of training and promotion.

6.3.7. Gender and training transfer

Only a restricted amount of research has been conducted on gender differences in technology acceptance and training transfer, with limited findings (Venkatesh *et al*, 2000; Venkatesh and Morris, 2000; Morris *et al*, 2005). As was seen in section 4.3, when taking the sample as a whole, no significant difference was found in the degree to which males and females transferred the training. However, what was unexpected was that when the sample was split into two sub-samples – low ICT-users, and medium to high ICT-users (pre-training), the difference in transfer rate between males and females was more pronounced. It was found that women perceive that they transfer the training more than men. If a difference had existed between males and females in the whole sample, it could have perhaps been explained, but it is difficult to account for why only a difference exists in the low ICT users' sub-sample. A tentative explanation could be that the perceptions of what constitutes an increase in usage may differ between males and females in this sample.

The results also indicated that women were both more motivated to attend, and to apply their ICT training to men (see section 4.8.2.). This result was not unexpected given that women reported having found the training more closely related to their job than men. This could also explain why women found that they had learned significantly more during training than men, found the training more useful, easier to understand, and easier to apply. Further research would be required to determine why women appear to find ICT training more useful, easier to understand and apply, with differences in job profile being the obvious candidate for an explanation.

6.4. Employers

The perceptions, attitudes and managerial styles of employers not only impact on the extent to which ICT training is provided for employees, but also on the extent to which the ICT training is transferred to the workplace. Employers have control over many factors that have been proposed to impact in training transfer, for example, the time given to them to adapt to what they have learnt and how they encourage and support their employees to transfer the training. As a result, the data gathered from the employers has allowed further insight into the transfer process.

6.4.1. The transfer of training

The main aim of this thesis has been to determine how much formal ICT training is transferred back to the workplace. The conclusions drawn from the employees' responses (see Section 6.2) were that, in general, employees perceive that they transfer the training to a reasonable degree, although different employee groups were found to transfer the training to different extents. The employers were asked how much they believed their employees transferred the training, the results of which were remarkably similar to that of the employees' responses on that score. Indeed, there were few differences throughout the survey between the responses of the employees and those of the employers. Whilst it was not surprising to find that the transfer rates gave similar results, it was thought that differences might well exist between some of the other items in the survey, for example training motivation and employer support, but this did not turn out to be the case.

6.4.2. Training course content

One of the most interesting findings from the employers' questionnaire was that over 50% stated that the training provider decided on the course content. As noted in Section 6.4.4, this tends to lead to more generalised training because the training is not always tailored to individual company needs, which some employees may find difficult to transfer to the workplace, especially the employees with limited ICT experience. Why, in many cases, employers allow

training providers to dictate the content of a course is a question worth asking, and one not easy to answer. One possible answer could of course be that employers are not aware of exactly what training is required and place too much trust in the training provider. If this is the case, the training would be presumably be less effective and a consequent waste of resources, and perhaps lead to a negative perception of the effectiveness of ICT training within a company. However, the results which have been presented here suggest that this is not the case: training transfer appears not to vary significantly depending on who decides on the training content, which was surprising. It was thought that training transfer would be higher for when the employers decided the course content. Perhaps the most obvious reason for this is that employers may not be experienced with deciding on course content, whereas you would assume training providers have. Nevertheless, since it was found that the majority of the small companies (70%) rely on training providers for designing course content, it is perhaps important for the Government to not only provide financial support to small companies for ICT training, but to also provide advice and support to small companies so as to help them design their own training, and better communicate their needs to training providers. However, it is worthy noting that 43% of employers did say that they would not have designed the course differently if they had been given the chance.

6.4.3. Location of training

The employers' perceived transfer rate was significantly higher when the training was conducted on the companies' premises. This might be explained by the fact that the training may have been more closely related to the work environment since it actually took place in that environment. Again, the majority of small companies were found not to conduct training at their own premises which once more puts them at a disadvantage in terms of the resulting transfer rate.

6.4.4. Informal training

Within many organisations there is a notion that formal training is a necessity. However, some question the value of such formal training as compared to informal training (Enos *et al*, 2003). It was interesting to find that the employers

in the study presented here believed that informal training was superior to formal training, yet continued to provide formal training for their employees. Could it be that many employers are so fixed in a mindset, which is to send their employees on courses no matter what the costs or benefits, that they do so without thinking? Formal training is expensive, and if informal training is found to be as effective, if not more so, then the value of such formal training is called into question. Indeed, formal training has had its critics. It has been reported that it does not prepare employees for the constant change that occurs in a workplace, and does not provide employees with sufficient real-world experience to develop workplace proficiency (Hartley, 2000). Equally, informal training has had its strong supporters. Enos *et al* (2003) have stated that skills learned informally are more likely to be related to skills required for specific jobs. However, providing formal training can motivate employees of a company because they feel valued because they are being invested in. It is likely that some companies are aware of this and may provide training even if it does not result in significant direct financial gains.

6.4.5. Opportunity to transfer the training

If employees are not able to practise their newly acquired skills, training transfer will not be maximised. Several researchers have shown, hardly surprisingly, that the extent to which individuals are given opportunities to use newly acquired skills in the workplace influence transfer (Baldwin and Ford, 1988; Wexley and Latham, 1991; Tannenbaum and Yukl, 1992; Facteu *et al 1995*; Lim and Johnson, 2001), and Arthur *et al* (1998) showed that delays between training and actual use on the job create significant skill decay, while Lim and Johnson (2001) found that lack of opportunity was the biggest deflator of training transfer. Whereas this relationship may seem self-evident, the results from the present study suggest that transfer is suffering because of the gap between the transfer itself and its application.

The evidence from the study presented here suggests that in some cases employees are not transferring their skills frequently enough, or before serious skill decay sets in. While no quantitative data was collected on this score, the

qualitative data revealed some interesting points. The majority of the comments made by the employers fit broadly into two categories. Firstly, situations where employees do not get to practise their skills regularly enough before skill decay sets in, and secondly, situations where the skills learned are not closely related to the job, and as a result are never used. In both cases, there is an obvious lack of training effectiveness, that is, only a small percentage of what is being learnt is being transferred. It seems senseless for employees to attend training in order to learn skills will never use back at the workplace. Without further research it is not possible to determine to what extent it is the fault of the employer or the training provider, although it seems most likely, to be a mixture of the two.

