

**The conceptualisation, practice and value of
Design Thinking in Entrepreneurship Education –
an Educator's Perspective**

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Abstract

The thesis illustrates how entrepreneurship educators understand Design Thinking (conceptual understanding), how and on what level they apply it in their entrepreneurship teaching (educational practice) and why and for what perceived value they choose to do so (perceived value). By adopting a more critical and differentiated perspective on this integration than previously reported in the existing literature, this research study provides novel insights to the question of the conceptualization, practice and value of Design Thinking for Entrepreneurship Education – from an educator’s perspective. It follows an interpretive and qualitative approach, drawing upon semi-structured interviews from 29 entrepreneurship educators from Higher Education in the UK and Northern Europe. Thus, the thesis demonstrates that entrepreneurship educators integrate Design Thinking in many ways and for different reasons.

As a result, this thesis synthesises existing perspectives on Design Thinking (toolset, process, mindset) and defines a framework for the four forms (selective, idea-centric, procedural, holistic) of Design Thinking integration in the context of Entrepreneurship Education. The findings suggest that perceived values of Design Thinking could be explicit and implicit and that entrepreneurship educators integrate Design Thinking to provide value for their students’ learning but also to develop their own teaching practice. Overall, this study contributes to unfolding the Design Thinking concept and advocating a common ground among educators’ sense-making of a Design Thinking integration in Entrepreneurship Education. In conclusion, this study reaffirmed the wide application of Design Thinking within Entrepreneurship Education but presented the new centrality of the educator’s perspective at the core of the discussion on its utility and thus, moving towards convergence of a common understanding. The findings of this research would be of interest for entrepreneurship educators and entrepreneurship education researchers who seek a more profound and reflective integration of Design Thinking within Entrepreneurship Education.

Author's Declaration

The author declares that the work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree. Further, the thesis is the result of the author's own investigations, except where otherwise stated and that other sources are acknowledged by giving explicit references and that a bibliography is appended.

Related Publications:

Schneider, H; Huxtable-Thomas, L; Jones, P.; Högsdal, N.; Bowen, R. (2022 – in press): Design Thinking in Entrepreneurship Education – Different Perspectives and Common Themes in the Literature. In: Block, J., Halberstadt, J., Högsdal, N., Neergard, H. and Kuckertz, A. Progress in Entrepreneurship Education and Training: New Methods, Tools, and Lessons learned from Practice. Springer.

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List of abbreviations

DT* Design Thinking

EDT Entrepreneurial Design Thinking

EE* Entrepreneurship Education

ESRC Economic & Social Research Council

HEI Higher Education Institution

HPI Hasso-Plattner Institute

PBL Project-Based Learning

UK United Kingdom

US United States

*The words Design Thinking (DT) and Entrepreneurship Education (EE) are used very often within this thesis. Therefore, the words are in some cases replaced by its abbreviations. As much as possible, these are not abbreviated, but the Design Thinking/Entrepreneurship Education nexus is replaced with DT/EE nexus for brevity.

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Chapter 1 Introduction to thesis

1.0 Introduction to chapter

As an introduction, this chapter outlines the rationale for the study in an introductory manner. Further, it summarizes the research aims to provide an overview of the objectives of this thesis. Lastly, an outline of the thesis structure will be given to support orientation and provide an overview of the forthcoming chapters of this work.

1.1 The rationale for the study

Over twenty years, Design Thinking (DT) has emerged in a variety of educational contexts of entrepreneurship (Campbell, 2020) and Entrepreneurship Education (EE) is considered to be one of the pioneering fields in the implementation of Design Thinking (Sarooghi et al., 2019). In 2020 the new *EntreComp Playbook* by the European Union was published, describing Design Thinking as one of the three most important entrepreneurial methods (Baciagalupo et al., 2020). Recent research has demonstrated the broad application of Design Thinking among Entrepreneurship Educators (Kremel & Edman, 2019) and confirmed that Design Thinking is integrated into more than half of the entrepreneurship curricula (54%) (Sarooghi et al., 2019).

Researchers have been investigating the designer's thinking process for the past 50 years (Buchanan, 1992; Cross, 1982; Dorst, 2011; Simon, 1969) and today, myriad definitions of the term "design thinking" proliferate in academic and practitioner-oriented literature and demonstrate the different perspectives taken on the concept. As Design Thinking has been established as an umbrella construct (Hirsch & Levin, 1999; Dunne & Martin, 2006; Micheli et al., 2019), it misses coherence and clarity in its constitution. Thus, even though Design Thinking demonstrates a prevalence of the term, it also reflects definitional ambiguity. While conflicting views of concepts are not unusual, divergent understandings hinder progress in understanding the phenomena (Micheli et al., 2019), which also affects the Entrepreneurship Education Practice. It remains unclear how Entrepreneurship Educators understand and conceptualise Design Thinking within their context, despite the wide popularity and application

that it has gained in entrepreneurship curricula (Neck & Green, 2011; Sarooghi et al., 2019). Moreover, especially entrepreneurship educators are characterised as lacking criticality (Fayolle, 2013; Fayolle, 2016) and jumping into new methods for teaching without questioning (Blenker et al., 2019). Thus, there appears to be no consensus on the level at which the interface of DT/EE occurs. While some present Design Thinking as an entrepreneurial method that can be used as a toolbox for Entrepreneurship Educators (Seidel & Fixon, 2013; Huber et al., 2016) others argue for using Design Thinking to design Entrepreneurship Education in general (Huq & Gilbert, 2017; Nielsen & Stovang, 2015). Therefore, there is a clear need for increased clarity across the range of entrepreneurial methods to improve existing Entrepreneurship Education practices (Mansoori & Lackéus, 2019). Crucially, the understanding and application of Design Thinking in Entrepreneurship Education are under-researched and the underlying theoretical commonalities have not been yet constructed.

Design-based curricula and Design Thinking are possible answers to address the growing need for contemporary higher education and some even say Design Thinking holds major promise in bringing education into the 21st century (Henriksen et al., 2017). Moreover, within the design education literature, Design Thinking is proposed to drive the twenty-first-century educational transformation (Kickbusch et al., 2020). Indeed, future generations need to be equipped to face uncertainties and address problems with a creative lens (Sarooghi et al., 2019; Goldsby Smith, 2007). This is true, whether those are labelled as Design Thinking skills, entrepreneurial skills, or future skills. While the role and the requirements of the learner are changing, the role of the educator is changing simultaneously, i.e. the pedagogical approach needs to be aligned to adapt to the learners' changing needs. This shift also implies a new focus on the role of the educator as a designer of learning environments (Paniagua & Istance, 2018). Thus, within this work, the educator's perspective – and not the student's perspective - on Design Thinking within Entrepreneurship Education will be examined. This will be put in focus as the value of Design Thinking for Entrepreneurship Education does not solely lie on the side of

the student; much more Design Thinking might provide more value to the educator itself than to the entrepreneurship students. Therefore, this work will introduce the new centrality of the educator's perspective at the core of the review of Design Thinking as it pertains to Entrepreneurship Education.

1.2 Positioning of this Research

This study evaluates the current educator-centred view on the value of Design Thinking in Entrepreneurship Education in the context of the UK & Northern Europe's higher education (see Figure 1: Positioning of this research).

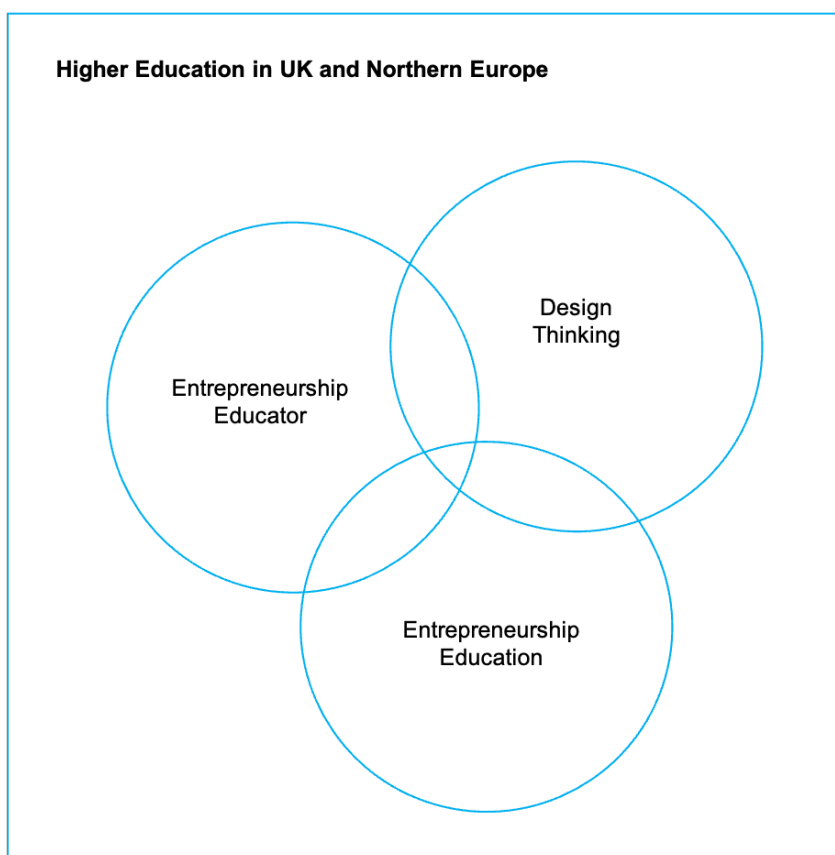


Figure 1: Positioning of this research

In order to illustrate the positioning of this research, the following text passages will further explain the important elements defining the positioning and context of this research, as illustrated in Figure 1:

Entrepreneurship Education: In the framework of this thesis, entrepreneurship is defined as entrepreneurial thinking in the context of value creation.

Therefore a broad perspective on the core of Entrepreneurship Education as a method is applied in line with contemporary scholars (Neck and Green, 2011; Williams-Middleton et al., 2021).

Design Thinking: With a focus on the Entrepreneurship Education context, this study adapts and develops a holistic understanding of Design Thinking, structuring the Design Thinking definition into three different categories namely “Mindset, Process and Tools” (based on Brenner et al. 2016, Sarooghi et al. 2019; Huber et al, 2016).

Entrepreneurship Educator: As this study is researching the phenomena of Design Thinking within Entrepreneurship Education from an Educator’s view, the role of the educator is central and thus the Entrepreneurship Educator is defined as the individual creator.

Higher Education in UK and Northern Europe: As illustrated in Figure 1, the context of this research is constrained to on the one hand, the focus on the Higher Education sector and secondly, focusing on the geographical scope of Northern Europe. Thus, this study aims to provide a perspective on the European Higher Education System.

1.3 Research Aims and Objectives

Overall, this study aims to contribute to the current debate on the value of integrating Design Thinking into Entrepreneurship Education (Daniel et al., 2016; Huq & Gilbert, 2017; Linton & Klinton, 2019; Sarooghi et al., 2019; Val et al., 2019) by bringing convergence to a common understanding of the conceptualisation, practice and value of Design Thinking for Entrepreneurship Education to inform future Entrepreneurship Education practices. While previous research has quantified the wide use of Design Thinking within entrepreneurship curricula (Kremel & Edman, 2019; Sarooghi et al., 2019), this study sheds light on the quality of the Design Thinking integration in Entrepreneurship Education—from an educator’s perspective. This study connects research on Design Thinking and Entrepreneurship Education with a particular focus on the Entrepreneurship Educator to examine – from an Educators point of view - the role

and value Design Thinking may have in Entrepreneurship Education in the Higher Education context. Thus, to address the overarching aim, “What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?” this study employs a qualitative approach and focusses on three different perspectives with guiding questions, as outlined in the table view below.

Overarching Research Question	What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?
Conceptual Perspective – Guiding Questions	What is the educators’ working understanding of Design Thinking? What is their understanding of the DT/EE nexus?
Educational Practice: Guiding Questions	How do educators apply Design Thinking in Entrepreneurship Education (as a method, course and/or general pedagogical approach)? How is Design Thinking integrated into Entrepreneurship Education Practice? On what level is Design Thinking integrated into Entrepreneurship Education? Design Thinking as a course model or pedagogic approach? Explicit or implicit integration?
Perceived Value: Guiding Questions	What are the educator’s pedagogical beliefs about the value of integrating Design Thinking in Entrepreneurship Education? Why do educators apply Design Thinking in Entrepreneurship Education?

Table 1: Overarching Research Questions and guiding questions

Results of this qualitative study illustrate how entrepreneurship educators understand Design Thinking (conceptual understanding), how and on what level

they apply it in their entrepreneurship teaching (educational practice) and why and for what perceived value they choose to do so (perceived value). Therefore, the purpose of this work is to explore the interface of Design Thinking within Entrepreneurship education and its current discussion within the literature. In order to do this, this study makes use of an interpretivist paradigm to review and acknowledge the concept of Design Thinking as it pertains to education. Moreover, the discussion and use of Design Thinking within the field of Entrepreneurship Education and a review of common themes and narratives will be illustrated. Based on this, a conceptualisation of the interface/an illustration of common conceptual dimensions and core principles will be introduced to provide theoretical sensitivity.

Based on the interpretivist paradigm, this study on the conceptualisation, practice and value of Design Thinking in Entrepreneurship Education emphasizes the interpretive understanding of it. Therefore, the chosen approach to this subject is truly interpretative, as it claims that the value of Design Thinking can only be understood through understanding the concept's meaning for those involved, which are in this case, the entrepreneurship educators. Thus, this interview study aims to reveal insights into the current state of practice and the entrepreneurship educator's pedagogical beliefs about the value of integrating Design Thinking in Entrepreneurship Education, following a qualitative approach.

1.4 Thesis Structure

This thesis is organised as follows. Besides the recent introduction introducing the rationale for the study and research aims, the study comprises two parts. The first part (I.) is devoted to the theoretical, definitional and conceptual framework of this study and consists of Chapters 2,3 and 4. The second part (II.) is dedicated to the research and practice part and includes Chapters 5, 6,

7 and 8. Every chapter intends to contribute to the research aims and objectives outlined above.

Chapter 2 provides an overview of the evolution and different perspectives on entrepreneurship and entrepreneurial thinking. It intends to frame the context of this study by exploring the evolution and contemporary understanding of Entrepreneurship and Entrepreneurial Thinking in general and Entrepreneurship Education in particular. Further, it puts a special focus on the pedagogical discourse and introduces the centrality of the Educator's role in Entrepreneurship Education.

Chapter 3 introduces Design Thinking by exploring its origin and elaborating on the definitional discourse. Firstly, the academic construction and evolution of the term from 'Designerly thinking' to Design Thinking will be displayed. Further, the chapter portrays Design Thinking process models and identifies key themes from the literature review. From this, it reviews different perspectives on possible dimensions structuring the term. It presents the Pyramid of Design Thinking as a novel synthesised conceptualization, before concluding with a portrayal of Design Thinking and how it pertains in an educational context.

Chapter 4 then synthesises and connects the earlier discussions of the previous chapters by highlighting the common themes and conceptual framework of the interface of Design Thinking within Entrepreneurship Education. It reflects upon the existing literature discussing Design Thinking in the context of Entrepreneurship Education and develops the culmination of common themes and unifying logic. As a result, it presents a conceptualisation of the nexus, including a conceptual and educational level and discusses the common themes within Design Thinking and Entrepreneurship Education conflate. From this, it derives the research gaps in the literature and defines the research questions, which outline the contribution of this study.

Chapter 5 presents the research methodology explaining and justifying the research approach and methodological design adopted in this study. It discusses the underlying worldview and research philosophy of interpretivism and the ontological and epistemological considerations within this research. Further, it

depicts the methodological choices and demonstrates the instrument design for this qualitative interview study and concludes with a critical examination of its research rigour.

Chapter 6 displays the results and analysis of the interviews with 29 Entrepreneurship Educators from Higher Education in Europe. It presents and analyses the emergent themes from the data through a holistic analysis of the perspective on Entrepreneurship Education, the conceptual perspective on Design Thinking and the educational practice. Further, the chapter derives the value of Design Thinking expressed by the Entrepreneurship Educators and provides new insights and novel perspectives on the conceptualisation.

Chapter 7 aims to relate the findings from the qualitative interviews to the extant literature and the conceptualisation of the DT/EE nexus along the defined dimensions. Thus, it answers the research question of this study by approaching the value of Design Thinking for Entrepreneurship Educators from three defined perspectives.

Chapter 8 draws conclusions on the major findings from this study. Firstly, it summarises the contribution of this study to a more profound understanding of Design Thinking within Entrepreneurship Education in European higher education. Further, it outlines the implications of this study for both policy and practice and discusses the value and contribution thereof. The final chapter concludes with a critical examination of this study's limitation and identifies potential areas and opportunities for future research.

Part I. Theory and Definitional Framework

Chapter 2 Entrepreneurship and Education

2.0 Introduction to chapter

The following chapter will summarise the literature on the evolution and different definitions of entrepreneurship and entrepreneurial thinking. Different perspectives on the term entrepreneurship and the most influential models and concepts defining entrepreneurship will be presented, and common emerging themes will be characterised. Moreover, the emergence and development of Entrepreneurship Education and its pedagogy, as well as the central role of the Entrepreneurship Educator, will be discussed.

2.1 Perspectives on Entrepreneurship

To understand the different perspectives on entrepreneurship, it is crucial to describe the evolution of the term. Entrepreneurship is a progressing and very dynamic scholarly field of research with long intellectual roots (Chandra, 2018). Semantically, the term “entrepreneurship” has developed from the French term “entreprendre”, which has the meaning of “to undertake” and was first used by the French economist Richard Cantillon (1680-1734), who is considered as the founder of the entrepreneurship literature (Kraus & Gundolf, 2008; Kirby, 2003; Kolshorn & Tomecko, 1998). Besides Cantillon (1755), the origins and foundations of entrepreneurship lie in the seminal work of economists such as Smith (1776) and Schumpeter (1934) who researched its relationship with innovation and economic growth. Today Entrepreneurship is a field that is of interest to different disciplines for different reasons, and therefore there exist a variety of definitions focusing on various aspects of entrepreneurship (Fayolle & Gailly, 2008). In particular, the diversity of disciplines that have researched entrepreneurship, such as sociology, psychology, and management research, explains to some extent the different perspectives that have been taken. As a result, the field of entrepreneurship is a wide label for a broad array of research efforts (Shane & Venkataraman, 2000). Referring back to Drucker’s (1985) questions on whether Entrepreneurship is art, theory and practice, Johannsen concludes that the answer to this question lies “in the mind of the person who makes the statement” (Johannisson, 2014, p. 63).

Indeed, researchers agree on entrepreneurship as a heterogeneous phenomenon with myriad definitions (Gartner, 2001).