For tasks that are performed infrequently, formal training may not be appropriate, because of skill decay. In such cases, informal training would be more appropriate, given its just-in-time nature. In the situation where the training is unlikely ever to be transferred back to the workplace, it seems natural to provide no training.

This chapter has discussed the results from the data collected from the employers and employees. Whilst it has not come to a definite conclusion, that is, whether ICT training is beneficial in terms of training transfer, it has shown that different groups of employees transfer the training to different degrees and has also raised a number of issues, and future directions for research. The following chapter presents the case studies and the small-scale longitudinal survey.

Chapter 7. Longitudinal Investigation and Case Studies

While the main study in this thesis has aimed to provide an in-depth quantitative analysis of the attitudes and opinions of employees and employers, it was also considered important that some additional qualitative research was carried out.

7.1. Methodology

A small-scale three-stage longitudinal study was designed to investigate the extent to which trainees' attitudes and perceptions towards ICT and its use at work change over time. The 14 respondents in question were attending a 25-day introduction to business computing course. The course syllabus included all the main Microsoft applications: Word, Excel, Access and PowerPoint.

The respondents were surveyed at three time periods:
t1: at the first week of training course (week 1);
t2: at the final week of the training course (week 25);
t3: three months after the final training session (week 37).

The questionnaire administered at t1 consisted of the following five questions (in addition to the normal demographic questions).

- If you had already used any software programs at work prior to receiving this training on them, to what extent had you already used them?
- To what extent do you believe that the training you are undertaking will increase your usage of IT at work?
- To what extent do you believe that the training you are undertaking will improve your performance at work?
- To what extent do you believe that the training you are undertaking will improve the performance of the company you work for?
- To what extent do you believe that the training you are undertaking is closely related to your job?

As with the main study, all questions were measured using 7-point Likert-scales, with 1 equal to very little and 7 to a great deal. A copy of the questionnaire administered at t1 can be found in appendix B1.

The second questionnaire was administered at t2. The questions were similar to those of the first survey, except for necessary tense adjustments. The only significant difference between the two was that the question relating to the trainees' previous experience was replaced by one measuring short-term transfer, that is, the extent to which ICT usage had increased since attending the first training session. This question read 'to what extent has your ICT usage increased as a result of attending this training course?' A copy of the questionnaire administered at t2 can be found in appendix B1.

A letter was sent out to the employees who indicated that they were willing to be contacted three months after their last ICT training session (see appendix B3). These respondents were surveyed again at t3, and were visited at their work over the period of a week. A semi-structured interview was conducted in an attempt to probe the respondents on their previous responses and to record any further information that could be gleamed.

It was decided against using a focus group to collect the qualitative data because it would have been almost impossible to get all the participants in one place at one time, as they are based in companies throughout South Wales. Moreover, respondents are more likely to provide a socially desirable answer when in a group. Further, whereas the interviews could have been conducted over the phone, it was believed that face-to-face interviewing would be more beneficial in terms of the amount of information that could be collected and of the quality of responses.

Fourteen questionnaires were returned from those administered at t1, and only 10 from the surveys administered at t2, thus restricting the degree to which the data could be statistically analysed. Unfortunately, only six respondents completed both questionnaires and were interviewed. While this was not ideal, only six were willing to be contacted, and provided contact details.

7.2. Results

All 14 of the trainees who attended the first training session completed a questionnaire (9 female, 5 male). The age groups were all represented in the sample with the majority aged between 31-60. Most of the respondents had had very little experience with ICT prior to attending the training (not surprising given that the course was an introduction to business computing), although three respondents actually reported that they had had a great deal of previous ICT experience. They may well have overestimated their experience, but if the scores recorded are to be taken at face value, these trainees were ostensibly unsuited for the course.

The respondents were asked at t1 to what extent they believed that their ICT skills would increase subsequent to attending the training. The majority marked a 7 on the scale. That was not unexpected; it would have been strange to find trainees enter training believing that they were not going to find it useful. However, a couple of respondents did report the contrary; and interestingly these were respondents who claimed they had previous ICT experience (this supporting a finding from the main study).

When the respondents were asked the same question at t2, a distinct change in attitude was apparent. At t2, nobody said their ICT training would increase a great deal, and only two marked a 6 on the scale. Therefore it is apparent that the trainees' attitudes towards the use and usefulness of ICT had decreased over the duration of the course. At the beginning of the training, when trainees rely on information from work colleagues, friends etc, they perceive that the training will significantly increase their ICT usage at work. By the end of the training, when the trainees were able to draw on their own experience, they seem to have readjusted their perceptions, which are not as favourable towards the potential usefulness of ICT. This is confirmed by some of the comments made by respondents at t3:

> *"At the start of the training I thought the training would have a big impact on computer usage at work [...] I had high expectations. But as the days*

went on, I realised that computers could not do all that I thought they could."

This respondent was probed further on how he thought computers could have helped them before he attended the training, but was unable to give a reason.

The employees also undertook the training, as one might expect, perceiving that it would improve their performance at work, with the majority of employees marking 6 or 7, yet at t2 the scores dropped, indicating once again a change in attitude. The same goes for when the respondents were asked about the extent to which they believed the training would affect their company's performance: there was a fall in positive attitude between t1 and t2. While it must not be forgotten that this longitudinal study was based on a small sample, it is apparent that the respondents' attitudes towards their perceived transfer rates and usefulness of the training did decrease between t1 and t2. People are consistently being informed that computers are the future and that computers are vital in the workplace and can significantly improve workplace performance. While in many cases this is certainly true, if employees undertake training with such high expectations, the chances are (as it has been shown here) that they will not be met. It must of course be borne in mind that any fall in scores between t1 and t2, or indeed negative comments made at t3, may be a reflection of the quality of the course provided, but it could also be due to workplace constraints that these trainees encountered.

Respondents were asked if, in hindsight, they thought that the training was an effective use of their time (in terms of usefulness at work). Some thought to the contrary. Take the following comment:

"For me, I enjoyed getting away from the office one-day a week. But I do feel that I could have learned what I did in a couple of hours instead of 25-days."

Another admitted:

> *"As I didn't use computers whatsoever for business, any increase would be an increase. Although I must admit I still rarely use a computer for business."*

Or take the following comment:

> *"I don't think so [that the training made good use of my time]. The girls [who work in the office] have all had a look at the course notes I brought back from the class, but I don't think much has changed."*

Rather than having a need for specific ICT training then finding a course that will meet needs, it would seem that this employee attended a training course, then returned to the company to look for ways to apply it.

One respondent openly admitted that the training had been all but useless in terms of transfer:

> *"To be honest, I know I shouldn't, but I still write invoices by hand because it takes more time to switch on the computer and remember what I am doing, then to get my invoice pad out of the draw [...] the training has not fed through to company benefits because it actually slows me down."*

Moreover, she acknowledged that she could have learned all she needed in 30 minutes if the trainer had worked one-to-one. This was, in fact a common theme throughout the interviews. This does not mean the training received is of poor quality *per se*, it suggests that many training employees have specific training needs, for which it is very difficult for training providers to provide for, as training sessions are often targeted at trainees from different companies, with different requirements.

Respondents were asked how their usage had increased, that is, what applications on what they had received training were they now using more. One respondent said:

> *"While I now use a few more [keyboard] shortcuts, and a few more features, I do not use Word any more than I did, and certainly not any more of any of the others [applications]."*

Along the similar lines:

> *"The most useful thing that I learned was all the keyboard shortcuts [...] PowerPoint, was very interesting and fun to play with, but is very unlikely to be used at work [...] We haven't got around to using Excel, although we might use it in the future, however I'll have probably forgotten how to use most it by then."*

> *"We still use Microsoft Word the most and that is unlikely to change in the foreseeable future. In the future, the usage of Access will probably increase the most if everything goes to plan."*

> *"Nothing in particular, but there were lots of little things that I learned and found useful, such as what all the buttons on the toolbar do."*

> *"I have not used as much training as I may have done because my job role is quite narrow."*

> *"I did learn a lot of things, but I'm unlikely to use 90% of it [...] I found PowerPoint very interesting but do not know if I will ever use it, and similarly with Excel and Access."*

> *"I have learned lots of skills [...] Access is really good, and I can see how useful it is for storing data, although I have already forgotten the majority of what was taught. Maybe if I read the course notes, most of it would come back to me [...] The funny thing is that the other people in the office have*

read through the notes, and now know more than I do! PowerPoint was good, although neither I, nor anyone else in the company would ever have any use for it. I found Excel OK, although again I do not think we will use it very much."

"A lot of what was taught I already knew, so I did not find it very useful."

"Although I learnt a few new things, most of it I either knew or didn't need to know."

All these comments indicate that training transfer in these cases has been very limited, and conform to ideas in the main body of this thesis that much of the training material taught may often be redundant.

Employees were asked why they attended the ICT course. Comments made by respondents included:

"I was asked by my boss if I would like to attend an ICT training course [...] It was not compulsory but the boss thought it would be beneficial for me to update my computer skills."

"I don't feel I needed to, but I thought it couldn't do any harm, and it is something extra to put on my CV."

"I attended the course because my friend told me that a local training provider was offering free computer classes. I did not think it would help me much with my work, because I have little need for using a computer [...] but as the course was free, I thought I would go along."

The above comments again confirm the notion mentioned in the main body of the thesis that trainees attended the training not necessarily for the 'right' reasons. It was even found that a few of the respondents only attended the course simply because it was free, irrespective of whether or not it was felt necessary.

"The boss sent an email around the office saying there was a free computer course about to start if anyone was interested in attending, and I thought it wouldn't do any harm, so I put my name down."

"No I definitely wouldn't have [attended the training if it was not free] because I did not feel that computers would really help me with my business."

"We work for the RSPCA, so the staff have little need for any computer training, but as the training was free [...] We couldn't say no."

While this undoubtedly helps towards government targets, for example, to get the Welsh workforce ICT trained, it does demonstrate a blatant waste of resources. This could no doubt explain why many employees in the main investigation reported low transfer rates. If ICT training was not required, it is unlikely to have had a significant impact on transfer or company performance. As a result, money should surely be invested in determining what training requirements employees have, and then offering the appropriate courses, as opposed to offering training and hoping that employees will find it useful.

As a number of the respondents did not believe the training was significantly effective, they were asked how they thought it could be enhanced, comments included:

"The training would be more effective if he [the tutor] knew how the training would be used back at work, so he could tailor it to our needs, which would cut out all the redundant information that was taught."

"If the trainer came into the workplace and ran the session here, then he would see how we are going to use it [...] We learned lots of things during the course, most of which we will never ever use [...] Seems a waste of time."

"The training would have been more beneficial if I could have had a consultation with the tutor and discussed what he thought I needed to help improve my business."

The effectiveness (or otherwise) of informal training has been consistently mentioned throughout the thesis. Therefore, it was not surprising that it was mentioned a number of times during the interviews, all praising the effectiveness of informal training:

"If I was in charge of training, I would promote informal training because it is cheaper, and I believe more effective, although I know most of us do enjoy attending external staff training."

"Informal training is probably more efficient as there is always someone on hand to help you if I get stuck, although formal training is a good excuse to get away from the office."

"I believe that informal training could be better than attending formal training courses [...] as I mentioned earlier the other people in the office now know as much, if not, more than I do, and they didn't even attend the training."

There was a mixed reaction when the respondents were asked if they would like to attend further ICT training sessions. For example:

"I think I would be interested in attending training sessions in the future, although I would prefer if the training concentrated on one specific area, for example, a whole course on Microsoft Access."

"Not really, I don't feel I need to know any more for what I do at work. If I moved jobs into the accounts department I would need to be trained though [in Sage Accounts]"

"I have learned all I need to know, but if another opportunity arose to attend another free course I would consider it."

"I would like to attend further courses to find out what else can be done to improve office efficiency, although I would also be interested in it for personal interest."