Even though different perspectives and influences inspiring the term entrepreneurship will be emphasised, the entrepreneurship focus of this work lies in Entrepreneurship Education. In particular, the educational perspective on the understanding of entrepreneurship will be highlighted. To begin with, the definition of entrepreneurship is unclear – some even describe entrepreneurship as “complex, chaotic (that) lacks any notion of linearity” (Neck & Greene, 2011, p. 55). Furthermore, some claim the danger of entrepreneurship falling into a category error by classifying it as a sub-discipline (Sarasvathy & Venkataraman, 2011). While other scholars refer it back to the act of creating a venture, it also describes alternative definitional bases such as innovation, creativity, risk-taking or autonomy (Fayolle & Gailly, 2008). Furthermore, no single clear definition exists, as well as a confusion between the term “entrepreneurship”, “enterprise”, and “small business”, both in academia and in practice (Alberti et al., 2004). To structure the thoughts and give guidance in understanding the different research strands, the following section will discuss entrepreneurship research along three main understandings based on the work of Fayolle (2007) and Lackéus (2016): 1.) Entrepreneurship as venture creation, 2.) Entrepreneurship as the discovery or creation of opportunities, and 3.) Entrepreneurship as the creation of new value.

Firstly, one perspective on entrepreneurship is the focus on firm creation, which is often associated with Gartner: “Entrepreneurship is the creation of new organisations” (Gartner, 1989, p.47). By this, Gartner (1985) established an important notion of entrepreneurship, and the research stream resulting from it aims to explain and develop the role of new enterprises in the economic process on different levels. Thus, relevant work was done by Gartner (1988) researching the activities entrepreneurs do in the act of firm creation. This perspective was new in a way that is focused on activities instead of personality traits (Gartner, 1988). This understanding of entrepreneurship is widely used, even though entrepreneurship can, but does not have to, include the creation of a new venture (Alberti et al., 2004). Thus, this definition is connected to the

idea that entrepreneurship is recognised as the engine driving economic development and society in general (Birch et al., 1979; Brock & Evans, 1989). Moreover, authors such as Kuratko (2005) emphasise the act of creation of business as an essential facet of entrepreneurship, although not limiting the definition of it (Kuratko, 2005). In contrast to the pure concept of venture creation, Kuratko refers to entrepreneurship to creation in the broader sense as the “creation and implementation of new ideas and creative solutions” (Kuratko & Hodgetts, 2004, p. 30).

Another perspective focuses on the process of opportunity exploitation by defining entrepreneurship as the discovery, evaluation and exploitation of opportunities to create future goods and services (Shane & Venkataraman, 2000). This also includes the research on the existence of those opportunities, the focus on the people who exploit them (entrepreneurs) and the different modes of action to exploit them (Shane & Venkataraman, 2000). This research strand has focused on explaining why, when, how and by whom opportunities are created and exploited in a given environment. Respectively, Shane and Venkataraman’s (2000) notion of entrepreneurship has been widely recognised within the scientific community and has been driving the idea that entrepreneurship can occur more widely than only in the act of firm creation.

With regard to the historical context of the different perspectives on entrepreneurship, there has been an evolution from a rather narrow view of entrepreneurship as firm creation and entrepreneurs as small business owners towards a more holistic definition of entrepreneurship as a key mindset for every individual (Sarasvathy & Venkataraman, 2011). Thus, the understanding of entrepreneurship has evolved and opened in the last twenty years and moved from pure for-profit entrepreneurship towards an understanding of entrepreneurship in the broader context, including social and public entrepreneurship (Sarasvathy & Venkataraman, 2011). Entrepreneurship can therefore be understood as a “way of reasoning about the world.” (Sarasvathy & Venkataraman, 2011, p. 113). Sarasvathy and Venkataraman (2011) compare the entrepreneurship method as a counterpart to the scientific method, which is currently taught to “everyone, starting at an early age, as an essential mindset and skill that forms

the core of all education—in line with reading and writing and arithmetic.” (Sarasvathy & Venkataraman, 2011, p. 114). By comparing the scientific method with the entrepreneurial method, they demonstrate important differences regarding the aim and dominant logic: While the scientific method builds upon the dominant logic of experimentation and the aim to discover general, universal laws – the entrepreneurial method follows the logic of effectuation (further explained in Chapter 3) and aims to generate and refine design principles (Sarasvathy & Venkataraman, 2011). It is the goal of this section to present the existing different perspectives on entrepreneurship in general to get an overview of one of the overarching fields of research. At the end of this chapter, a definitional framework will outline the chosen perspective on Entrepreneurship (see Section 2.5). In consideration of the purpose of this study, the following sections dive deeper into the focus on Entrepreneurship Education.

2.2 Entrepreneurship Education

While Entrepreneurship Education has a long history (Kuratko, 2005), entrepreneurship today as a topic has made its way into the standard curricula in higher education institutions (Twaalfhoven & Wilson, 2004), and most universities offer entrepreneurship courses to their students (ERIA OECD, 2014). As reported, Entrepreneurship Education is booming and is proliferating worldwide (Edwards & Pittaway, 2012a; Fayolle, 2013; Kuratko, 2005; Neck & Greene, 2011). There has been a growing interest in the research on Entrepreneurship Education from different perspectives. Within the last three decades, the research has evolved in an appropriate manner, theoretical frameworks have been developed (Block & Stumpf, 1992), existing literature has been reviewed (Dainow, 1986), and different themes have been explored (Pittaway & Cope, 2007) while the evolution of the field has been traced (Katz, 2003; Hägg & Gabrielsson, 2019). The scholarly interest in Entrepreneurship Education has been growing significantly, and entrepreneurship is diffusing into the education system globally (Dana et al., 2018; Ratten & Jones, 2018) and driving innovation on different levels (Jones & Colwill, 2013; Wyness & Jones, 2018). It is apparent that the definitions of entrepreneurship vary

according to the different roles' entrepreneurship can play for politics, education, and the economy - these different understandings, or rather to say other emphasizes, are also represented when defining the goal of Entrepreneurship Education.

The problem of an unclear definition of entrepreneurship is further exacerbated in Entrepreneurship Education, which is also described as “enterprise education”, “enterprising education”, or “entrepreneurial education” (Alberti et al., 2004; Gartner & Vesper, 1994). These slight differences in meaning and naming evolved due to the dividing line between the European and North American scholars (Hägg & Gabrielsson, 2019). In the UK the term “enterprise education” is prevalent, referring back to the early influences of Gibb centering on aspects of small business (Gibb, 1987) and focusing on developing an enterprising behaviour (Jones et al., 2014). Thus, the term “enterprise education” is commonly used in the UK and defined by the Quality Assurance Agency as *“the process of equipping students (or graduates) with an enhanced capacity to generate ideas and the skills to make them happen”* (QAA, 2012, p.2). The term Entrepreneurship Education in the UK context is understood with a focus on equipping students with the knowledge and skills to set up a new venture. On the contrary, the term “Entrepreneurship Education” is commonly accepted in the US context, where it is also not limited to the focus on the education of venture creation (Sarasvathy & Venkatamaran, 2011). Moreover, a trend can be observed that further differentiates the term “Entrepreneurial Education” (Hägg & Gabrielson, 2019; Gianiodis & Meek, 2019; Rodríguez-López & Souto, 2019; Hahn et al., 2017).

Besides this lack of consensus regarding the naming and designation of the term itself, there also exists a lack of consensus on what Entrepreneurship Education is (Pittaway & Cope, 2007). In 1989, the OECD published their report *“Towards an ‘Enterprising’ Culture: A Challenge for Education and Training”*, promoting entrepreneurship as an important part of an educational context in a broader perspective (OECD, 1989). Even if the OECD paper has a strong business connotation, this broader view on entrepreneurship promoting an enterprising education can also be seen in early research by Gibb (1993).

Similarly, Gibb's (1993) work has its roots in business research, focusing on venture creation but can also be seen as one of the first, giving entrepreneurship a broader perspective by emphasising the generic competencies instead of just seeing entrepreneurship as context-specific. Thus, it started with Gibb (2002) to broaden the perspective on entrepreneurship by emphasising the importance of educating entrepreneurial individuals.

One common way of differentiating the various nuances is to utilise the term Entrepreneurship Education, defined as "education in entrepreneurial attitudes and skills", and entrepreneurial intentions, described as "desires to own or start a business" (Bae et al., 2014, p. 218) or distinguishing from a learning process-oriented view between "learning to become an enterprising individual" and "learning to become an entrepreneur" (Fayolle, 2008, p.199). This distinction is also represented by a definition of experts of the European Commission, which differs between a broader concept of entrepreneurship teaching, which educates for entrepreneurial skills and attitudes, and a rather narrow definition of training for venture creation (European Commission, 2002). Those different views also imply different target groups of Entrepreneurship Education; while venture creation or startup education aims to educate aspiring entrepreneurs, entrepreneurial education aims to impart key competences and include everyone by understanding itself "as an essential part of basic education" (Sarasvathy & Venkataraman, 2011, p. 120). Further, the conceptualisation of Hannon (2005) has been influential in understanding the different contexts of Entrepreneurship Education. In this, Entrepreneurship Education is presented as following an 'about' (learn about entrepreneurship as an academic study), 'for' (prepare students for the creation of ventures as entrepreneurs) or 'through' (learn/teach entrepreneurship through embedding it in other subjects) approach.

In practice, Entrepreneurship Education is meant to cover many different educational aspects, such as employability, venture creation, or self-efficacy (Pittaway & Cope, 2007). Pittaway and Cope (2007) developed a thematic framework for Entrepreneurship Education, which suggests a holistic approach regarding the multiple levels of the subject. Thus, the debate about an

appropriate pedagogy for Entrepreneurship Education needs to be discussed in a broader context, as those contextual factors and the understanding of Entrepreneurship Education play an integral role (Pittaway & Cope, 2007). As shown, there are approaches in trying to break down the broad field of entrepreneurship into subcategories. Thus, entrepreneurship as a field covers everything from foundation principles such as the entrepreneurial mindset to pre-startup and different stages of business creation. When defining the common factor, Neck and Green (2011) argue: “The marriage of all those content areas is value creation and capture entrepreneurship as an engine to create economic, social, personal value” (Neck & Greene, 2011, p. 56). The forthcoming Figure 2 illustrates the approach toward entrepreneurship as a method instead of a process (Neck & Greene, 2011).

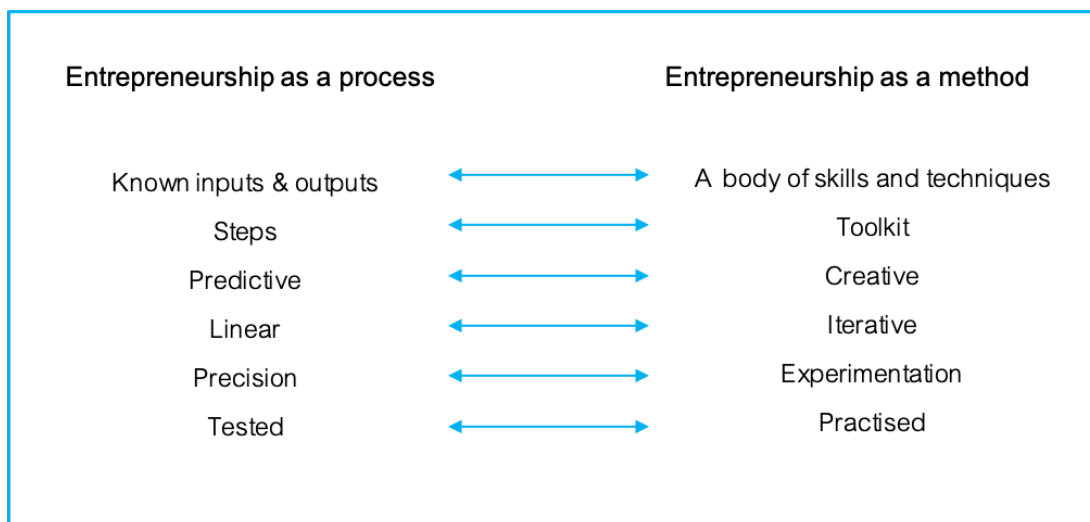


Figure 2: Process vs Method (Neck & Greene, 2011; Linton & Klinton, 2019)

Neck and Green argue to approach “entrepreneurship as a method means teaching a way of thinking and acting built on a set of assumptions using a portfolio of techniques to encourage creating” (Neck & Greene, 2011, p. 62). Thus, it is proposed to teach entrepreneurship as a method rather than teaching specific content (Neck & Greene, 2011). Indeed, the field of Entrepreneurship Education is acting in an ever-changing world, and that is why methods are important that are adaptable to fluid knowledge, content, and context (Neck

& Greene, 2011). The idea of teaching entrepreneurship as a method is supported by Sarasvathy & Venkataraman (2011), who advocate to “teach entrepreneurship not only to entrepreneurs but to everyone, as a necessary and useful skill and an important way of reasoning in the world” (p. 113). While Entrepreneurship was regarded as a sub-category of business or management disciplines, there is a trend to teach entrepreneurship as a key competence across all disciplines (Sarasvathy & Venkataraman, 2011) and it is proposed as a new educational philosophy (Lackéus, 2016). As described by Fayolle & Gailly, Entrepreneurship Education is “intended for developing learners’ minds, raising people’s awareness of the entrepreneurial phenomenon, providing them with keys to their personal development and professional orientation and giving them incentives to act entrepreneurially” (Fayolle & Gailly, 2008, p. 574). For the purpose of this thesis, the different definitions are synthesised based on the work of Neck and Green (2011), which understands and conceptualises Entrepreneurship Education as a method within applied science which encourages entrepreneurial acting in the sense of creating. A summary of the definitional framework this thesis builds upon will be provided in the final section of this chapter (see Section 2.5).

2.3 Pedagogy and Teaching Models in Entrepreneurship Education

Following the discussion within the field of Entrepreneurship Education in general, there has been a growing, even though still young, field of research debating in particular on the pedagogical form of the teaching (Fiet, 2001; Fayolle, 2013; Jones et al., 2014; Lackéus et al., 2016; Haara et al., 2016; Neck and Greene, 2011). Similar to the extension of the understanding of Entrepreneurship (see Section 2.1), the understanding of Entrepreneurship Education has evolved, and the evolution of pedagogy in entrepreneurial education has been researched in detail (Hägg & Gabrielsson, 2019). Next, some key shifts in the scholarly discourse on pedagogy in entrepreneurial education will be presented. Hägg & Gabrielsson (2019) suggest that the theoretical influences of entrepreneurial education, and key concepts as illustrated in Figure 3, centre on the foundations of the experiential learning theory (Kolb, 1984);

the constructivist educational philosophy (Piaget, 2000); experience-based pedagogy (Dewey, 1963), problem-based learning (Barrows & Tramblyn, 1980), situated learning (Lave & Wenger 1991) and action learning (Revans, 1982).

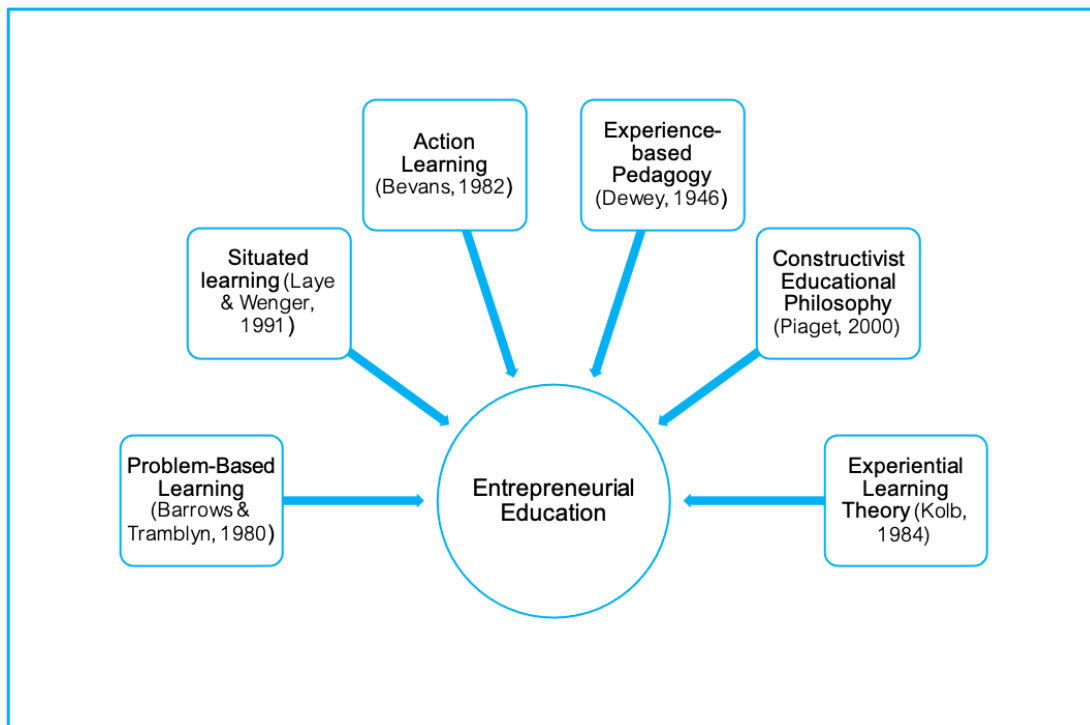


Figure 3: Theoretical Influences of EE (Hägg & Gabrielsson, 2019)

Since the 1980's entrepreneurial education has moved from a traditional didactic, teacher-centred period towards a learner-centred perspective and a more constructivist approach to learning (Hägg & Gabrielsson, 2019), along with the shift from teachability towards learnability, contemporary discussions on pedagogy within Entrepreneurship Education emphasise the foundations of an experience-based approach. However, a divide can be observed between the scholarly discussion and educational practice in this field, as lecturers are often unaware of their systematic teaching approach (Toding & Venesaar, 2018). It is therefore appropriate to reflect upon how theoretically grounded the Entrepreneurship Education practice is in everyday practice. Previously, entrepreneurship educators have been accused of staying closer to craft than science (Bécharde & Grégoire, 2005) by building their teaching activities on

personal experiences rather than systematic approaches (Fayolle & Gailly, 2008) and choosing teaching content that is borrowed from management consultancy rather than derived from Entrepreneurship Education research itself (Henry, 2020).

In order to bridge this gap, teaching models have been proposed to connect the educator's teaching practice and their beliefs about teaching and therefore unite the conceptions with the actual teaching behaviour (Bécharde & Grégoire, 2005). Drawing from the education literature, the concept of a teaching model originates in the idea that "most experienced teachers practice their craft within the context of some theory or conceptual framework" (Anderson, 1996, p.89) or, alternatively that teaching models define an ensemble of explanations and justifications for teacher's behaviour in the classroom (Marland, 1995). Therefore, teaching models can consist of implicit and explicit elements and can be grounded within a theoretical, academic theory, but also draw from personal experience.