7.3. Conclusions

While the large quantitative survey provided an in-depth analysis of the sample, this smaller qualitative study has enabled responses to be probed further, and thus to gain some extra insight into the attitudes and opinions of the respondents. It should be noted also that the case studies only sampled trainees from a single training course. Nevertheless, this part of the study has found that in many cases Government money is being wasted on providing either heavily subsidised or free ICT training courses for employees of SMEs who are not acquiring the intended benefits. While it is a noteworthy effort by the government who are investing in ICT training in Objective 1 areas in South Wales, to help develop the local economy, serious thought should be given to who receives the training and whether it will indeed lead to increased performance.

Chapter 8. Summary and Conclusions

8.1. Summary

This thesis has principally investigated the extent to which ICT training is transferred back to the workplace in SMEs, with a particular attention paid to SMEs in South Wales. Chapter 1 introduced the thesis and the general area of ICT. Chapter 2 began with a review of the existing literature in the areas both directly and indirectly involved in the training transfer process, from which a direction for research was established. Chapter 3 gave a detailed overview and discussion of the research methods used for the investigation as well as detailing the objectives of the study. Chapters 4 and 5 presented the analyses of the data gathered from the surveys of employees and employers. Chapter 6 provided a discussion of the results. Chapter 7 analysed and discussed results from the small-scale longitudinal questionnaire. This chapter draws some general conclusions.

8.2. General conclusions

The central aim of this thesis was to determine the extent to which ICT training is transferred to the workplace. This study has by no means provided universal support for the transfer of formal ICT to the workplace. Whilst the results from the main study suggest that there is a slight increase in usage as a result of attending the training, it is by no means convincing. Initially, it was surmised that the results from the study would lead to a fairly straightforward conclusion, viz. that a significant level of ICT training received is transferred to the workplace, leading to considerable company benefits. Yet, as was found in chapters 4, 5, and 7, this is not always the case.

It is well understood that successful training transfer involves a three-way process. All three parties – employee, employer, and training provider, have an important role to play (see Figure 8.1), but the results from this study suggest that these roles are not always played in the best way. This study has highlighted the fact that great attention must be paid to all three stages of the transfer process to

ensure training transfer. Too often employers rely solely on the training part of the transfer process at the exclusion of the other two. Training transfer would be greatly enhanced if communication between the three parties were strengthened. A training needs analysis should be conducted so training can be tailored to trainees' requirements and therefore would make training more efficient, the training providers should therefore provide training that is more closely related to their jobs, and in a format that is easily understandable by all trainees; and employers should offer training that is appropriate, and support the trainees in applying the training.

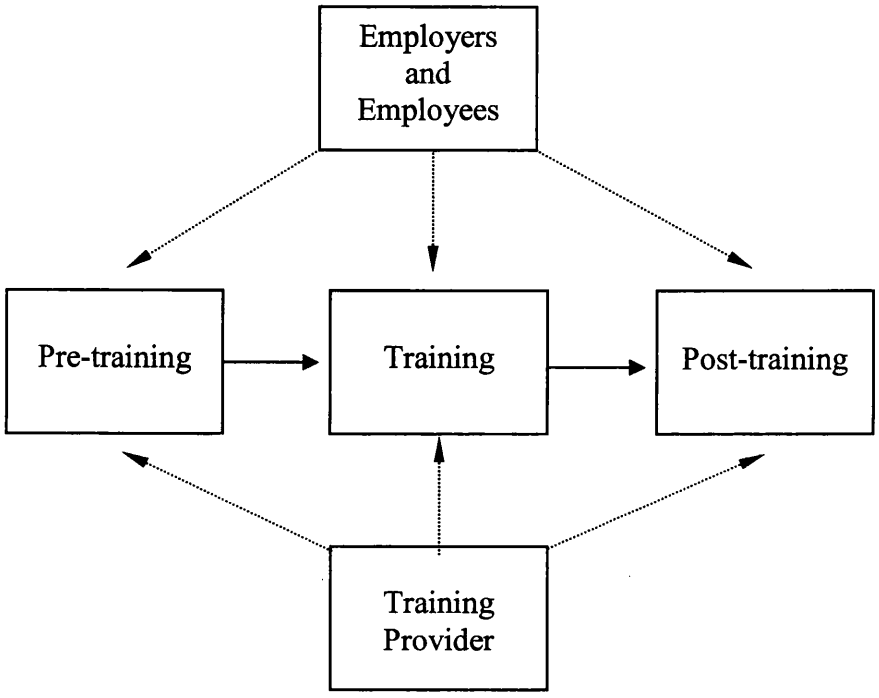

Figure 8.1 - The training-transfer process

8.3. Implications of Research

The outcomes of this research can provide advice to policy makers, training providers and employers.

8.3.1. Policy Makers

As has been evident from throughout this thesis, a significant amount of ICT training in South Wales is subsidised by the European Social Fund (ESF) and the Welsh Assembly Government, with the intention of increasing the general ICT skill-levels of the workforce and increasing the use of ICT in SMEs in South Wales. Chapter 1 listed some of the schemes that have been initiated, from meet-the-mouse which teaches the most basic of skills, to the more advanced that increases the knowledge of more experienced employees. Given that so much public money has been invested, it would be desirable to conclude that this has fed through to increased employee and subsequently company performance. The extent to which this is the case, is somewhat difficult to conclude. The results from this thesis are somewhat mixed and if you read Government reports they will say that the initiatives have been '*a success*' because they have met their target of training employees in South Wales or that they are '*continuing to work towards targets*'. As has been shown throughout this thesis, just because employees have received training, does not necessarily mean that they have learnt a great deal, learnt anything that is relevant to their jobs, or used this training back at the workplace. So whilst at first glance this may seem that the initiatives have been a success, after further investigation this is not necessarily the case. It should be noted however that not all of the Government projects sole aims were to increase employees' usage of ICT at work, but to increase the skill base of the workforce. So while the results from this study suggest that training is not always used back at the workplace, it does not mean that there knowledge base has not increased, although, in many cases it was found that it did not!

The results from the survey and the interviews raised a number of issues with regard to the Government subsidised training that need to be addressed. Firstly, it was found that employees often attend these subsidised courses irrespective of whether or not they have a real need to (see chapter 7). In a number of cases employers sent their employees on these courses because they were free and not because there was a real need, and employees were treating it as an excuse to get away from the office for a few hours. As a result, it was contributing to

Government targets of training employees, but not leading to any personal or company benefits.

Secondly, the courses are not tailored for individual company needs. The courses have been designed for a universal audience and therefore sometimes fail to meet all employees' requirements. The courses are all the same length with the same time spent on each section of the course, even if some of the trainees have specific needs. It is recommended here that a training needs analysis should be conducted before training content is decided upon so training effectiveness can be enhanced. There is no point spending four days on PowerPoint, if the employees are never going to have any need to use it at the workplace.

It is also suggested here that more stringent guidelines need to be put in place when deciding on who receives subsidised training, so that funding is only spent on companies and employees who will benefit from the training and not employees who use it as a 'day off'. Moreover, given that it has been found that formal training does not lead to significant training transfer, policy makers should consider other ways of investing the funding so as to meet targets. One such way is informal training, which is discussed below (see section 8.3.2).

Policy makers should also revaluate how they measure the success of some of there schemes. Too often factors are used that do not always give a true measure of success. As it was mentioned briefly above too often success is measured on the number of employees trained or on asking employees if they have found the training useful. Whilst it is not argued these are measures of training success, more should be used such as, increase in knowledge, training transfer and change in company productivity. This will give a much better indication of the success, or otherwise, of the Government initiatives. However, whilst it may be a contentious issue, it may be that the Government chooses to publish the measures that put the initiatives in the best light.

8.3.2. Managerial

This research has brought attention towards the need for more investment and research into the development of informal training. Whilst undoubtedly, formal ICT training will continue to exist in some form or another, this thesis has brought into question the relative contribution of such training compared to that of informal training. It is suggested here that formal training should not become a given in companies. It seems to be the case that some employers are stuck in a mindset that training has to be conducted no matter what the outcome. Informal conversations with employers revealed that some were just in the habit of sending employees on training courses even though they admitted that it had not always brought the benefits they hoped for. Many admitted they never considered making informal training more *'formalised'*, in fact some failed to recognise informal training as a form of training. This is somewhat surprising as is the fact that employers continue to send their employees on training even if it does not always translate to any significant benefits. Whilst only a limited amount of quantitative data was collected on the success or otherwise of informal training, the results and conclusions do support what many researchers have found in the past (see Poell *et al*, 2006). Even though this study has not necessarily extended the knowledge on informal training, it has highlighted the fact that findings from past research have not led to significant difference in the workplace.

As mentioned previously, it is recommended here that policy makers should revaluate how they invest their money in ICT training. Instead of continuing to reinvest in formal training courses, which from the evidence from this thesis is not entirely successful, money should be invested in helping SMEs develop their informal training network.

This research also found that older employees do not benefit from training as much as younger employees. Whilst this may come as no surprise given pervious findings (see for instance Warr *et al*, 1999), it does highlight whether it is worthwhile sending older employees on training sessions. However, this is of course a contentious issue because refusing training to certain groups of employees because of their age would cause numerous problems in the

workplace, as well as contravening recent age-discrimination legislation. Past research has highlighted the need to tailor training for older employees so to improve training effectiveness (Warr *et al*, 1999), however this is often deemed impractical given the finite resources of most SMEs. Although, there is nothing stopping employers giving their employees a choice whether they want to attend the training or not, and if the results from the study are anything to go by, many older employees may chose not to. Whilst the sample of respondents that fell into the over sixties group could be considered as small n=25, it was thought that given the lack of variability in the data collected from this group, this sample size, whilst not ideal, would be sufficient. This is shown in the results throughout the analysis, with little variation and few outliers.

This study has also found that the majority of ICT training sessions have a mix of trainees of different ages, with varying ICT experience and learning requirements. This was found to have an impact on training effectiveness. Previous research has suggested, quite naturally, that different groups of individuals need to be trained in different ways. Thus, organising different training programs for different employee groups within a company, would improve training effectiveness. However, in practice, once again this is unlikely to be a feasible option. Companies, especially SMEs, will not have the knowledge, time, or money, to provide such tailored training for their employees. As a result, more research should be conducted into ways of designing training so that it satisfies all trainees' needs. This is no doubt raises the question whether e-learning would help solve this problem. More research should be conducted into the viability of using e-learning for this type of training and, of course, the extent to which training via e-learning is transferred to the workplace.

8.3.3. Training Providers

Whilst it has been concluded that ICT training may not be as successful as it could be with regards to training transfer, it must not automatically concluded that the training received was that of poor quality. In general, trainees reported that the training received was that of high quality. However, one issue that this study has raised is the link between theory and practice. Some trainees (especially

the less experienced ones) fail to transfer the training because they struggle to link the theory to practice (see chapter 7). To counteract this, training providers and employers should work together so both parties know what is expected and what is needed. As a result, training providers will be able to link the theory closer to the employees practice. Whereas this will involve greater resources in terms of time and money, it would no doubt have a positive impact on training transfer.

Employees are trained on a wide range of applications, ranging from the general Microsoft package, to the more job specific applications, such as, SAGE and Dreamweaver. However, this research has raised the issue of sending some employees on certain courses, when there is no direct need for training. For example, the results from this study show that in a number of cases, employees are attending 25-day courses, when perhaps only 6-7 days are relevant to their needs, and in some cases significantly less. It was also found that employees were spending a number of days on PowerPoint and whilst they found it useful, most reported little need to use it. Similarly with regards to Word, many trainees already had experience with the application so learned very little new material. Self-evidently, in terms of training transfer, this proves a waste of time in regards to the employee and the company he or she works for. Moreover, it is taking up a place on the ICT course that could have been taken by someone who had a need for the training. Although, it should be noted that whilst the training may not directly increase training transfer, it will probably increase employees' computer self-efficacy and make them feel more valued within the company. As a result, it is suggested that employers and training providers should again work together when arranging training, for example, either shortening the length of the course, or instead of having five days on PowerPoint, lowering that to two and increasing the days on another application such as Access. Naturally, this will lead to more effective use of employee's time and more time can be dedicated to what is needed.

8.4 Research and the future

It is believed here that a number of studies have measured training success in ways that do not give a good measure of training transfer, such as, increase in learning, or whether they intend to transfer the training in the future (see for example Mathieu *et al*, 1992). This study has developed a method of measuring training transfer that takes into account many other factors in the transfer process, and gives a good indication of transfer. It is not denied that the scale used to measure training transfer is perfect, but it does provide a foundation that can be developed in the future.