Regarding different teaching models, Bécharde and Grégoire (2005) made a valuable contribution discussing the importance of conceptual frameworks in Entrepreneurship Education. Three different teaching models (supply model, demand model, competence model) and two hybrid models (supply-demand model, demand-competence model) in Higher Education are examined and their implications on the ontological and operational level of Entrepreneurship Education are discussed (Bécharde & Grégoire, 2005a). Following on from this, a further important contribution to the discussion on Entrepreneurship Education pedagogy is the generic teaching model for entrepreneurship proposed by Fayolle and Gailly (2008). Their conceptual framework consists of two levels (ontological and educational) and constructs an applicable teaching model for entrepreneurship (Fayolle & Gailly, 2008) – see Figure 4.

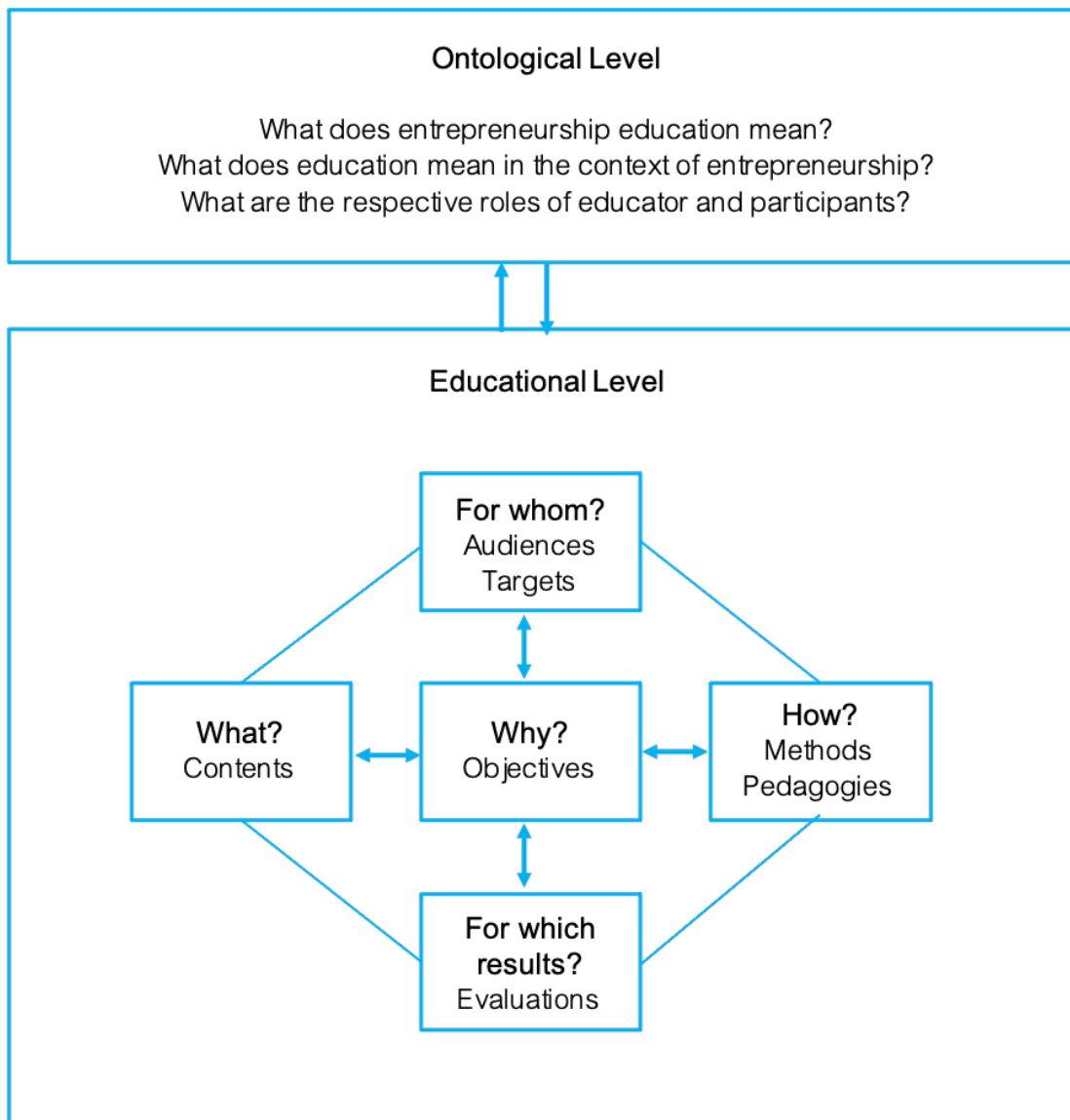


Figure 4: Teaching model framework (Fayolle & Gailly, 2008)

Regarding the educational, didactical level, the teaching model proposes five key questions every educator should ask: “What? For Whom? Why? How? For which results?”. According to this, pedagogy is answering the “How?” question of the framework, as he states that “Pedagogy is a means to achieve objectives” (Fayolle & Gailly, 2008, p. 579). While the existing frameworks give a great overview of which factors should be considered when designing Entrepreneurship Education and making pedagogical choices, the question of which approach appears to be most prevalent and suitable remains unsolved (Bécharde & Grégoire, 2005a; Fayolle & Gailly, 2008).

Regarding the ontological perspective, Fayolle & Gailly (2008) refer back to Merriam (1982) stating that each educator should clarify their philosophical position towards education:

“Philosophy contributes to professionalism. Having a philosophic orientation separates the professional educator from the paraprofessional in that professionals are aware of what they are doing and why they are doing it. A philosophy offers goals, values and attitudes to strive for. It thus can be motivating, inspiring, energizing to the practitioner.” (Merriam, 1982, p.90-91))

Entrepreneurship scholars have discussed the lack of educational philosophy for Entrepreneurship Education (Hannon, 2006; Gibb, 2007, Kyrö, 2005) even though it is known that there is a strong relation between the teacher’s philosophical belief system and their teaching style and pedagogical course design (Toding & Venesaar, 2018; Ardalan, 2008). Since the pioneering work of Alan Gibb on the varying institutional approaches to Entrepreneurship Education and the underpinning pedagogy (Gibb, 1986), there is still a need for a more strategic approach to the pedagogy in Entrepreneurship Education (Pittaway & Cope, 2007) and a call for shared frameworks (Fayolle, 2013). Regarding the pedagogical principles, relevant research has been conducted reflecting the course content and pedagogical methods (Gartner & Vesper, 1994) or assessment methods (Edwards & Pittaway, 2012b; Hannon et al., 2009), and the debate on pedagogy in Entrepreneurship Education has been wide-reaching (Pittaway & Cope, 2007).

While all of these aspects are relevant regarding pedagogical principles, a particular focus of this work lies in the educator’s perspective. Indeed, it is the role of the Educator to ensure that the Entrepreneurship Education is appropriately anchored in contemporary practice (Henry, 2020). Within the following, the central role of the educator as the designer of education, and the unit of analysis for this study, will be introduced and discussed as not only the individual student but rather the individual educator plays a crucial part within the entrepreneurial learning process (Henry, 2020; Kyrö, 2015).

2.4 The central role of the Educator

As previously described, the expectation of education has shifted towards a learner-centred focus of Higher Education aimed at preparing students to become lifelong learners with a diverse set of 21st-century skills instead of just infusing discrete knowledge (Paniagua & Istance, 2018). To adapt to the rapid pace of change in modern society, learning how to learn is essential, and students must be equipped differently to become innovative and unique problem solvers (Wagner, 2012). The need for diverse, unique individuals is central to the learner-centric view, as diverse individuals with different perspectives and skill sets are needed to solve future problems. The focus toward the application of competencies and a broad set of social skills such as collaboration, creativity, and innovation also imply a shift in pedagogical approaches. While the role of the learner is changing, the role of the educator (or teacher) is changing simultaneously. In order to adapt to the learners' changing needs, the pedagogical approach needs to be aligned. This shift implies a new focus on the role of the educator as a designer of learning environments (Paniagua & Istance, 2018). Thus, in the context of Entrepreneurship Education, the educator's role is central as the teacher is considered the key player in the design and delivery of Entrepreneurship Education (Voding & Venesaar, 2018; Löbner, 2006).

Previous research has defined the conceptual understanding of teaching entrepreneurship at a pivotal point between a rather traditional content-centred, and a learning-centred, approach to teaching (Voding & Venesaar, 2018). It is one of the challenges for contemporary entrepreneurship educators to decide what and how to teach in Entrepreneurship Education (Henry, 2020). This is becoming even more relevant with the trend to embed Entrepreneurship Education in non-business disciplines. Hannon (2005) suggests it is crucial to not only insert Entrepreneurship Education but to drive embedding entrepreneurial thinking into the existing curricula (Hannon, 2005). Overall, it is the role of the Educator to ensure that the Entrepreneurship Education is appropriately anchored in contemporary practice (Henry, 2020). By contrast, the

Entrepreneurship Education delivered should not only draw from contemporary practice but also be grounded in a theoretical framework.

While the teaching should be anchored in theory, the field of Entrepreneurship Education is also characterised by subjective choices of the educator on an individual level (Vanevenhoven, 2013). As Entrepreneurship Education evolved from different fields (Fayolle & Gailly, 2008), the educators have different backgrounds and come from different disciplines, and thus the teaching should be individualised than generalised (Vanevenhoven, 2013). The challenging role of the entrepreneurship educator has been discussed in the literature from different perspectives, and different proposals have been made in the past, such as a shift towards a more individual, enacted approach (Vanevenhoven, 2013), the concept of co-teaching in Entrepreneurship Education (Henry, 2020). The entrepreneurship educator has to face the challenge of delivering content and knowledge on a whole spectrum within very different academic disciplines outside of the usual business, management or economics fields that it is usually associated with. These areas range from basic awareness-raising on business planning to specific topics such as opportunity recognition or stakeholder value creation (Henry, 2020). Thus, Entrepreneurship Education deviates from the traditional perspectives of a single educator teaching, and new concepts move toward the concept of a team or co-teaching (Henry, 2020). Within this suggested teaching model, the role of the entrepreneurship educator is to collaborate with the lead lecturer of the non-business discipline to meaningfully weave in entrepreneurship principles within the core field of study (Fayolle, 2013; Henry, 2020). In addition, further external factors influence the educator's content decision - as illustrated in Figure 5 (Henry, 2020).

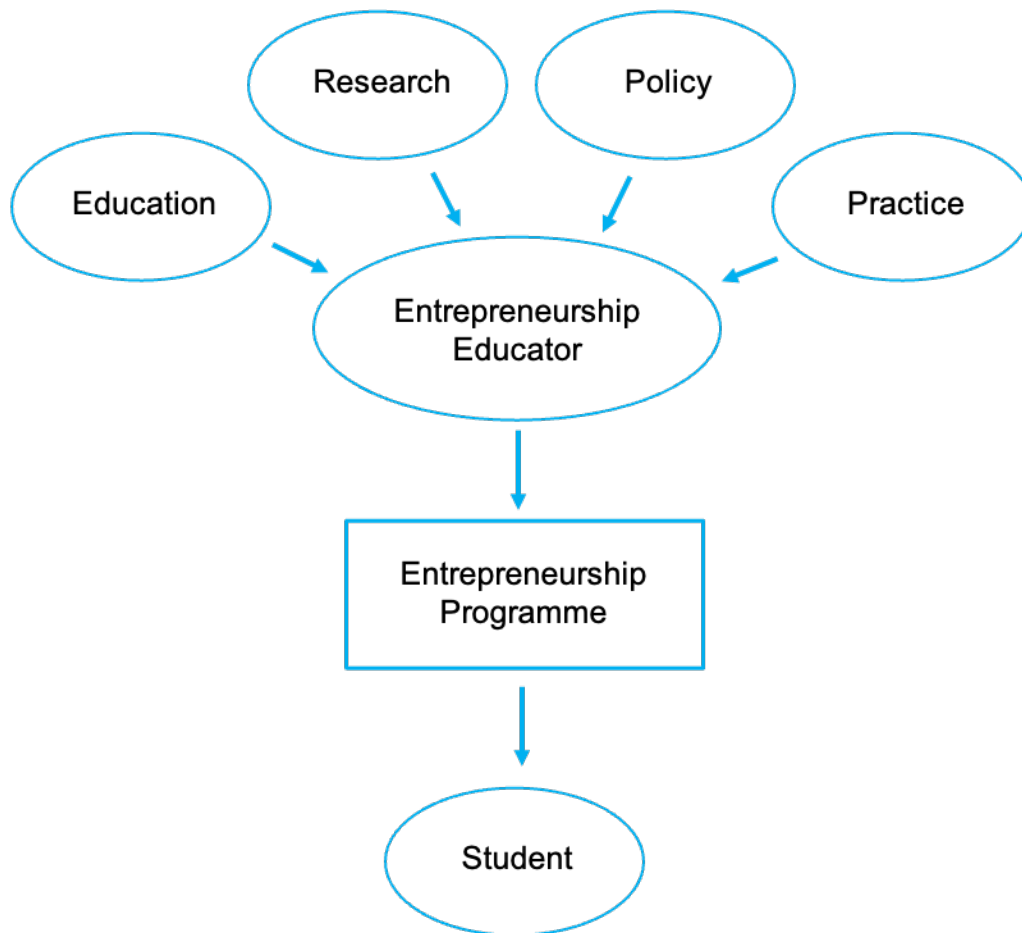


Figure 5: Categories influencing the impact of the content decision (Henry, 2020)

Within this model, Henry (2020) suggests four different categories, namely education, research, policy and practice, which influence the content decision of the entrepreneurship educator delivering the Entrepreneurship Education programme. Thus, the educator is influenced by the internal teaching environment and external regulatory requirements such as strategic priority within Higher Education Institutions (HEI), and assessment components (Henry, 2020). The aspect of external influences, such as that from policymakers has also been stated by Pittaway and Cope (2007). Within this context, it is also worth mentioning the “entrepreneurial” role of HEIs. There are a range of studies discussing the “entrepreneurial acting” of HEIs (Poole & Robertson, 2003) and the self-understanding of HEIs as entrepreneurial institutions (Conceicao & Heitor, 2002), that being a HEI which not only acts entrepreneurially by itself but also

encourages others to do so (Pittaway & Cope, 2007). Hence, to handle the different external influencing factors, the entrepreneurship educators have to be reflective in their understanding of Entrepreneurship Education (Kyrö, 2015), quick in their decision-making (Vanevenhoven, 2013) and brave to develop their own unique perspective (Henry, 2020).

2.5 Summary and Definitional Framework

The previous chapter has framed the context of this study by exploring the perspectives on Entrepreneurship in general (Section 2.1) and Entrepreneurship Education in particular (Section 2.2) with a special focus on Pedagogy and Teaching Models (Section 2.3) and discussing the centrality of the Educator's role (Section 2.4). This section summarises the previous section and synthesises the theoretical introduction of the concepts in the definitional framework employed in this study – as illustrated in Figure 6.

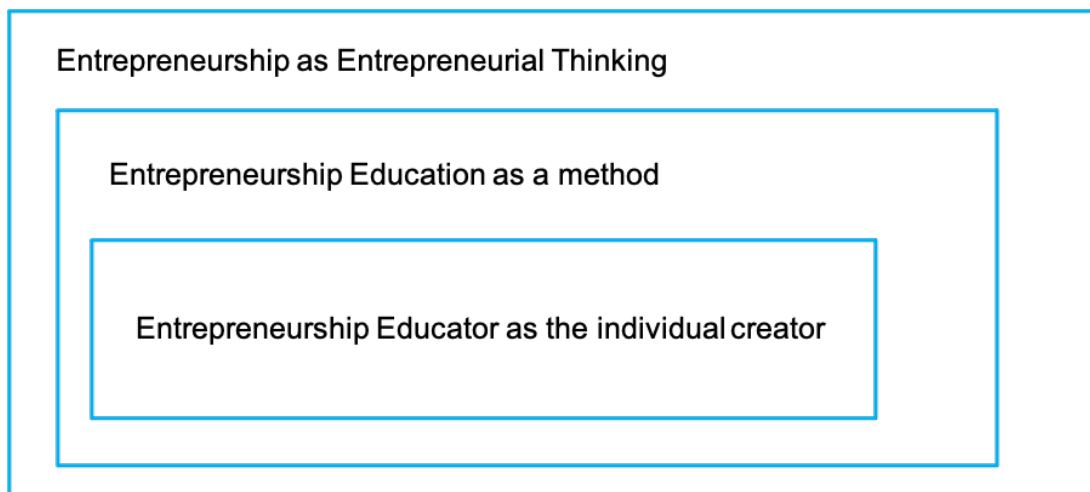


Figure 6: Definitional Framework of Entrepreneurship Education in this research

It has been shown that the different perspectives on entrepreneurship have implications on the view of Entrepreneurship Education, as the way entrepreneurship is conceived influences the way entrepreneurship is taught. In summary, along with the broadening of the perspective on Entrepreneurship from

venture creation (Gartner, 1988) to value creation (Lackéus, 2016), the view on Entrepreneurship Education has changed and moved from traditional business planning towards a more open view on Entrepreneurship Education. This movement is represented in the literature by the call for design-based learning (Neck & Greene, 2011) and the call to teach Entrepreneurship as a method (Sarasvathy & Venkataraman, 2011). In a contemporary understanding, Entrepreneurship Education aims to enable students to become entrepreneurial, with a focus on their personal development (Williams-Middleton et al., 2021). Moreover, the pedagogical discourse in entrepreneurial education has shifted towards a more constructivist perspective (Hägg & Gabrielsson, 2019). As shown, Entrepreneurship Education is characterised by different facets and can fulfil many purposes depending on the aim that needs to be achieved, even though there is an overall consensus in academia that entrepreneurship should be taught 'differently' (Neck & Greene, 2011; Vesper & McMullen, 1988).

Therefore, in the framework of this dissertation, as illustrated in Figure 6, entrepreneurship is defined as entrepreneurial thinking in the context of value creation. Further, a broad perspective on the core of Entrepreneurship Education as a method is applied in line with contemporary scholars (Neck and Green, 2011; Williams-Middleton et al., 2021). As illustrated in the Section 2.4, the role of the educator is central and thus the Entrepreneurship Educator is described as the individual creator. This contemporary view of entrepreneurship reflects its complexity and its relevance beyond the traditional meaning. By this, entrepreneurship manifests its multidimensionality. Further, this definitional framework provides the foundation for the identification of commonalities between Entrepreneurial Thinking and Design Thinking in the forthcoming chapters.