It was found in chapter 5 then the majority of employers believe that informal training is superior to that of formal training, yet these employers continue to provide formal training for their employees. More research is required into why this is the case. More research is also needed so we have a better understanding of what, how, and when informal training works. Whilst it can not be denied that informal training is common practice in companies, there appears to be few guidelines on how to optimise such training.

This study has also brought to attention the problem of having mixed ability employees in training sessions and how employees with less experience, differ in many ways to employees who have more experience. There has been little research in the differences between experienced and inexperienced users (but see (Taylor and Todd, 1995b); this study has highlighted the need for further research in this area because it appears to have a big impact on training transfer. Moreover, too often, employees from SMEs attend ICT training sessions and are taught training material that has been designed for a universal audience; smaller companies are often unable to invest in different training for all of their employees. More research is needed into ways around this problem; one such way - e-learning, has received much interest in the literature, but as is apparent from this study, the use of it is still limited.

Research has moved on since the theory of reasoned action model *(Fishbein and Ajzen, 1975)*, the theory of planned behaviour (Ajzen, 1985), and the technology acceptance model (Davis, 1985) were developed. Researchers are now developing models that are specific to training transfer and effectiveness (see for example (Baldwin and Ford, 1988; Mathieu *et al*, 1992; Warr *et al*, 1999; Agarwal *et al,* 2000). The regression model developed for this thesis attempted to move the research on further. The transfer model developed, explained 55.6% of the variation in transfer for low pre-training ICT users. The model suggests that training transfer can be also maximised if employees are encouraged by the company to transfer the training. Whilst this model consists of only one independent variable, it does provide a foundation for further research into the area.

8.5. Weaknesses

Given more time, research in many areas covered in this thesis could have been expanded. If the survey could be redesigned, it would be advantageous if less constructs were measured, so more items could be used to measure the remaining constructs. This would therefore mean that all the scales could be tested for reliability using Cronbach's alphas, which would, in turn, also improve the reliability of the scales. This was a particular problem with chapter 5 where no Cronbach's alphas could be calculated. Moreover, it may have been beneficial to have used factor analyses in the survey; this may have reduced the number of variables into a smaller subset of factors. Whilst overlooked, I do not believe the exclusion of factor analysis has had a significant impact on the quality of the survey and the output generated from it.

The scale used to measure training transfer also had some slight problems. As was discussed previously in the thesis, when using a Likert-scale there are only a finite number of responses from which a respondent can choose, in the case of this study, seven. The trouble arises when a respondent chooses seven as their usage before training because they are unable to choose a higher figure when asked to estimate their post-training usage. Perhaps researchers in the future could develop another scale for collecting data on this variable.

With regards to the measures used to collect the data on training transfer, an objective measure would have been better. This would have involved measuring employees' computer usage pre-training and their usage post-training. Whilst this was not deemed practical in this study, it would be beneficial to see the variability between the results collected and those from this study.

As with many other studies, a larger sample size both in terms of the quantitative and qualitative studies would have made easier to generalise the findings to the whole population. Moreover, having a larger pilot study may have identified any problems earlier on, such as, the measure of training transfer, and the lack of items measuring some constructs. Whilst, I do not believe that these issues significantly impacted on the quality of the survey, it would have brought them to my attention earlier.

The initial regression model looked at the variables which have an impact on training transfer for employees who had a low usage of ICT pre-training. However, the initial model was flawed to some extent. Firstly, three of the variables that were included in the model were non-significant. Secondly, the constant in the model was statistically significant; therefore, it appears that there is at least one further variable that was not included in the model that would have explained more of the variation in the model. As a result of this, a reduced regression model was run, although it included only one independent variable. It is believed here that this model could be improved and added to in the future, as it is likely that there are independent variables, which are not included in this model, which could help explain the variation in training transfer.

Furthermore, if a larger sample size of qualitative data had been collected, computer assisted qualitative data analysis software (CAQDAS) could have been used such as *Nudist* and *Atlas/ti*. Given that these programs analyse patters in the data, clearly with a sample size such as the one in this data would not have given any meaningful results. However, it is something that should be considered in the future.

8.6. Conclusion

Clearly, ICT training will continue to be offered for as long as there are computers used at the workplace. Employers will always want new employees to be ICT-trained and companies will always install new computer systems for which training is also needed. However, sending employees on formal training courses should not become a given within SMEs. In the past, research has found that training is not transferred back to the workplace as much as some people believe (Georgenson, 1982; Newstrom, 1986; Detterman, 1993; Saks and Belcourt, 2006). However, to the knowledge of this author, this is the first study that has specifically focused on the ICT industry in Wales; and has come to the same conclusion.

A number of suggestions have been made throughout this thesis that will improve training transfer, including, further investment in informal training, adapting courses so more time is spent on certain areas, conducting a needs analysis, employees having more say on what they are trained on, to name a few. If researchers, companies, training providers and funding bodies take on the points highlighted in this study, training effectiveness will be greatly enhanced.

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Appendix A1 - Employee Questionnaire

I am most grateful to you for filling in this questionnaire
Justin Eaglen

Employees Questionnaire

Please tick where appropriate

If you have attended training courses given by different training providers, please assume that the questions refer to the most recent provider.

a) **Age**

Under 20	21-30	31-40	41-50	51-60	60+

b) **Sex** F M

c) **Company position**

d) **Job description**

e) **Approximately how many days' IT training have you had in the last two years?**

f) **Which software programs for which you have been trained were quite new to you when you began your training?**

g) **If you had already used any software programs prior to receiving training on them, to what extent had you already used them?**

Very little A great deal

1	2	3	4	5	6	7

h) **Since attending the training, to what extent do you do you use ICT training at work?**

Very little A great deal

1	2	3	4	5	6	7

i) **How do you rate the quality of the following with respect to the IT training you have had?**

	Poor						Excellent
Course instructor	1	2	3	4	5	6	7
Computer facilities	1	2	3	4	5	6	7
Physical environment	1	2	3	4	5	6	7
Course material	1	2	3	4	5	6	7
Course content	1	2	3	4	5	6	7

j) **To what extent were the IT facilities used during the training better or worse than those you use at work?**

Worse						Better
1	2	3	4	5	6	7

Any comments on the facilities available in the training environment?