Chapter 3 Design Thinking

3.0 Introduction to chapter

This chapter explores the idea of “Design Thinking” and its evolution in a wide range of contexts. Design Thinking is a fragmented term, which describes a very complex idea (Kimbell, 2011) without a clear definition and a tendency of being overcomplicated (Dorst, 2011). Therefore, it is crucial to review its origins within the Design research literature and its transformation into the management discourse in order to understand the concept. As even though Design Thinking is a fragmented term, with very different complex definitions, common themes emerge.

This chapter focuses specifically on the exploration of Design Thinking by:

(Section 3.1) exploring its origins and development

(Section 3.2) presenting relevant process models

(Section 3.3) defining the core principles and common themes

(Section 3.4) elaborating different perspectives and conceptual dimensions

(Section 3.5) discussing the concept as it pertains in education

Finally, this chapter concludes with a summary and definitional framework of Design Thinking as applied in this thesis (Section 3.6).

3.1 From Designerly Thinking to Design Thinking

Although the term “Design Thinking” had yet to be coined, researchers have been investigating the Designer’s thinking process for over 50 years (Buchanan, 1992; Cross, 1982; Dorst, 2011; Simon, 1969). Previous research has outlined the origin and evolution of Design Thinking (Auerhammer & Roth, 2021) and thus, the starting point of the thinking and research on design can be traced back to the 1960s when academic research began to consider the process of how designers undertake designing – initially by focusing on design methods and latterly on Design Thinking (Cross, 1982). Referring back to Kimbell, the “Design’s fragmented core” (Kimbell, 2011, p. 290) emerged from the two opposing schools of thought by Alexander and Simon (Simon, 1969). While Alexander is describing ‘Design’ as the making of things and giving form

to objects, Simon can be seen as the first who developed the design terminology by stating that “Everyone designs who devises courses of action aimed at changing existing situations into preferred ones” (Simon, 1969, p. 111). and “Design is the transformation of existing conditions into preferred ones” (Simon, 1969, p. 4). Even if Simon never mentioned the term Design Thinking, this theory-driven understanding of Design as the activity to create something new or the creation of artefacts, can be regarded as the starting point for the academic discourse about Designerly thinking.

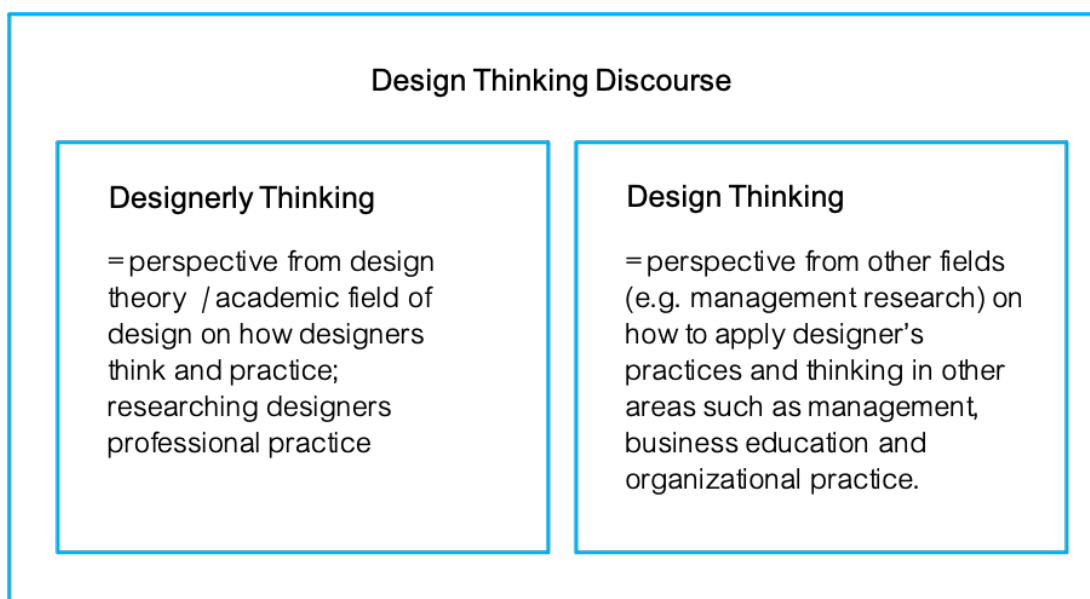


Figure 7: Design Thinking discourse (Johansson-Sköldberg et al., 2013)

The concept “Design Thinking” is widely used both in theory and in practice (Johansson-Sköldberg et al., 2013; Kimbell, 2011, 2012; Razzouk & Shute, 2012) According to a study by Johansson-Sköldberg et al. (2013), reviewing relevant Design Thinking literature, there exist many different definitions of the term “Design Thinking” in academic and practitioner-orientated literature. Thus, the whole variety of discourses on Design Thinking can be broken down into two discourses: Design Thinking and Designerly Thinking (see Figure 7). One part of the literature approaches the subject by referring to and defining the academic construction of “Designerly thinking”. Whereas the other

discourse mainly describes “Design Thinking” as a practice that uses “Design-erly Thinking” beyond the design context. Even if the terms or designation of those two main approaches slightly differ, the aspect and notion of the classification into two discourses are also mentioned in several studies (Cross, 1982; Dorst, 2011; Kimbell, 2011). Overall, the work of Johansson-Sköldberg et al. (2013) summarizes the different theoretical perspectives on designerly thinking into five sub-discourses and classifications as illustrated in Figure 8:

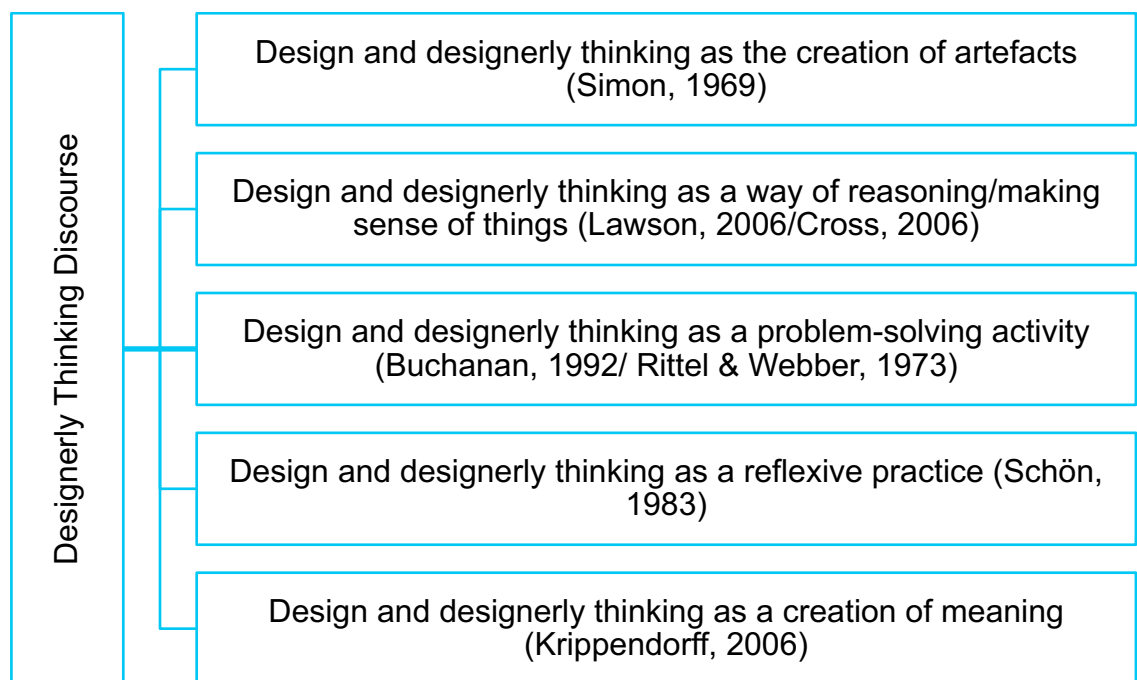


Figure 8: Sub-discourses on Designerly Thinking (Johansson-Sköldberg et al., 2013)

Simon (1996) is often cited and has been described as the “foundational father of design research in the way Taylor was for management research” (Johansson-Sköldberg et al., 2013, p. 124). In 1987, Peter Rowe, a Harvard architecture professor, introduced the term “Design Thinking” as a cognitive, rational process in his same-titled book on a theory of architectural design (Rowe, 1987). In addition to Simon, Schön and Buchanan are often quoted as initial and inspirational thinkers and their views on Design and Design Thinking provided valuable ideas feeding into the discourse with considerable impact

(Dalsgaard, 2014). Schön introduced the idea to describe designers thinking as the notion of “co-evolution” of problem and solution by moving through action and reflection in an iterative process (Schön, 1984). While Schön is taking a descriptive approach to Design Thinking by defining it as an iterative process of reflection, Buchanan focuses on the idea of Design Thinking as an approach to problem-solving (Buchanan, 1992; Schön, 1984). Buchanan describes Design Thinking as a way to deal with so-called “wicked problems (see Section 3.3.1 for a more detailed introduction of Wicked Problems as a key theme) as introduced by Rittel and Weber, and therefore as a problem-solving method used by designers (Buchanan, 1992; Rittel & Webber, 1973). Thus, Buchanan shifted away from the design theory towards a more general concept of Design Thinking that could be applied in any discipline (Buchanan, 1992). In the following section, the recent literature on Design Thinking (management-oriented view) will be examined. Here, Design is perceived as a valuable approach for businesses to solve problems in an innovative way, building upon the Designers’ toolkit (Brown, 2008).

In contrary to the studies on Designerly Thinking within the “world of Design”, the discourse regarding the possibility of transferring this “way of thinking and doing” beyond the design context became popular with the release of Tim Brown’s (2009) “Change by Design”. While the Design Thinking discourse in academia has existed for a long time, the popularization of the Design Thinking concept has evolved within the last years. In general, the term “Design Thinking” is much younger than the discourse on Designerly thinking, and therefore its research is not as robust or extensive (Johansson-Sköldberg et al., 2013). Therefore, some important concepts are popular in practice rather than rigorously explored within the academic literature. Tim Brown was one of the first, transferring the idea of Design into the “outer world” and moving Design Thinking into the spotlight of the management learning discourse. Brown (2009) suggested applying the design firm IDEO*’s Design Thinking process to create innovation within business and describes Design Thinking as a human-centered organizational process that inspires innovation (Brown, 2009). In so doing, he made the practices of designers accessible and relevant to managers.

*IDEO (www.ideo.com) is a global design company, founded in 1991 by Tim Brown and David Kelley, early leaders in the promotion of Design Thinking as a way of working and transferring Design Principles in the Innovation sector (Johansson-Sköldberg, 2013). Thus, IDEO as a global design and innovation company has been a key driver in the emergence of human-centred design (Dell’Era et al., 2020) and promoting the Design Thinking concept beyond the Design context.

Early works on Design Thinking proposed its wide-ranging applicability, such as Buchanan for example stating in 1992: *“The subject matter of design is potentially universal in scope, because Design Thinking may be applied to any area of human experience”* (Buchanan, 1992, p. 16). Brown’s theories are compelling but lack a theoretical framework or any academically robust basis in research (Johansson-Sköldberg et al., 2013) even though Brown never claimed to be academic (Kimbell, 2011). The academic literature on Design Thinking shifted its focus and identified Design Thinking as *“an exciting new paradigm for dealing with problems in many professions”* (Dorst, 2011, p. 521). In response to a modern world where innovation cycles are becoming faster, organizations expressed interest in studying the designer’s practices in order to develop new skills and strategies to face open and complex problems (Dorst, 2011). For this, the open abductive reasoning of designers’ practice was considered to be particularly useful.

As in Designerly Thinking, the definition of what Design Thinking is – or consists of, is blurred. According to Johansson-Sköldberg et al. (2013), the discourse on Design Thinking can be structured in three different perspectives, as visualized in Figure 9 below.

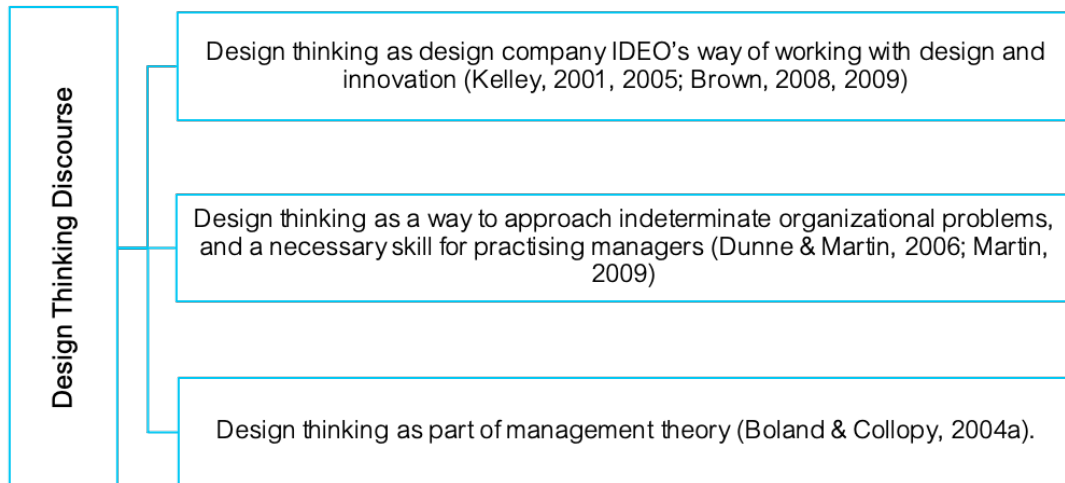


Figure 9: Design Thinking discourse (Johansson-Sköldberg et al., 2013)

Figure 9 demonstrates that within the discourse on Design Thinking different perspectives and approaches to defining what Design Thinking is (or should be) have been taken. Generally, Johansson-Sköldberg et al. (2013) differentiate three discourses: Design Thinking as a way of working in the innovation sector (Brown, 2008; Brown, 2009), Design Thinking as a necessary skill that managers should adapt from Designers in order to solve organizational problems (Dunne & Martin, 2006) and Design Thinking as part of the management theory (Boland & Collopy, 2004). Complementary to this, Hassi and Laakso (2011) define that Design Thinking, as used within management, consists of the following three elements: a set of practices, a cognitive approach, a mindset. Without anticipating, these categorizations can be perceived similar to the discussion on the perspectives on entrepreneurship as illustrated in the earlier Sections 2.12.5. Further, the different perspectives on Design Thinking will be further elaborated in the forthcoming Section 3.6 on the definitional discourse on Design Thinking within this work. This will reinforce the conceptualization of common core principles in the nexus of Design Thinking and Entrepreneurship Education. In the following, the core ideas will be presented by reflecting on the Design Thinking process models and other elements that emerged from the literature.

3.2 Design Thinking Process Models

Within the Design Thinking discourse, Design Thinking has been often conceptualized as a process (Elsbach & Stigliani, 2018; Seidel & Fixon, 2013). However, the weaknesses of this idea are obvious as this perspective prevents flexibility in thinking (Auerhammer & Roth, 2020) and as Design Thinking is never a clear linear process, and design problems are seen as “wicked” (Buchanan, 1992) without a single solution (see Section 3.3.1 for a more detailed introduction of Wicked Problems as a key theme). Furthermore, Rittel (1987) and Brown (2009) argue that Design Thinking cannot be fully pictured as sequential steps by supporting the view that “There is no clear separation of the activities of problem definition, synthesis, and evaluation. All of these occur all the time” (Rittel, 1987, p. 2), and design processes should rather be seen as spaces (in the case of Brown: Inspiration, Ideation, Implementation) than steps (Brown, 2008).

However, as Design Thinking tries to provide a framework – the idea of a process (step by step) can be found in most of the recent literature and is helpful in providing a guideline for practice, as shown by Razzouk & Shute, who state that “Design Thinking is generally defined as an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback and redesign” (Razzouk & Shute, 2012, p. 330). The five-stage Design Thinking Process (see Figure 10) by the d.school (2010) is presented as exemplary to describe the general principles of process models:

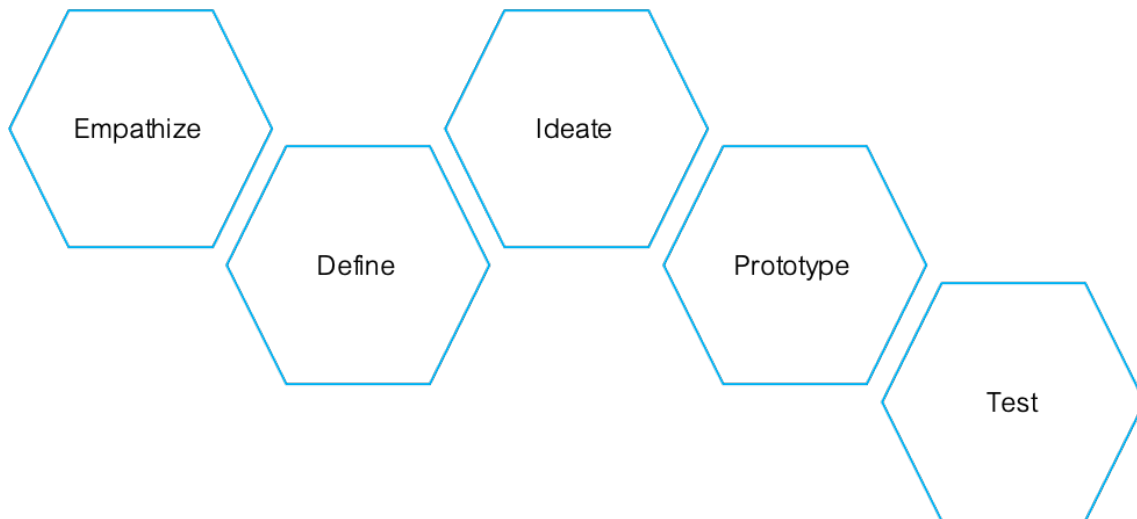


Figure 10: Five-stage Design Thinking process (d.school; 2010)

The five stages within this model are: Empathize, Define, Ideate, Prototype, Test – the model is described as iterative and human-centered. The process proceeds as follows: the first step is to frame the problem space by gaining an empathic understanding of the problem (Empathize), the people’s perspective and their needs, methods used in this process step are, e.g. observation and interviews in order to collect as much information as possible to gain a deeper empathy for the problem and develop the best possible understanding for the problem that should be solved and its user (or human), including the underlying needs. Secondly, all the collected information is be gathered and structured (Define) by analysing and synthesizing the information into insights, which identify patterns and define the problem space by framing the (human-centered) problem statement. (e.g., in this phase the well-known method of defining a “How might we...” question is applied). After the problem has been observed and analysed, ideas to solve the problem are generated in the third phase (Ideate). Using different ideation and creative techniques, a wide range of solutions and ideas is generated and selected. Next and fourthly, the selected solutions are quickly prototyped through e.g., rough sketches or crafted physical objects, making the ideas and solutions more tangible (Prototype). Lastly, the developed prototypes are investigated and tested (Test), involving

end-users in order to get feedback to improve and examine the developed solutions. It is noted that this process should be understood as iterative and non-linear – in practice, the stages are not always sequential but occur in parallel or are repeated in an iterative way.

Among the five-stage model by Stanford University d.School (2010), a tremendous amount of different stage models for Design Thinking has been developed. Table 1 gives an overview of some of the most popular Design Thinking process models:

Author/Source	Design Thinking process model – Steps
d.school Stanford, 2010	Emphasize –Define – Ideate – Prototype - Test
IDEO Design Company, 2012	Inspiration – Ideation – Implementation
Design Council, 2005	Discover – Define – Develop – Deliver
Martin, 2007	Generate Ideas (Abduction) – Predict Consequences (Deduction) –Test - Generalize (Induct)
Liedtka & Ogilivie, 2011	visualization, journey mapping, value chain analysis, mind mapping, brainstorming, concept development, assumption testing, rapid prototyping, customer co-creation, learning launch
Ray, 2012	Identify opportunity – design – prototype – get feedback – scale and spread – present
Hasso Plattner Institute (HPI), 2014	Understand – Observe – Define Point of View – Ideate –Prototype – Test

Table 2: Design Thinking process models in comparison

Even though the different Design Thinking process models differ regarding their number of steps and stages, most of them have common elements in that they are iterative, recursive, and non-linear. Thus, the Design Thinking process models reflect this with never-ending “loops” in order to search for, or come

closer to, a possible solution. The idea of iteration is key to Design Thinking based on the solving of wicked problems (see Section Iteration and Prototyping as Principles 3.3.2 on Iterative Principles as a key theme) and will later on play an essential role as it defines one of the core conceptual commonalities between the concepts of Design Thinking and Entrepreneurial Thinking (see Section 4.2).

3.3 Design Thinking Themes and Models

Even though Design Thinking is a fragmented term, with different complex definitions, common themes emerge. Recent research has conceptualized Design Thinking along similar themes, such as the definitions of ten main attributes that connote Design Thinking by Micheli et al. (2019) or the five themes (User Focus, Problem Framing, Diversity, Experimentation, Visualization) identified by Carlgren et al. (2016). A review of this and other literature on Design Thinking identifies five themes as being key to defining Design Thinking (see Figure 11).



Figure 11: Design Thinking themes and key principles

In order to further conceptualize the key principles in Design Thinking, each identified theme (Wicked Problems, Human-Centredness, Interdisciplinarity, Tangibility and Creative Confidence) will be presented and examined in detail in the following sections.

3.3.1 Wicked Problems & Divergent Thinking within Problem-Solving

As Design Thinking is often treated as a problem-solving approach (Dorst, 2011) the idea of problems being “wicked” is essential to the concept of Design Thinking. Buchanan, referring back to Rittel and Weber (1973) introduced the idea of wicked problems to the design community (Buchanan, 1992). This comes with an emphasis on problem understanding as an important part of the design process, in that it is essential to structure, shape and understand the problem first instead of just identifying it and then work towards the solution (Christensen, 2009). Most Design Thinking process models embrace the idea of a “problem understanding” and “solution formulation” phase as separate. Problem-solving as a process often starts with the creation of a problem space to encounter the problem situation (Dorst, 2011). This problem space defines the environment in which the search for a solution takes place (Simon, 1969). This problem space is easy to define if the problem is known to the problem-solver (e.g., from daily personal or professional life) because the problem space can be filled with known information. However, this is different if a problem has to be solved which hasn’t been encountered before, in this case, the problem space needs to be explored through discovery and observation processes (Simon, 1969).

Within this context, another well-known model associated with Design Thinking is the Double Diamond Model (illustrated below in Figure 12) combining the ideas of divergent and convergent thinking with the distinction of problem and solution phases (Design Council, 2005). Even though the Double Diamond Model can also be seen as a Design Thinking process model (see Section 3.2 on Design Thinking Process Models), it slightly differs in its focus, by not only focusing on the process steps itself but by emphasizing the switch between thinking modes (divergent vs. convergent) illustrated by the Diamonds (Design

Council, 2005). In this context, it needs to be referred back to Buchanan who notes the double repositioning of design problems by moving from signs to action (understanding the problem, collecting and interpreting insights) and then from action to signs (by redesigning a solution) (Brown, 2008). Buchanan's work is based on the concept of dividing the design process into two distinct phases, differing between *problem definition* and *problem solution* (Buchanan, 1992; Rittel & Webber, 1973).

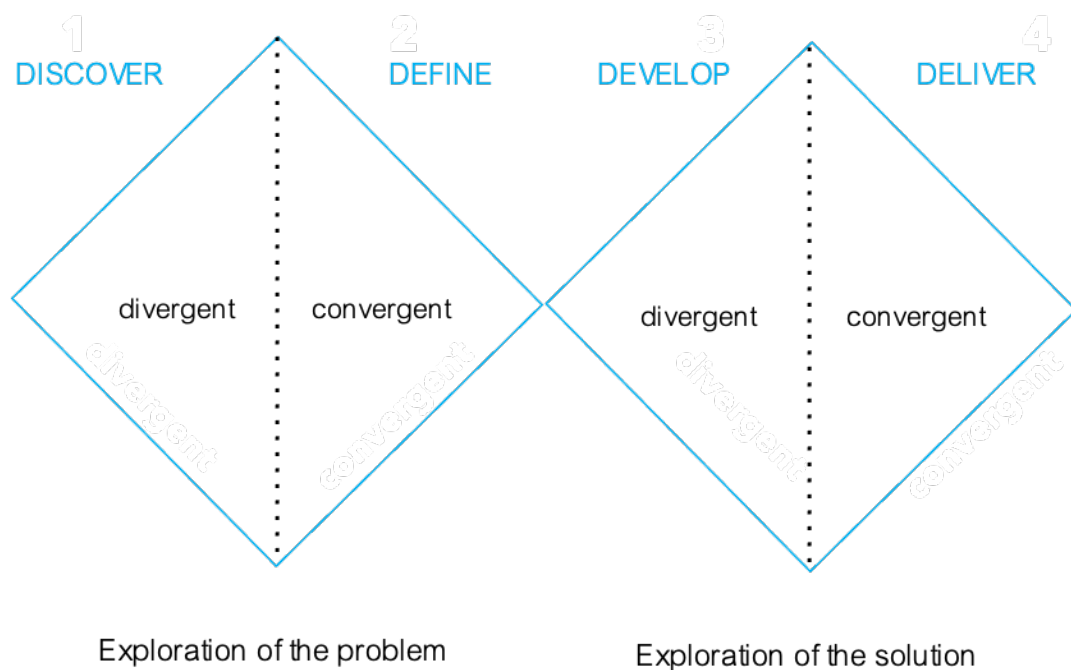


Figure 12: Double Diamond model (Design Council, 2005)

This idea is shown in the Double Diamond design process model (Figure 12), distinguishing between the “problem space” and the “solution space”. The Double Diamond model defines four different stages, in the two spaces, always switching between a divergent and convergent thinking mode. This model is like Owen's (1998) model, that defines Design Thinking through its switch between analytical and synthetical phases. It needs to be noted in this context that Dorst (2011) does not agree with the differentiation of the problem and the solution exploration, stating that the “parallel creation of a thing (objective, service, system) and its way of working is the core challenge of design reasoning” (Dorst, 2011, p. 525).

Even though some processes might run in parallel, most other process models – regardless of their different steps and stages – incorporate this logic of separating the problem and the solution space. The importance of defining and framing the problem as a starting point for the Design process has also been shown by Dorst and Cross (2001). Rittel and Weber (1973) suggest that wicked problems are endless in a way that there is never a definite end to the problem-solving process, because there is no definite solution, and further, the solution to a wicked problem cannot be either right or wrong. By that logic, as there is not only one solution to a Wicked problem the solution can be only good or bad, or better or worse, but never correct (Rittel & Webber, 1973). Moreover, it was noted that “*there are degrees of wickedness*” (Christensen, 2009, p. 20). The idea of wicked problems comes with a special approach or “attitude” towards the problems solving process (Boland & Collopy, 2004). Boland and Collopy (2004) make a distinction between a decision and a design attitude: Within the world of management, problems are seen as stable and problem solving as a decision process, evaluating and analysing different alternatives (decision attitude); by contrast, the design attitude approaches problems by creating new opportunities and inventing new solutions (Boland & Collopy, 2004; Dunne & Martin, 2006). Along with this, comes the idea of iteration and prototyping as important principles, which will be introduced in section 3.3.2.

3.3.2 Iteration and Prototyping as Principles

Iterative thinking or Iteration is one of the key themes identified in the Design Thinking literature (Brown, 2009; Huber et al., 2016; Kelley, 2005). Building upon the idea that Design Thinking addresses Wicked Problems which are indefinite in a way that the solutions to it can only be good or bad or better or worse, but never correct (see previous Section 3.3.1), it clarifies why an iterative approach is a way to approach such wicked problems and identify suitable solutions.

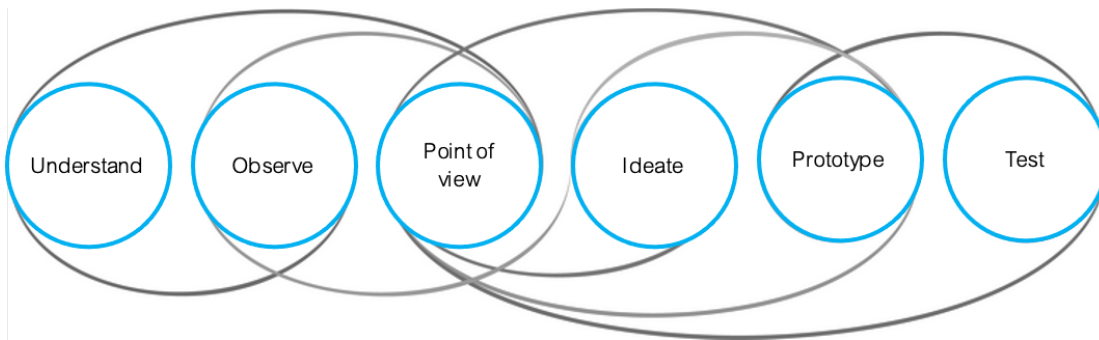


Figure 13: The iterative Design Thinking process (HPI, 2014)

This iterative character is for example represented within the six-phase model of the Hasso Plattner institute (HPI), visualized by repeating “waves” – see figure 9. Within the previous chapter (see Section 3.2), the myriad of process models within Design Thinking have been explained with more detail and most of them reflect and include iterative loops within the process. Thus, the figure illustrates a Design Thinking process model, emphasizing the iterative character of the process by the illustration of waves/loops that move forwards and backwards between the different steps. Thus, Design Thinking embraces prototyping (i.e., the creation of a first version of a product or service for testing) as a way to develop and test an idea and obtain useful user feedback. As stated by Brown (2008): “The goal of prototyping isn’t to finish. It is to learn about the strengths and weaknesses of the idea and to identify new directions that further prototypes might take.” (Brown, 2008, p. 87).

Prototyping, at its core, is about transferring ideas and explorations from a conceptual world towards a physical. As such, Prototyping is also a way to build a coherent convergence of different ideas, making it more tangible to the potential user but also to the design team itself (Brown, 2008). Regarding the fact that Design Thinking is often used to solve “Wicked problems”, Prototyping is a fitting method to approach a solution, as stated by Christensen saying that “Wicked problems demand an opportunity-driven approach: they require making decisions, doing experiments, launching pilot programs, testing prototypes, and so on” (Christensen, 2009, p. 20). The prototype (which can be a physical

object but does not have to) also can be seen as a constitution of a shared language and a way to communicate the idea (Brown, 2008). As stated above, prototyping can work as an internal tool (for the team to create a shared understanding) as well as an external tool, in order to present and communicate, or test the idea to get feedback (Brown, 2008). Furthermore, depending on where in the process Prototyping is applied, it can not only inform the evaluation of a solution but also potentially inspire some further ideation (Seidel & Fixson, 2013). As described in the process models associated with Design Thinking, Prototyping is included in most of the Design Thinking processes (Boland & Collopy, 2004; Brown, 2009).

However, the idea of prototyping within Design Testing goes further than just “testing” and making things tangible, Prototyping in Design Thinking is not only used as a method, tool, or step in the process, it also can be seen as an attitude or mentality within this context. In addition, the definition of Kelley states Prototyping as “thinking with your hands” and characterizes Prototyping as a thinking mode. Thus, Design Thinking embraces the doing and fosters an attitude of experimentation (Brown, 2009; Liedtka & Ogilvie, 2013), which is why this theme is strongly connected with the notion of experimentation (Boland & Collopy, 2004; Carlgren et al., 2016; Dell’Era, 2019). As stated, the prototyping principles also plays an essential role in order to get user feedback and put the human first and the importance of desirability and a human-centred approach will be further introduced within the next section (3.3.3).

3.3.3 Desirability and Human-Centered Approach

In contrast to a technology – or organization-oriented approach, Design Thinking puts the human (needs) in the centre of the innovative problem-solving process (Kimbell, 2011). The working principle of user-centricity has been established in the design literature for a long time, although recently the terms used in the language shifted from user-centricity to human-centred design (Brown, 2008; Kimbell, 2009). By putting people first, Design Thinkers show the ability of empathy, to see the world from different perspectives and identify

needs that inspire innovation (Glen et al., 2014). Therefore, empathy is the centrepiece in defining Design Thinking as a human-centred approach to problem-solving (Carlgren et al., 2016) and Design Thinkers are, by definition, empathetic (Brown, 2008).

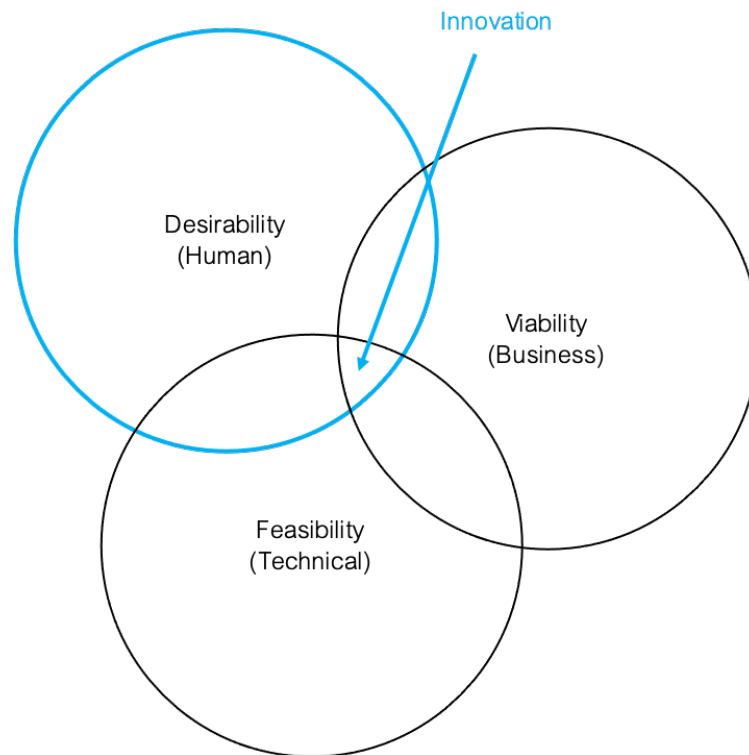


Figure 14: Design Thinking model - Sweet Spot of Innovation (Brown, 2008)

The importance of desirability within the process of innovation is visualized (see Figure 14) and conceptualized with the “sweet spot of innovation”, describing a framework of three intersecting spaces: desirability, feasibility and viability (Brown, 2009).

It illustrates the definition of Design Thinking as “a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity.” (Brown, 2008, p. 86). While innovation occurs when all three factors are met and balanced (as shown in Figure 14), Design Thinking especially embraces the factor of desirability, by putting people’s need at the starting point of the process of innovation. The intersection

of this principle with the notion of Entrepreneurship will be later discussed in the forthcoming section on the conceptual interface (see Section 4.2). Building upon the idea of Design Thinking as human-centred (see Section 3.3.2), the use of different perspectives is also represented in the ideal Design Thinking Team. Thus, the next theme (Section 3.3.4) has been identified as “interdisciplinarity and multidisciplinary teams” as an important element of Design Thinking.

3.3.4 Interdisciplinarity / Multidisciplinary teams

Interdisciplinary collaboration is key to addressing wicked problems from diverse perspectives (Dell’Era, 2019; Dunne & Martin, 2006) and thus, the perfect Design Thinking team is considered to be multidisciplinary, highly collaborative and not hierarchical structured (Brown, 2009). As such, diverse perspectives are represented internally by a project team with different backgrounds and beyond: by also including specialist views and outside perspectives (Dunne & Martin, 2006). This is a recurring theme in the Design Thinking literature (Johansson-Sköldberg et al., 2013; Carlgren et al., 2016) especially if Design Thinking is presented as a method for innovation (Brown, 2009). The academic literature has presented several potential benefits of multidisciplinary teams in innovation projects, as when it comes to innovation, a wide range of perspectives provide multiple ways to approach a problem (Seidel & Fixson, 2013; Taylor & Greve, 2006).

In acknowledging the literature on innovation and creativity, both innovation and creativity benefit from a variety of perspectives (Penaluna & Penaluna, 2009). Thus, typical Design Thinking teams include a mixture of different specialisms or disciplines as well as diversity. Contrary to other popular agile methods such as Scrum, the Design Thinking concept does not have any prescriptive roles within the team, even though different roles within the team – such as the moderator or the timekeeper - may be assigned (Thoring et al., 2014). Usually, the hierarchies are flat and there is no team leader. An important concept within this context is the so-called “T-shaped profile” of the typical Design Thinking Team (Brenner et al., 2016; Brown, 2009).

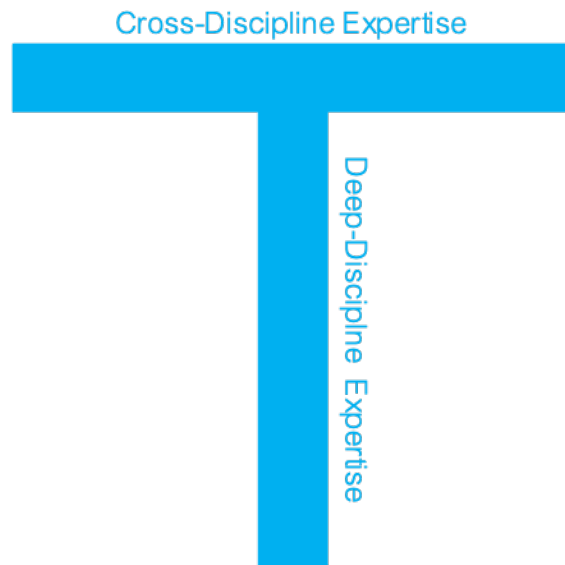


Figure 15: Illustration of T-Shaped skills (Brown, 2008)

The T-shaped Skills profile suggests that each team member should demonstrate a special expertise within one specific discipline on the one hand while also being knowledgeable in several other areas (Kelley, 2005). Thus, the depth of expertise within one specific field is symbolized by the vertical line of the “T”. The horizontal line of the “T” illustrates the ability for meaningful collaboration through the skills to make connections, build bridges and show interest in other disciplines and domains and adjacent areas (Huber et al., 2016; Thoring et al., 2014). Therefore, the ideal Design Thinking team member is an expert within their field, but also able to apply the expertise to areas beyond the primary field.