Any comments on the general quality of the training?

This next set of questions has been dived into three sections.

Please tick an appropriate box for the following statements:

1. Your experiences with, and general thoughts about IT training

1 = Do not agree 7 = Strongly agree 8 = Don't know/unsure

1a) I have had significant experience in the past with computers	1	2	3	4	5	6	7	8
1b) Working with computers makes me nervous	1	2	3	4	5	6	7	8
1c) I see career progression as an important part of my life	1	2	3	4	5	6	7	8
1e) I am highly competent with the use of computers	1	2	3	4	5	6	7	8
1f) I believe E-learning is better than traditional methods of training	1	2	3	4	5	6	7	8
1g) I am highly motivated to attend IT training sessions	1	2	3	4	5	6	7	8
2h) I have enjoyed the IT training sessions I have had	1	2	3	4	5	6	7	8

2. The quality, and effectiveness of your IT training

2a) IT training has increased my productivity in my job	1	2	3	4	5	6	7	8
2b) I can apply the training without any help e.g. from my employer or work colleague	1	2	3	4	5	6	7	8
2c) IT training has improved my work performance	1	2	3	4	5	6	7	8
2d) In my job, applying IT training is important to me	1	2	3	4	5	6	7	8
2e) I have found it easy to apply the knowledge I gained on IT training courses (or course)	1	2	3	4	5	6	7	8
2f) I found the IT training easy to understand	1	2	3	4	5	6	7	8
2g) I have found IT training to be useful in my job	1	2	3	4	5	6	7	8
2h) The IT training has increased my IT knowledge significantly	1	2	3	4	5	6	7	8
2i) I feel motivated to use at work the knowledge gained during my IT training	1	2	3	4	5	6	7	8
2j) The IT training has been closely related to the job I do	1	2	3	4	5	6	7	8
2k) People I consider influential think I should apply my IT training to my job	1	2	3	4	5	6	7	8

3. Your work environment, and its impact on the use of your IT training

3a) The (corporate) policy of the organisation / business where I work encourages me to apply to my job what I have learnt on IT training courses	1	2	3	4	5	6	7	8
3b) I feel the organisation I work for is as supportive as they could be in helping me to apply to my job the IT training I have had	1	2	3	4	5	6	7	8
3c) My peers encourage me to use the IT training I have had	1	2	3	4	5	6	7	8
3d) There are incentives within the organisation I work for, for using the IT training I have had	1	2	3	4	5	6	7	8
3e) My supervisors encourage me to attend IT training sessions	1	2	3	4	5	6	7	8
3f) People in my organisation who apply their IT training to their jobs have more prestige than those who don't	1	2	3	4	5	6	7	8
3g) In my job, applying IT training is important to my employers/supervisors	1	2	3	4	5	6	7	8
3h) People in my organisation who apply IT training to their jobs have a high profile	1	2	3	4	5	6	7	8
3j) There is strong pressure in my organisation to attend an IT training course	1	2	3	4	5	6	7	8
3k) Using IT skills is a status symbol in my organisation	1	2	3	4	5	6	7	8
3l) I was given a lot of choice of IT training sessions I could attend	1	2	3	4	5	6	7	8
3m) The company I work for supports E-learning (computer-mediated) for staff training	1	2	3	4	5	6	7	8
3n) The company I work for intends to support E-learning in the future for staff training	1	2	3	4	5	6	7	8

k) What specific software programs have you been trained on (e.g. Word, Excel, Access, email, Dreamweaver), to what level, and to what extent had you already used them before the training began?

1. Name of Program

	Beginner	Intermediate	Advanced

Extent to which already used

Not at all — A great deal

1	2	3	4	5	6	7

Subsequent to your training

Not at all — A great deal

1	2	3	4	5	6	7

2. Name of Program

	Beginner	Intermediate	Advanced

Extent to which already used

Not at all — A great deal

1	2	3	4	5	6	7

Subsequent to your training

Not at all — A great deal

1	2	3	4	5	6	7

3. Name of Program

	Beginner	Intermediate	Advanced

Extent to which already used

Not at all — A great deal

1	2	3	4	5	6	7

Subsequent to your training

Not at all — A great deal

1	2	3	4	5	6	7

4. Name of Program

	Beginner	Intermediate	Advanced

Extent to which already used

Not at all A great deal

1	2	3	4	5	6	7

Subsequent to your training

Not at all A great

1	2	3	4	5	6	7

Appendix A2 – Employers questionnaire

I am most grateful to you for filling in this questionnaire. Justin Eaglen
Please tick where appropriate

Employers Questionnaire

1. **Location of company?** .....
2. **Industry area of company?** .....
3. **Size of company (number of employees?)** ☐
4. **Please tick an appropriate box for each of the following statements:**

1 = Not at all 7 = A great deal 8 = Don't know/unsure

How far would you say that the training your employees have had has increased their usage of IT at work?	1	2	3	4	5	6	7	8

A) IT training at the workplace

How proactive do you believe you are in encouraging employees to use what they have learned from their IT training?	1	2	3	4	5	6	7	8
To what extent do you require your employees to undertake IT training?	1	2	3	4	5	6	7	8
To what extent do you put in place measures to ensure that your employees use their IT training at work?	1	2	3	4	5	6	7	8
To what extent are your employees given a choice of IT training sessions?	1	2	3	4	5	6	7	8
To what extent do you provide incentives to your employees for using their IT training at work?	1	2	3	4	5	6	7	8
How far would you agree that you provide *regular* IT training for your employees?	1	2	3	4	5	6	7	8
To what extent have you had difficulties with employees actually applying the knowledge that they have gained from their IT training?	1	2	3	4	5	6	7	8
To what extent do you provide feedback to your employees on how they have used the knowledge gained from their IT training?	1	2	3	4	5	6	7	8
To what extent have you experienced problems with your employees not accepting new technology and itt use?	1	2	3	4	5	6	7	8
To what extent do you consider formal IT training given by a training provider to be superior to informal on-the-job learning?	1	2	3	4	5	6	7	8
To what extent do you consider it important that your employees attend some IT training?	1	2	3	4	5	6	7	8