A team-based approach with an emphasis on multidisciplinary and interdisciplinarity is an important and widely discussed theme within the Design Thinking literature (Brown, 2009; Kelley, 2005; Welsh & Dehler, 2013). Indeed, it has been proposed that the superiority of multidisciplinary teams is moderated by the positive belief of each team member which leads not to a higher quantity but higher quality of ideas (Nakui et al., 2011). The quality of ideas is also influenced by the creative confidence of the Design Thinking team, which will be further elaborated on within the next section.

3.3.5 Curiosity, Optimism and Creative Confidence

Creativity plays an important role in the design process (Dorst & Cross, 2001; Owen, 2005). Design Thinking in the popular literature is often misunderstood in that any creative activity is labelled as Design Thinking (Dorst, 2011). Nevertheless, an optimistic, proactive and curious approach to creativity is a key principle of design thinking, because Design Thinking is driven by the desire to change things for the better (Brown, 2009; Owen, 2005).

Along with this comes the idea of “Creative Confidence” as presented in the popular book of IDEO founder Kelley (Kelley & Kelley, 2013), in which it is stated that Design Thinking rather evokes creativity than creating it. To approach “wicked problems” Design Thinkers are required to be confident and optimistic about their ability to creative problem solving. Creative confidence, therefore, refers to a person’s trust in their own creative problem-solving ability (Jobst et al., 2012). Moreover, curiosity is an essential part to foster the notion of surprise, in a sense of a surprising, and therefore the innovative solution to a problem (Dorst, 2011; Dorst & Cross, 2001; Schön, 1984).

This attitude also influences the approach to constraints: unlike scientific thinking, Design Thinking embraces constraints “as the impetus to creative solutions” (Dunne & Martin, 2006, p. 518). Building upon the understanding of wicked problems as indefinite, Design Thinking as a method needs to deal with uncertainty and ambiguity, which can be best addressed by an optimistic attitude (Dorst & Cross, 2001). Along with the theme of creative confidence comes the specific emphasis on visualization and the ability to visualize is described as a central characteristic of design thinkers (Razzouk & Shute, 2012).

Within Design Thinking practice, many tools, methods and rituals build upon training ability for creativity, curiosity and visualization such as ideation techniques, the principle “show, don’t tell”, and brainstorming rules among many others (Stanford, 2009). Overall, creativity and creative problem-solving are a persistent theme within the literature defining Design Thinking (Brown, 2009; Johansson-Sköldberg et al., 2013; Kelley & Kelley, 2013; Razzouk & Shute, 2012). Besides the Creative Confidence, the previous sections have illustrated

the core themes of Design Thinking centring around the notions of Wicked Problems, the Principles of Iteration, Human-Centredness, and Interdisciplinarity. Besides the illustration of the main attributes that connote design thinking, this work will dive deeper into the definitional discourse of the concept discussing its display on different dimensions within the forthcoming section (3.4).

3.4 Discourse and Perspective of Design Thinking

Within the analysis of this work, it became apparent that the concepts of Design Thinking display a multiplicity of perspectives. As such the different dimensions presented in the literature will be reviewed and discussed here. As has been shown in the previous sections, there exist myriad definitions of the term “Design Thinking” in academic and practitioner-orientated literature. This demonstrates that within the discourse on Design Thinking different perspective and approaches to define what Design Thinking have been taken. Recent contributions have made the effort to structure the discourses along different levels of dimensions, as illustrated and summarized the in Table 3 below:

Source / Author	Level of Dimensions	Dimensions
<p>“Four kinds of design thinking: From Ideating to making, engaging and criticizing”</p> <p><i>Dell’Era et al. (2020): Creativity & Innovation Management</i></p>	<p>Four kinds of Design Thinking defined as a result of the analysis of Design Thinking practice in consulting organizations</p>	<ul style="list-style-type: none"> • Design Thinking as Creative Problem Solving: Solving wicked problems by adopting both analytical and intuitive thinking. • Design Thinking as Sprint Execution: Delivering and testing viable products to learn from customers and improve the solution • Design Thinking as Creative Confidence: Engaging people to make them more confident with creative processes • Design Thinking as Innovation of Meaning: Envisioning new directions that aim at proposing meaningful experiences to people
<p>“Design Thinking: Past, Present and Possible Futures”</p> <p><i>Johansson-</i></p>	<p>Connecting to three different origins of the Design Thinking course within the management area</p>	<p>Three different perspectives without hierarchical order:</p> <ul style="list-style-type: none"> • Design Thinking as a way of working in innovation • Design Thinking as a necessary skill

<p><i>Sköldbberg et al. (2013); Creativity & Innovation Management</i></p>		<ul style="list-style-type: none"> • Design Thinking as part of management theory
<p>“Conceptions of Design Thinking in Design and Management Discourses”</p> <p><i>Hassi & Laakso (2011); Proceedings of IASDR2011</i></p>	<p>Differing between Design Thinking practices; thinking styles and mentality</p>	<p>Design Thinking as</p> <ul style="list-style-type: none"> • A set of practices • A cognitive approach • A mindset
<p>“Design Thinking and Entrepreneurship Education: Where Are We, and What Are the Possibilities?”</p> <p><i>Sarooghi, H., Sunny, S., Hornsby, J; Fernhaber, S., (2019): Journal of Small Business Management</i></p>	<p>Introduces three potential categories in order to classify the different definitions of Design Thinking based on Brenner, Uebernickel & Abrell (2016)</p>	<p>Three different Perspectives* without hierarchical order:</p> <ul style="list-style-type: none"> • Mindset = characteristics of the problem agent • Process = different stages of the problem-solving effort • Tool = array of frameworks and techniques <p>*Adopted from Brenner, Uebernickel & Abrell 2016</p>
<p>“Design Thinking-Based Entrepreneurship Education: How to incorporate Design Thinking Principles into an Entrepreneurship Course”</p> <p><i>Huber et al. (2016): 3 E Conference ECSB</i></p>	<p>Introduce the “APE* Pedagogical Pyramid”, when students reach the highest stage of “mindset & Beliefs” the pyramid is turned upside-down.</p> <p>*= APE Academic Program for Entrepreneurs, the curriculum “builds heavily on the principles of Design Thinking” (p.10)</p>	<p>Within hierarchical order differing between four different stages with Tools & Methods as the lowest stage of the Pyramid</p> <ol style="list-style-type: none"> 1.) Mindset & Beliefs 2.) Principles & Rules 3.) Process (Implicit & explicit) 4.) Tools & Methods

Table 3: Overview on influential literature framing the Design Thinking perspectives

As shown in the overview (Table 3), Johansson-Sköldberg et al. (2013) differentiate between three different perspectives; Design Thinking as a way of working in the innovation sector (Brown, 2008; Brown, 2009), Design Thinking as a necessary skill that managers should adapt from Designers in order to solve organizational problems (Dunne & Martin, 2006) and Design Thinking as part of the management theory (Boland & Collopy, 2004) – which has been introduced in Section 3.1 on the evolution of the term.

In parallel, Hassi and Laakso define that Design Thinking, as used within management, consists of the following three elements: a set of practices, a cognitive approach, a mindset (Hassi & Laakso, 2011). Moreover, Brenner et al. distinguish between three different forms of Design Thinking, namely Design Thinking as a mindset, a process and a toolbox perspective (Brenner et al., 2016). Furthermore, Dell’Era et al. (2020) identified four different interpretations of the Design Thinking paradigm characterized by the different practices in consulting organizations, namely creative problem-solving, sprint executions, creative confidence and innovation of meaning. Overall, as shown in Table 3, there can be seen a significant diversity in the definitions and different perspectives on Design Thinking. However, this can be seen as a deserved representation of the richness of the concept and the different perspectives on it (Sarooghi et al., 2019). At the end of this chapter, the definitional framework of Design Thinking within this thesis will be summarized utilising the point made here (see Section 3.6). Bringing the focus back to education, the forthcoming section addresses the concept of Design Thinking with a focus on how it pertains in the educational context.

3.5 Design Thinking within Educational Context

As Design Thinking can be applied on many levels as shown in the previous chapter, this is also true for the field of education. It has been proposed that Design Thinking holds major promise in bringing education into the 21st century (Henriksen et al., 2017) addressing the issues raised, that traditional ways of learning are unable to keep pace (Thomas & Brown, 2011). Design Thinking has claimed a space within a new culture of learning, focusing on learning

within the world as opposed to teaching about the world. Moreover, within the design education literature, Design Thinking is proposed as a driver for twenty-first century educational transformation (Kickbusch et al., 2020).

As described by Melles et al. (2012), who reviewed existing courses in Higher Education on Design Thinking, Design Thinking can be incorporated in Education as a course logic (e.g., Master in Design Thinking), a course unit, as a seminar – or at its highest level, as an approach to education and general philosophy (Melles et al., 2012). Additionally, Design Thinking Education can be delivered in Design Education context (design schools) and other schools, which aim to integrate Design Thinking in a Non-Design context. While Design Thinking can provide a relevant toolkit of methods for Educators (IDEO, 2012), it can also aim for a whole new perspective on education and the design of schools (Kickbusch et al., 2020). For example, Dunne and Martin (2006) propose that Design Thinking as an approach to business education might be revolutionary as the current system of business schools is ‘broken’ with major critiques on what is taught, how and to whom it is taught (Dunne & Martin, 2006). However, this is not only relevant for Business education. The application of Design Thinking in the educational context has already spread through many different disciplines and the opportunities of the Design Thinking integration is also discussed in e.g., nursing education or project management education (Beaird et al., 2018; Ewin et al., 2017). The following Figure 16 illustrates the different levels of a Design Thinking integration in Education as based on Melles et al., (2012).

As illustrated in the pyramid (Figure 16) Design Thinking can be incorporated into education as a course unit/ seminar, as a toolkit or at its highest level, as an approach to education general philosophy (Melles et al., 2012). Design Thinking tools and methods can be applied on its basic level by integrating project work using the Design Thinking process and methodology and applying Design Thinking principles such as prototyping, testing, and working in interdisciplinary teams. By this, Design Thinking in education will help to “design learning that enables students to work in multidisciplinary teams and enact positive, design-led change in the world” (Rauth et al., 2010. p.2).

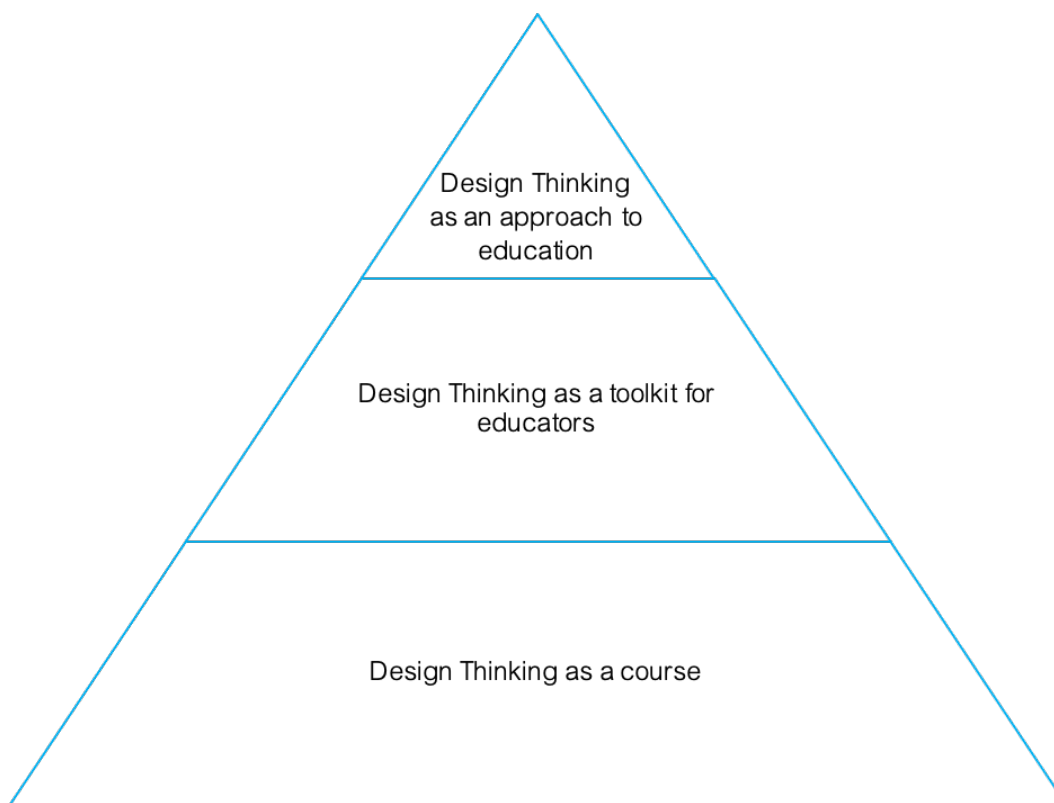


Figure 16: Different perspectives of Design Thinking integration in education

Moreover, Rauth et al. (2010) reflected on Design Thinking as a learning model and “as a metadisciplinary concept and education model” (p.1). Above this, Design Thinking can be perceived as a creative approach to education that promotes the idea of teachers as designers. Qualitative research by Rauth et al. (2010) at the well-known d.schools in Potsdam and Stanford, one of the most influential schools of Design Thinking, aimed to understand the role of Design Thinking as an educational model. They did this by interviewing Design Thinking teachers and concluded creative confidence to be an important goal of Design Thinking education.

Visualized in the pyramid (Figure 17) Design Thinking education can be described as follows: methods and tools are used to express creative behaviour while the process provides a cognitive framework, by repetitively applying the process a certain mindset is developed, which is manifested in creative behaviour in uncertain situations and leads to the development of creative

competence. While the d.school is an established school for design Thinking, the design agency IDEO (founded by Tim Brown and David Kelley – see Section 3.1. for background information on IDEO) has also driven the application of Design Thinking within the education sector. Within this context, their program “Design Thinking for Educators” needs to be noted (IDEO, 2012). Thus, the Design Thinking process is reframed for educators (mostly primary and secondary school) by an adaptation of the Design Thinking process on a pedagogical approach and matching applied methods to each phase of the process. In its Design Thinking toolkit, IDEO presents Design Thinking as an approach to “the design and development of learning experiences (curriculum), learning environments (spaces), school programs and experiences (processes and tools) and system strategies, goals and policies (systems)” (IDEO, 2012, p. 12). On its basic level, Design Thinking Tools and methods can be applied in education such as integrating project work using the Design Thinking process and methodology and applying Design Thinking principles such as prototyping, testing or working in interdisciplinary teams. As such, Design Thinking in education can help to “design learning that enables students to work in multidisciplinary teams and enact positive, design-led change in the world” (Rauth et al., 2010, p. 2).

Henriksen et al. (2017) present a qualitative study on Design Thinking as a creative approach to education and it is also Henriksen who promotes the idea of teachers as designers. In their study, they used the Stanford Design Thinking process (Empathize, Define, Ideate, Prototype, Test – see Section 3.2) to reflect on the potential of Design Thinking in the teacher education (Henriksen et al., 2017). Rauth et al. (2010) reflected on Design Thinking as a learning model and “as a metadisciplinary concept and education model” (Rauth et al., 2010, p. 1). In addition, Design Thinking in education has been described as a cognitive style stimulating curiosity within students (Kimbell, 2011). Overall, a trend in the literature has been identified that shows Design Thinking endorsed as an overarching framework to re-envision education within the twenty-first century (Jobst et al., 2012; Johansson-Sköldberg et al., 2013; Kickbusch et al., 2020; Razzouk & Shute, 2012). Thus, similar to the understanding of Design

Thinking as a mindset (see Section 3.4), the mindset of the educator is considered essential in order to increase their own capability to facilitate the acquisition of future skills and similar capabilities of their students (Kickbusch et al., 2020).

3.6 Summary and Definitional Framework

The previous sections have reviewed the origin and evolution of Design Thinking and portrayed different perspectives on the discourse. As an introduction, the first section (Section 3.1) identified the starting point (Simon, 1969; Buchanan, 1992; Rittel & Webber, 1973) of the academic construction of the term from Designerly Thinking towards Design Thinking (Johansson-Sköldberg et al., 2013). Next, the Design Thinking process models (Section 3.2) and key themes (Section 3.3) that connote the term were defined. The review identified that Design Thinking centres on the notion of Wicked Problems and Problem Solving (Rittel & Weber, 1973; Dorst 2011), Prototyping and Iteration (Brown, 2008; Kelley, 2005; Christensen, 2009), Empathy and Human-Centredness (Kimbell, 2011; Brown, 2009), Interdisciplinarity and Collaboration (Brown, 2009; Dunne & Martin, 2006, Kelley 2005) as well as Creative Confidence (Dorst & Cross, 2001; Owen, 2005). From this point, Section 3.4 reviewed different perspectives on possible dimensions structuring the discourse on Design Thinking. Regarding this, Figure 17 presents the synthesized definitional framework of Design Thinking in this research. Within this work, the classification based on Brenner et al. (2016), differentiating between the three categories, “Mindset, Process and Tools” will be adapted and further developed, structured in a new hierarchical order (see Figure 6 - Pyramid of Design Thinking Perspectives). This classification also has been picked up by Sarooghi et al. (2019) discussing Design Thinking within the context of Entrepreneurship Education, and thus has been chosen within this work as the classification by Brenner et al (2016) refers to a comprehensive view on the Design Thinking concept and aligns most closely with the focus of this work on the educators perspective. Inspired by the four-stage Pedagogical Pyramid presented from

Huber et al. (2016), the three different perspectives on Design Thinking from Brenner et al. (2016) have been conceptualized within a hierarchical order as shown in Figure 17.