1 = Not at all 7 = A great deal 8 = Don't know/unsure

B) Effectiveness of IT training

How far would you say that the IT training your employees have had has increased their IT knowledge?	1	2	3	4	5	6	7	8
How much has any change in performance and/or efficiency due to your employees undertaking IT training resulted in benefits to your company?	1	2	3	4	5	6	7	8
How far have your expectations been met with regard to increased performance and/or efficiency resulting from the IT training your employees have had?	1	2	3	4	5	6	7	8
To what extent do you believe that it is more the installation of new software as opposed to the actual training that has provided your company with benefits?	1	2	3	4	5	6	7	8
To what extent do you use e-learning for staff training in your company?	1	2	3	4	5	6	7	8
To what extent do you believe that e-learning is a more effective training method than traditional classroom methods?	1	2	3	4	5	6	7	8
If you had a chance to design the course material, to what extent would it have differed from that of the training providers?	1	2	3	4	5	6	7	8

C) Your employees and their IT training

To what extent do you believe that your employees are motivated to apply at work the IT training they have received?	1	2	3	4	5	6	7	8
To what extent do you believe your employees think that the IT training provided is useful to them in their careers?	1	2	3	4	5	6	7	8
How much experience did your employees have with computers prior to the training?	1	2	3	4	5	6	7	8
How much support is available for any of your employees who have difficulty with applying their IT training to the workplace?	1	2	3	4	5	6	7	8
To what extent do you believe that your employees are motivated to attend IT training sessions	1	2	3	4	5	6	7	8

5. **Is the IT training you arrange conducted at your premises or elsewhere?**

On premises	Elsewhere

6. **Specifically, what difficulties, if any, have you come across regarding employees failing to use their IT training at work?**

7. **What qualities do you look for in a training provider?**

8. **What factors do/did you take into account when deciding on an IT training provider?**

9. **How did you locate an IT training provider? Via:**

The Internet		**A mail-shot sent to your company**	
A colleague at work		**A business associate**	
Someone in another company in your area of business		**Someone in another company not in your area of business**	
Other (please specify)			

10. When deciding on which training provider to conduct IT training for your company, who did you go to for advice?

Nobody		**A colleague at work**	
A business associate		**Someone in another company in your area of business**	
Someone in another company not in your area of business		**Other (please specify)**	

11. Would you consider arranging further IT training for your employees in the future?

Yes	**No**

Any comment?

12. Who decided on the content of the IT-training course?

You	**Your employees**	**The training provider**

Any comment?

13. Please briefly describe you attitude towards e-learning as a method of employees training

Appendix A3 – Covering letter for main questionnaire

XXXXXXXXXXX
XXXXXXXXX
XXXXXX
XXXXXXXX
XXXXXXX
XXX XXX

15th October 2004

Dear

My name is Justin Eaglen and I am a PhD student at the University of Wales Swansea investigating into the usefulness of computer training in organisations throughout South Wales.

In order to develop an understanding of the industry, I need to gain an insight into SMEs (small and medium sized enterprises) assessment of the computer training they have received and how it has benefited their company. I am writing to ask if you would be prepared to provide some information, which would assist in my research.

The enclosed questionnaire aims to investigate current demands for computer training, to what extent the training is used in the workplace and the feelings of employees regarding the computer training they have received. Computeraid have forwarded me your contact details, indicating that you would not

Naturally, all completed questionnaires will be treated with the utmost confidentiality and results will only be disseminated in a summary form. Any insight you can provide into the computer training market would be greatly appreciated. I will be more than happy to forward you a copy of the summarised results via email.

Please contact me using the following details if you have any queries or concerns

Yours faithfully

Justin Eaglen

184386@swan.ac.uk

01792 295299

Appendix B1 – Short questionnaire (t1)

I am most grateful to you for filling in this questionnaire
Justin

Name	
Sex	F / M
Age	<20 / 21-30 / 31-40 / 41-50 / 51-60 / 60>
Job description	

If you had already used any software programs at work prior to receiving this training on them, to what extent had you already used them?

Very little						A great deal	Don't know / unsure
1	2	3	4	5	6	7	8

To what extent do you believe that this training that you are undertaking will increase your usage of IT at work?

Very little						A great deal	Don't know / unsure
1	2	3	4	5	6	7	8

To what extent do you believe that this training you are undertaking will improve your performance at work?

Very little						A great deal	Don't know / unsure
1	2	3	4	5	6	7	8

To what extent do you believe that this training you are undertaking will improve the company that you work for performance?

Very little						A great deal	Don't know / unsure
1	2	3	4	5	6	7	8

Appendix B2 – Short questionnaire (t2)

I am most grateful to you for filling in this questionnaire
Justin

Name

To what extent has your IT usage increased as a result of attending this training course?

Very little A great deal Don't know / unsure

1	2	3	4	5	6	7		8

To what extent do you believe that this training that you have undertaken will increase your usage of IT at work in the future?

Very little A great deal Don't know / unsure

1	2	3	4	5	6	7		8

To what extent do you believe that this training you have undertaken will improve your performance at work?

Very little A great deal Don't know / unsure

1	2	3	4	5	6	7		8

To what extent do you believe that this training you have undertaken will improve the performance of the company you work for?

Very little A great deal Don't know / unsure

1	2	3	4	5	6	7		8

Would you be willing to be contacted in 3 months time to see what influence this IT training course has had on your usage of IT at work?

Yes No

Contact number / address

Appendix B3 – Short questionnaire cover letter

XXXXXXXXXXX
XXXXXXXXX
XXXXXX
XXXXXXXX
XXXXXXX
XXX XXX

8th June 2005

Dear

My name is Justin Eaglen and I am currently studying at Swansea University. Earlier this year you attended an IT training course ran by ComputerAid, and you kindly completed a short questionnaire for me to help me with my studies. You were also kind enough to say that you would be willing to be contacted in 3 months to see what influence the IT training has had on your usage of IT at work. Well that time has come! I only need 15-20 minutes of your time to ask you a few questions about how you have used your IT training for your job. If you could contact me via email or phone and set up a time I would be much appreciated

Email: 184386@swan.ac.uk
Phone: 01792 2955299

Thank you for your time

Justin Eaglen