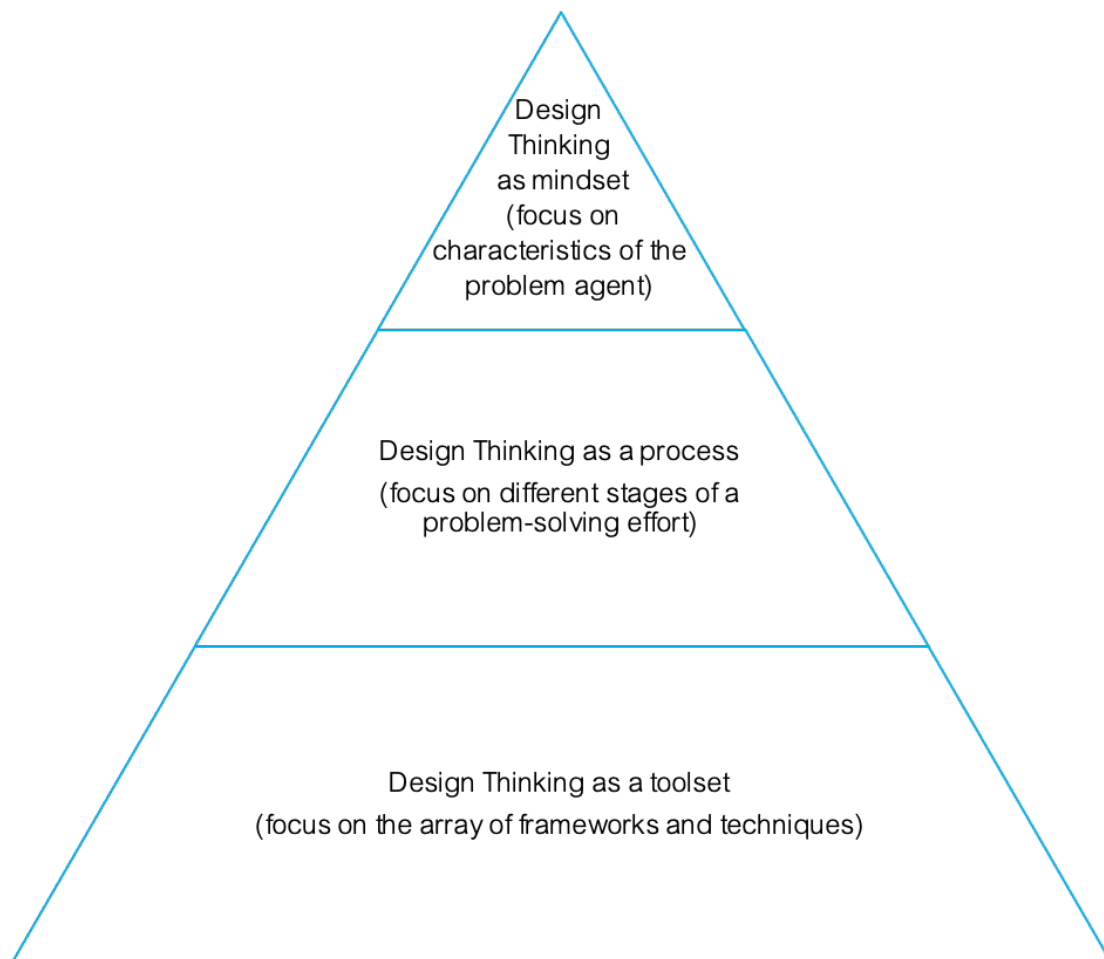


Figure 17: Pyramid of Design Thinking perspectives (Synthesis based on Sa-rooghi et al., 2019; Brenner et al., 2016; Huber et al., 2016)

Thus, the perspective of Design Thinking as a toolset with the focus on the array of frameworks and techniques is presented on the lowest stage. The process perspective adds a further layer on the understanding of Design Thinking by organizing the methods and tools within a process and focuses on the different stages of a problem-solving effort. Thus, this perspective is presented in the second stage. Lastly, on the highest level of the pyramid, the mindset perspective on Design Thinking is presented, focusing on the

characteristics of the problem-solving agent and understanding Design Thinking as a way of thinking. Overall, Figure 17 represents a synthesis of Design Thinking perspectives based on Sarooghi et al., 2019; Brenner et al., 2016; Huber et al., 2017. This synthesized conceptualization of the three predominant perspectives on the Design Thinking concept is highly influential for the further progression of this work, especially when researching the Entrepreneurship Educator's conceptual understanding of Design Thinking (see Section 7.3 for the results as well as Section 8.1 for discussion of the results in the context of the literature).

Chapter 4 Common Themes & Conceptual Framework

4.0 Introduction to chapter

It is one of the aims of this work to conceptualize the interface of Design Thinking and Entrepreneurship from an Entrepreneurship Education Perspective, therefore the following chapter examines the existing literature in this field (Section 4.1) and gives an overview of the reoccurring themes (Section 4.2 & 4.3). Despite shared philosophical roots and practical commonalities, the discourses and research streams on Design Thinking and Entrepreneurship have developed mostly in isolation. Some steps have been taken to bring the two together: most recently, a greater focus on Design Thinking and entrepreneurship and its potential unifying conceptual logic has been developed and has been researched with the focus on entrepreneurship practice, entrepreneurship research and entrepreneurship pedagogy (Saroghi et al., 2019). Analogue characteristics of designers and entrepreneurs such as experiential learning, mindsets and non-linearity have previously been illustrated in the research on the interface of creativity and business (Penaluna & Penaluna, 2009). Moreover, there has been research on the interface of design and entrepreneurship in a wider context such as Romme and Reymen (2018) presenting an inclusive framework on entrepreneurship at the interface of design and science, and Dimov (2016) introducing the concept of entrepreneurship as a design science.

However, in order to keep focus in the context of this work, the following section will focus on examining the nexus of entrepreneurship and Design Thinking from an *Entrepreneurship Education* perspective. Within the following, the existing literature discussing Design Thinking in the context of Entrepreneurship Education will be reflected. Based on the discussion of the existing literature in the field, the culmination of the theoretical part will be presented within the conceptualization and framework. This can be seen as a synthesis and further development from the literature review. In particular, this conceptualization differs between the conceptual and the educational level and discusses the different dimensions and themes in within Design Thinking and Entrepreneurship Education conflate.

4.1 Existing Literature on the DT/EE nexus

A number of developments have resulted in a greater focus on Design Thinking and Entrepreneurship Education and its potential unifying conceptual logic as the concept of Design Thinking shows parallels to the current debate on how to design and teach Entrepreneurship Education (Huber et al., 2016). Although Design Thinking has gained wide popularity and application in the entrepreneurship practice, the interface of entrepreneurship and Design Thinking has not been discussed sufficiently in academia (von Kortzfleisch et al., 2013). Previous research has failed to provide a proficient literature review on Design Thinking and Entrepreneurship Education (Johann et al., 2020). While this research gap exists, there are some publications contributing to the Entrepreneurship Education and Design Thinking nexus (see Table 4).

Without any claim to completeness, the table presents the most relevant and/or commonly cited core ideas and concepts contributing to the Literature on the Design Thinking and Entrepreneurship Education nexus and illustrates the development of the literature over time.

Year	Paper/ Author	Core Ideas	Themes on DT/EE nexus	Type of Study
2013	<p>“Potentials of Entrepreneurial Design Thinking For Entrepreneurship Education”</p> <p><i>von Kortzfleisch , H. F., Zerwas, D., & Mokanis, I. (2013). Procedia - Social and Behavioral Sciences</i></p>	<p>Entrepreneurial Design Thinking as a “team-diversity-based approach for treating user-centered problems as entrepreneurial opportunities within an iterative process supported by the use of creativity fostering tools and environments”</p>	<p>Entrepreneurial Design Thinking as a new method for the design of entrepreneurship education programs / DT/EE nexus described by:</p> <ul style="list-style-type: none"> • Similarity of Actors • Environment • Character • Tool 	<p>Conceptual (Entrepreneurial Design Thinking)</p>
2015	<p>“DesUni: university entrepreneurship education through design thinking”</p> <p><i>Nielsen, S. L., & Stovang, P. (2015). Education + Training</i></p>	<p>“The DesUni teaching model ... involves a change in curriculum, teaching methods, use of knowledge, teaching style, teacher-student relations, culture, habitat and assessment” (Nielsen & Stovang, 2015, p. 977)</p>	<p>Design Thinking principles as a new teaching model to form a new approach to entrepreneurship education, including:</p> <ul style="list-style-type: none"> • Designerly Action • Designerly Imagination • Designerly Mindset <p>Pedagogical Dimension:</p> <ul style="list-style-type: none"> • Knowledge • Assessment • Habitat and Culture • Facilitated Teaching <p>Design Methods</p>	<p>Conceptual teaching model, Case study test</p>

2016	<p>“Incorporating Design Thinking in Entrepreneurship Education”</p> <p><i>Zupan, B.; Nabergoj, A. (2016): European Conference on Innovation and Entrepreneurship; Reading</i></p>	<p>The conceptual model of design-thinking based entrepreneurship education by Zuban & Nabergoj proposes 9 components in order to guide course and content design of entrepreneurship courses.</p>	<p>The proposed conceptual model of Design-Thinking based Entrepreneurship Education consists of 9 blocks:</p> <p>Process components:</p> <ul style="list-style-type: none"> • Fieldwork • Experimentation • Interdisciplinarity • User-centred research <p>Environmental Components:</p> <ul style="list-style-type: none"> • Tools and spaces • Mentoring • External recognition <p>Other (Basis for success):</p> <ul style="list-style-type: none"> • Continuity • Meaningfulness of the project 	<p>Conceptual model of Design-Thinking based entrepreneurship education based on in-depth interviews</p>
2016	<p>“Design Thinking-Based Entrepreneurship Education: How to incorporate Design Thinking Principles into an Entrepreneurship Course”</p> <p><i>Huber et al. (2016): 3E Conference – ECSB Entrepreneurship Education Conference</i></p>	<p>Presentation of conceptual links between Design Thinking and entrepreneurship education answering the question: What can we learn from Design Thinking to enrich Entrepreneurship Education</p>	<p>Nine key concepts on the interface including:</p> <ul style="list-style-type: none"> • Wicked problems • Formalized Design Thinking process models • Divergent and Convergent thinking • Iterations • T-shape • Multidisciplinary teams • Creative confidence • Informed intuition • Studio Learning 	<p>Conceptual, Presentation of Course Design Example</p>

2016	<p>“Fostering an entrepreneurial mindset by using a Design Thinking approach in entrepreneurship education”</p> <p><i>Daniel, A. D. (2016): Industry & Higher Education</i></p>	<p>The article addresses the suitability of ‘design thinking’ as a teaching approach in entrepreneurship education by using case study research methodology, including a student questionnaire.</p>	<p>Design Thinking Process (six steps) is used as an Entrepreneurship one-semester module strategy</p> <p>Empathy, Interpret, Ideation, Prototype, Test, Implement matched to Entrepreneurial Awareness, Entrepreneurial Skills and Hands-On Entrepreneurial Skills</p>	<p>Case Study & Student Questionnaire</p>
2019	<p>“Implementing Design Thinking as didactic method in entrepreneurship education. The importance of through”</p> <p><i>Kremel, A.; Edman, K. (2019): The Design Journal</i></p>	<p>Case study of a didactic experience that uses Design Thinking as a method to teach “through” entrepreneurship</p>	<p>Reoccurring themes (no model provided)</p> <ul style="list-style-type: none"> • Mindset of experimentation and iteration with no fear of failure • The outcome of creation value • Experiences real-life practice • Social dimension, relationships with stakeholders • Iterative approach to problem-solving and prototyping 	<p>Case Study; Course Development, Survey with Students</p>
2019	<p>“Design Thinking pedagogy and enterprise education”</p> <p><i>McLuskie, P.; Dewitt, S. (2019): European Conference on Innovation and Entrepreneurship</i></p>	<p>The aim of this study is to extend understanding of Design Thinking pedagogy in the context of enterprise education.</p>	<p>Nexus is only sketched and synergies are described based on Six-Stage process; Ten Principles for Entrepreneurship Education, further the article refers back to the 9 elements identified by Huber et al. (2016).</p>	<p>Online Survey among Design Thinking Educators</p>

2019	<p>“University entrepreneurship education: a Design Thinking approach to learning”</p> <p><i>Linton, G; Klinton, M. (2019: Journal of Innovation and Entrepreneurship</i></p>	<p>The paper presents a method approach utilizing Design Thinking for entrepreneurship education. Design Thinking is used to redesign an Entrepreneurship Course (Entrepreneurship as a method)/ Design Thinking as a method to teach through entrepreneurship</p>	<p>Reoccurring themes (no model provided):</p> <ul style="list-style-type: none"> • Co-creation of opportunities by using effectuation • Solving of wicked problems by an iterative process • Creative and innovative mindset • Experimentation and practices as central elements to Entrepreneurship Education and DT 	<p>Case Study / Pilot Course Design</p>
2019	<p>“Comparing effectuation to discovery-driven planning, prescriptive entrepreneurship, business planning, lean startup, and design thinking”</p> <p><i>Mansoori, Y; Lackéus, M. (2019): Small Business Economics</i></p>	<p>Comparison of Effectuation with five other entrepreneurial tools, including Design Thinking</p>	<p>Effectuation and Design Thinking match in the following conceptual dimensions:</p> <ul style="list-style-type: none"> • Knowledge expansion: User Needs as starting point • Redirection of power by implementing iteration loops • Continuous learning through iteration and feedback • Iterative and non-linear process • Stakeholder-interaction is active • Embrace of team-based collaboration <p>Emphasis on value-creation</p>	<p>Comparison based on Conceptual Dimensions</p>

2019	<p>“Design Thinking and Entrepreneurship Education: Where Are We, and What Are the Possibilities?”</p> <p><i>Sarooghi, H., Sunny, S., Hornsby, J; Fernhaber, S., (2019): Journal of Small Business Management</i></p>	<p>Sarooghi et al. “provide theoretical links to provide conceptual clarity to design-based entrepreneurship education, propose recommendations with a multistakeholder alignment-based model, and perform a survey to demonstrate its current state of practice” (p.78)</p>	<p>Focus on research on three main areas (all by survey):</p> <ul style="list-style-type: none"> • Overall Design Thinking orientation of the entrepreneurship curriculum • Comparative emphasis on Design Thinking mindset, process and tools Infrastructure supporting Design Thinking 	<p>Conceptual (Opportunity design framework to facilitate Design Thinking in Entrepreneurship Education)</p> <p>Survey on the use of Design Thinking in Entrepreneurship Education</p>
2019	<p>“Design Thinking in entrepreneurship education: Understanding framing and placements of problems”</p> <p><i>Tselepis, T.J. & Lavelle, C.A., 2020, Acta Commercii 20(1)</i></p>	<p>Design Thinking as a framework to be used by entrepreneurship educators to frame problems within entrepreneurship education</p> <p>Understanding of design as a perspective</p>	<p>They identify three main themes linking entrepreneurship and design</p> <ul style="list-style-type: none"> • The theme of transformation • The theme of novelty • The theme of innovation 	<p>Conceptual</p>
2020	<p>“Entrepreneurial ways of designing and designerly ways of entrepreneuring: Exploring the relationship between Design Thinking and effectuation theory”</p> <p><i>Klenner, Gemser, G., & Karpen, I. O. (2022): The Journal of Product Innovation Management</i></p>	<p>The study introduced the concepts on the “entrepreneurial ways of designing” and “designerly ways of entrepreneuring” exhibited by designer-founders. The research reveals the reciprocal relationship between Design Thinking and effectuation theory.</p>	<p>Identified themes and nexus described between Effectuation Principles and Design Thinking Practices:</p> <ul style="list-style-type: none"> • Means orientation + Human-centredness • Strategic partnerships + Embracing diversity • Nonpredictive control + Visualization • Affordable Loss + Experimentation • Exploitation of contingencies + Reframing 	<p>Qualitative Interview Study with Australian Design-Founders</p>

Table 4: Overview on literature discussing common themes among DT and EE

The review as summarised in Table 3 suggests that the studies either present a conceptual model for the interface (Sarooghi et al., 2019; von Kortzfleisch et al., 2013; Zupan & Nabergoj, 2016), or focus on describing a case study of the utilization of Design Thinking in entrepreneurship course design (Nielsen & Stovang, 2015; Linton & Klinton, 2019). One of the first papers discussing the Entrepreneurship Education/Design Thinking (EE/DT) nexus, is a conceptual paper by von Kortzfleisch et al. (2013), which presents the concept of Entrepreneurial Design Thinking (von Kortzfleisch et al., 2013). Based on the idea of bridging the gap between creativity and entrepreneurial innovation, the paper presents the concept of Entrepreneurial Design Thinking (EDT) (von Kortzfleisch et al., 2013). Based on the concepts of Design Thinking and Entrepreneurship, EDT defines a “team-diversity-based approach for treating user-centered problems as entrepreneurial opportunities within an iterative process supported by the use of creativity fostering tools and environments” (von Kortzfleisch et al., 2013, p. 2081). By this, they claim to offer a new method and guidelines to design Entrepreneurship Education in universities – and define Entrepreneurship and Design Thinking “to be a promising combination as a teaching approach in Entrepreneurship Education” (von Kortzfleisch et al., 2013, p. 2083).

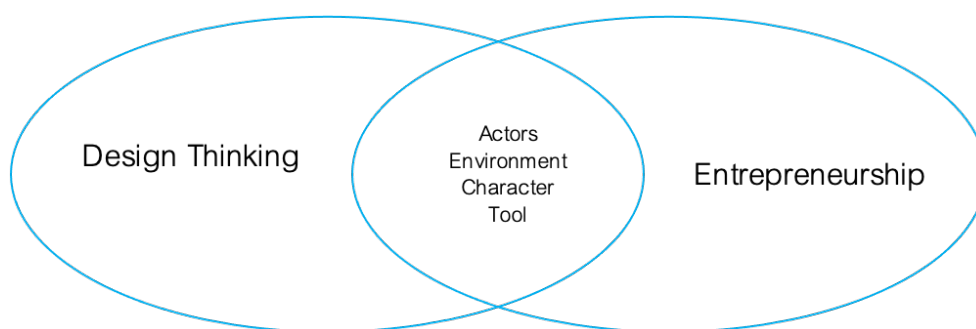


Figure 18: Entrepreneurship-Design-Thinking-Nexus (von Kortzfleisch et al., 2013)

When comparing the interface between both concepts of von Korfleisch et al. (2013) discuss the similarities of actors, environment, character and the role of creativity as shown in their Entrepreneurship-Design-Thinking Nexus. Common themes are: Entrepreneurs and designers have similar attributes and value a multidisciplinary team-based approach (similarity of actors), both disciplines have to deal with uncertainty (similarity in environment), and value empathy as a major force (similarity in character) as well as build upon creativity as an essential element (similarity in the role of creativity). However, the conceptual model lacks empirical evidence and the components of the model appear to be unselective, which might be the reason why the thoughts of Korfleisch et al. (2013) have not yet been picked up widely by the academic community.

By contrast, Nielsen and Stovang (2015) introduce Design Thinking as an approach to redesign traditional Entrepreneurship Education by using Design Thinking principles as a toolbox for Entrepreneurship Educators (Nielsen & Stovang, 2015). Thus, a new teaching model (DesUni Model – see Figure 19) is proposed in order to shift traditional didactical approaches towards a change in curriculum. By referring back to Sarasvathy et al. (2008) and Rae (2007) they describe entrepreneurs and designers as creative problem-solvers. The teaching model proposed includes two dimensions. First, the student perspective aiming to activate a “designerly” mind-set, action and imagination. Second, a teacher perspective discussing a pedagogical dimension including design methods, facilitated teaching, habitat and culture, assessment and knowledge.

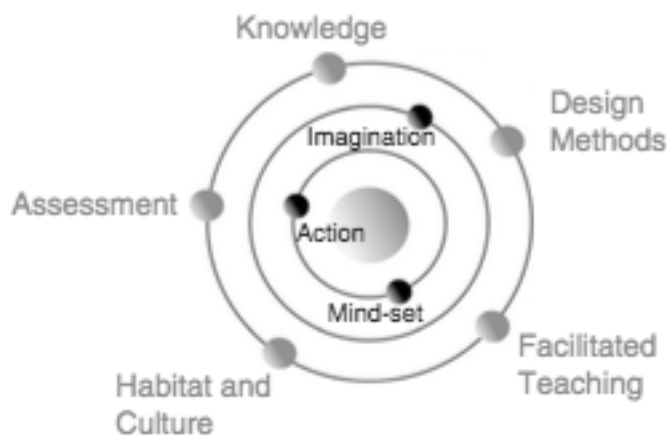


Figure 19: DesUni Model (Nielsen & Stovang, 2015)

With their teaching model, Nielsen and Stovang (2015) make a valuable contribution towards outlining the theoretical framework and also provide first steps in transferring the framework on a more concrete pedagogical and educational level. Rightly, it inspires the knowledge about the cross-over of Design Thinking and Entrepreneurship Education, but also it raises further questions on theoretical knowledge of the dimensions as it does not provide any insights or test it in practice.

The incorporation of Design Thinking principles in Entrepreneurship Courses has also been presented in a conference paper by Huber et al. (2016), introducing Design-Thinking-Based Entrepreneurship Education (Huber et al., 2016). This examination makes an influential contribution to the field, especially with the introduction of the pedagogical pyramid which inspired the definitional framework of this work (see Section 3.6). Based on current literature, they have identified nine key concepts arising from the Design Thinking and Entrepreneurship Education nexus. Those are: Wicked problems, Formalized Design Thinking process models, Divergent and Convergent thinking, Iterations, T-shape, Multidisciplinary teams, Creative confidence, Informed intuition and Studio Learning. Even though the paper is inspiring and adding valuable thoughts to the discussion, it is focused on providing an example for

practitioners, and the theoretical links have not been tested or evaluated in a wider context. However, even though the paper has not yet been cited widely, with this Huber et al. (2016) provide a key insight on the Design Thinking/ Entrepreneurship Education (DT/EE) nexus.

Another perspective on the subject is taken by Mansoori and Lackéus (2019) who present a comparison of effectuation and other entrepreneurial methods, including Design Thinking (Mansoori & Lackéus, 2019). Within their paper, a new conceptual framework (structuring the methods along the dimension of logic, model and tactics) is used in order to facilitate the comparison of different entrepreneurial methods. Within their perspective, they emphasize the themes of team collaboration, value creation, stakeholder interaction, continuous learning from feedback as well as the themes of iteration and user knowledge as being essential themes within Design Thinking in the context of Entrepreneurship Education.

As recently as 2019, the paper “Design Thinking and Entrepreneurship Education – Where are we and what are the possibilities?” of Sarooghi et al. (2019) has been highly influential within this context. Within this, the status quo of Design Thinking in Entrepreneurship Education is discussed and a design thinking-oriented course is defined as “*one that includes “possibility thinking in problem framing, iteration, collaborative problem-solving, human orientation, and visual thinking in achieving the students’ learning objectives.”*” (Sarooghi et al., 2019, p. 86). Building upon Carlgren et al. (2016), core themes blending Entrepreneurship Education and Design Thinking are artifact creation, collaborative decision making, user focus, problem framing, visualization, experimentation and diversity (Sarooghi et al., 2019). Moreover, the theme of physical space and supporting infrastructure for Design Thinking in Entrepreneurship Education is explicitly showcased, by introducing the argument that universities need to provide a dedicated infrastructure in order to deliver design-based Entrepreneurship Education. While the results of the survey (Sarooghi et al., 2019) confirm the wide use of Design Thinking within entrepreneurship programs, they also reveal an unbalanced application in practice.

In general, the review of the key papers discussing the DT/EE nexus explicitly (see Table 4) reveals the development and progression of the academic discussion over time. Early works within this field focus on a practitioner-oriented perspective, discussing, e.g. exemplary course designs (Nielsen & Stovang, 2015) or introducing new methods within this context (von Kortzfleisch et al., 2013). Some existing papers provide important initial ideas on the topic, but still remain insufficient by being published as solely conference proceedings (Huber et al., 2016; McLuskie & Dewitt, 2019; Tselepis & Lavelle, 2020).

Starting in 2019 more relevant and qualitative papers were published on the subject and new research has made first steps in researching the conceptual underpinnings of both concepts, such as in the search of a unifying logic in practice (Linton & Klinton, 2019) as well as defining the elements of a design-based Entrepreneurship Education at universities (Sarooghi et al., 2019). Most recently, Hölzle (2022) has added to the corps of literature in the field by proposing the DTE-Model for Design Thinking within Entrepreneurship Education. However, the review of the existing literature within the field has revealed additional empirical research is required in order to test the many frameworks and conceptualisations and to explore and address the gaps in knowledge left by the dearth of empirical research to date (further elaborated in Section 4.5). Based on the existing literature, common themes on the nexus of Design Thinking in Entrepreneurship Education – from a conceptual and educational perspective) have been identified, which will be presented in the forthcoming section.

4.2 The Conceptual Interface of the DT/EE nexus

The boundaries between the disciplines are blurring as Design is shifting towards a self-understanding beyond the pure Design Context and Entrepreneurship is transforming from a narrow management perspective towards a more holistic self-conception as Entrepreneurs can be seen as the designer of organizations and moreover, designing the world we live in (Sarasvathy et al., 2008). Thus, Mansoori describes the new perspective on entrepreneurship as a domain that is “intentional, systematic, strategic and guided” (Mansoori,

2017, p. 21) as a perspective that has great commonalities with the design science (Simon, 1969). The conceptual nexus and common themes identified within the literature are illustrated below.

Firstly, both concepts endorse the divergent thinking mode in the context of navigating through uncertainty by creative discovery (Sarasvathy et al., 2008). Firstly, Sarasvathy and Vankataram (2011) compare the scientific method as a counterpart to the entrepreneurial method – this has been also done with design attitude vs. scientific attitude: “Design Thinking is in many ways the obverse of scientific thinking. Where the scientist sifts facts to discover patterns and insights, the designer invents new patterns and concepts to address facts and possibilities. In a world with growing problems that require increased understanding and insight, there is also a need for ideas that can blend that understanding and insight in creative new solutions” (Owen, 2006, p. 17). While the decision attitude perceives problems as stable, the design attitude approaches problems with the creation of new opportunities (Boland & Collopy, 2004; Dunne & Martin, 2006).

Further, Sarasvathy et al. (2008) posit “effectuation as an entrepreneurial logic for designing artifacts” (p. 331) and therefore the common theme of emphasizing divergent thinking to navigate uncertainty is well represented in the idea of effectuation. Thus, effectuation and causation describe a decision logic, which is part of natural human reasoning (Sarasvathy, 2001). The difference between causation and effectuation is the set of choices – while the causation logic builds upon ‘many-to-one mappings’, the effectuation logic consists of a ‘one-to-many mapping’ (Sarasvathy, 2001). In a congruent narrative, Design Thinking embraces the use of divergent thinking as a way of reasoning (Dorst, 2011) to address complex and open-ended challenges and the focus on what might be (Schön, 1983). Further, the effectuation logic builds upon the idea of an unpredictable future and uncertainty, therefore, constitutes the entrepreneurial design space (Sarasvathy et al., 2008) and characterizes the entrepreneurial process by intrinsic novelty and the creation of something new (McKelvie et al., 2011; McMullen & Shepherd, 2006). In a similar way, Design has been described as a natural human activity, wherein dissatisfaction with the status

quo and the need to take action are the start of the design process (Razzouk & Shute, 2012; Simon, 1969). Thus Dorst (2011) refers back to the terms *entrepreneurship* and *effectuation* when describing the process of creating new frames for problem solving: “This last level is where design-based practices and organisational innovation are most intimately linked. This is where design practices and the knowledge that has been built up over almost 50 years of design research can directly relate to processes that have been described in terms of ‘entrepreneurship’ (Steyaert, 2007) and ‘effectuation’ (Sarasvathy, 2008) in management literature.” (Dorst, 2011, p.531).

Further, Design Thinking and Entrepreneurship overlap by emphasizing Value-Oriented and Creation with limited resources. Both concepts embrace the value creation for other stakeholders (Johansson-Sköldberg et al., 2013; Mansoori & Lackéus, 2019; Sarasvathy et al., 2008) and Design Thinking has been described as a source for value creation (Dell’Era et al., 2020). In a similar vein as designers, entrepreneurs also use certain methodologies to solve complex problems and realize their aspired ideas in a process of world-making (Mansoori, 2017, Sarasvathy, 2012). Moreover, both disciplines mention the innovation and value creation process within the context of limited resources and an uncertain environment i.e., the designer’s specific ability has been described as to “produce novel, unexpected solutions, tolerate uncertainty, work with incomplete information, apply imagination and forethought to problems, ... as a means of problem solving” (Cross, 2006, p.41). Creating value by Design has been stated clearly by Simon (1969) who stated that “everyone designs who devises courses of action aimed at changing existing situations into preferred ones” (Simon, 1969, p. 111). This emphasis on value creation is also seen in Entrepreneurship Education by the understanding of entrepreneurial action as the making of a positive difference (Sarasvathy & Venkataraman, 2011).

Along with the idea of uncertainty, comes the ill-structured problem space. Both in Design Thinking and in Entrepreneurship, problems are not clearly defined and are “wicked” in a way as they do not show logical means-end relationships. Therefore, the iterative problem-solving process relies on the

subjective facilitation of individuals decision, as there is no clear “end point” in the search for solutions, nor can the solution found be assessed as “right or wrong” (Sarasvathy, 2008; Sarasvathy & Venkataraman, 2011). Entrepreneurship and entrepreneurial action are about making a positive difference and the identification and exploitation of opportunities have been described as a core principle of entrepreneurship (Shane & Venkataraman, 2000) and has been extended by the act of making opportunities through creative discovery (Sarasvathy, 2008).

Extensive research has been undertaken focusing on how entrepreneurs search, find and exploit opportunities (Erikson, 2001; Shane & Venkataraman, 2001). This does not only include the discovery process of existing opportunities, as recent work also emphasized the creation of opportunities as an important entrepreneurial element (Sarasvathy & Venkataraman, 2011). Moreover, Entrepreneurship is often associated with the solving of ill-defined, complex real-world problems (Plaschka & Welsch, 1990) and some even classify the entrepreneurial method as “human problem solving” (Sarasvathy & Venkataraman, 2011, p. 125). In describing the ‘actors’ in the process, entrepreneurs are described as creative problem solvers in the course of effectuation (Sarasvathy, 2001).

Further evidence of the nexus appears in that iteration is a core principle to all formalized Design Thinking process models (Brown, 2009; Design Council, 2005; Huber et al., 2016) and Mansoori (2017) compares the nature of the Entrepreneurial Problem Space with Design: “As such, akin to domains such as design, entrepreneurship should be guided by rules, principles, heuristics and methods that are distinct and suitable for solving structured and ill-structured aspects.” (Mansoori, 2017, p. 24). Jobst et al. (2012) discuss the similarities of the concept of creative confidence (see Section 3.3.5) and the concept of self-efficacy (Jobst et al., 2012). Thus, both the construct of self-efficacy as well as the concept of creative confidence build upon the idea of trust in one’s ability to solve future problems in a creative way (Jobst et al., 2012). According to Timmons (1994) creativity is central to entrepreneurship, and it is therefore considered central to Entrepreneurship Education (Hamidi et al, 2008). The

definition of creativity is a complex and controversial issue, which is described in detail by Berg (2011). In this context, the creation and implementation of creative solutions and new ideas are an important facet of entrepreneurship (Kuratko, 2005).

Along with the concept of creativity comes the concept of Bricolage, which evolved as a description of a unique entrepreneurial behaviour (Welter et al., 2016), describing it as “making do by applying combinations of the resources at hand to new problems and opportunities” (Baker & Nelson, 2005, p.333). Whereas bricolage in the common sense is creation from a wide range of available things, in the entrepreneurial sense it describes the behaviour to use what resources are on hand to create value by solving a problem in a novel way (Welter et al., 2016).

As illustrated in this section, the conceptual nexus of Design Thinking and Entrepreneurial Thinking shows parallels in their core ideas and thinking modes of being human & problem-centred, iterative, creative and value-creation oriented. The forthcoming sections will dive deeper into the educational interface (Section 4.3) and summarize the themes (Section 4.4).

4.3 Common Themes within the Educational Interface

A review of the literature suggests that the educational interface between Design Thinking and Entrepreneurship Education shows a high level of overlap regarding their general educational philosophy, their similar understanding of a key competence and their actual teaching methods and pedagogical approach regarding the role of educators and students. Within the following, the unifying themes will be illustrated in further detail.

Firstly, reflecting on the parallel evolution of Design Thinking and Entrepreneurship Education, both have developed from a rather specialist view towards a more general understanding as a key competence of the 21st century that is relevant to everyone. While Design Thinking moved the idea of Designerly Thinking toward describing a way of thinking and doing beyond the design context (Brown, 2008; Johansson-Sköldberg et al., 2013), also the view on

Entrepreneurship Education shifted its view from narrow venture creation to a wider and more holistic understanding as a way of thinking (Sarasvathy & Venkataraman, 2011). This might be because they both claim to transfer key competencies for the 21st-century learner such as the ability to solve open and complex problems creatively and innovatively. Through this, both disciplines became relevant to “everyone” – and today both argue to be important beyond their traditional field of practices – Design Thinking has emancipated and freed the Designerly Way of Thinking from being only relevant to designers, while the Entrepreneurship Education teaches entrepreneurship and entrepreneurial thinking across disciplines (Sarasvathy & Venkataraman, 2011). At this point, Entrepreneurship Education and Design Thinking claim to play an integral role in a possible new way of understanding education in general, especially in education across different disciplines (Razzouk & Shute, 2012). Within both, the acquisition of 21st-century skills and competencies to apply and create knowledge to solve future problems is a persistent theme (Johansson-Sköldberg et al., 2013; Kickbusch et al., 2020; Razzouk & Shute, 2012; Welsh et al., 2016; Welsh & Dehler, 2013).

Moreover, regarding the underlying educational philosophies, Design Thinking and Entrepreneurship Education both build upon the influences of constructivism such as experiential learning, critical pedagogy and active learning (Dewey, 1963; Hägg & Gabrielsson, 2019; Welsh & Dehler, 2013). Concerning the actual use of teaching methods, one of the reoccurring themes is the focus on project-based learning. Most Design Thinking Curricula make use of project work on real-life cases (Melles et al., 2012) and the engagement in real-life opportunities (learning through entrepreneurship) are also a valuable practice in Entrepreneurship Education (Edwards & Pittaway, 2012a; Hannon, 2005). Both concepts demonstrate a high level of “doing” in the experience of education by teaching the subject through the creation of experiences in practice (Neck & Greene, 2011; Welsh & Dehler, 2013). Entrepreneurship Education programmes are often associated with experiential learning – as stated by Pittaway and Cope: “Entrepreneurship Education can have an impact on the awareness and perceptions of students, where it engages them with “real-life”

opportunities to learn and involves them in experiential forms of learning” (Pit-taway & Cope, 2007, p. 490).

In educational practice, this is often realized by the incorporation of business creation in the entrepreneurship curriculum – as shown in courses by e.g., the Babson College or Monmouth University in the USA among many others (Neck & Greene, 2011). To bring the content to life, students experience the act of venture creation by starting their own business – this “doing experience” lets the students experience entrepreneurship and the connected competencies (opportunity recognition, entrepreneurial thinking, value creation) in practice (Neck & Greene, 2011). Along with this, comes the idea of prototyping, which is also represented in Design Thinking Education. Henriksen et al. (2017) present the idea, that Design Thinking brings up a new way of thinking in education by introducing the concept of prototyping. Unlike common educational practice, where the “thinking about things” and the “doing things” are separate, the prototyping mindset of Design Thinking connects both (Henriksen et al., 2017).

Moreover, learning in the Design Thinking literature is often described as learning by doing. Therefore, project work and experiential learning play an integral role. It was Dewey who introduced the idea of Learning by Doing and by that introduced a theory of education whereby the learning should be more practical than theoretical. (Dewey, 1963). Rooted in this, educational research has developed this idea into an approach called “project-based learning”. The design pedagogy is often based on so-called “studio-learning”, which describes that the students work on concrete projects and by doing so, learn design principles (such as space, form, colour etc) in an integrated way “on the go” (Welsh & Dehler, 2013). These processes are consistent with the ideas of project-based learning. This approach is also seen as learner-centred pedagogy and proposes a collaborative, hands-on and active exploration of (real-world) project-based challenges (Gordon, 2013).

Project Based-Learning (PBL) is more than just the inclusion of a project – the project is a central part of the curriculum. Thus, this approach is student-driven as the students decide on their path to work on the project and they make their

own decisions on where the project will lead them and what the outcome might be – while the role of the teacher is rather supportive (Gordon, 2013). Furthermore, the projects applied in PBL are realistic and result in a real outcome – hypothetical scenarios, therefore, do not apply. Most Design Thinking curricula include project work – even though most programs include a mixture of readings and project work, the work on the projects is central to the course content. The leading-edge schools of Design Thinking often encourage the students work on real-world problems instead of made-up cases (Melles et al., 2012). In the literature on education, this is also known as authentic learning when students are asked to apply the curricular knowledge to an issue related to everyday life (Reeves et al., 2012). Referring back to Simon (1969) Design Thinking education focuses on the use of artificial, tangible stuff such as boundary objects, prototyping etc. (Nielsen & Stovang, 2015). Moreover, Project Based-Learning is more than just the inclusion of a project – the project is in most cases also driven by the student (Hägg & Kurczewska, 2020). Thus, student-centeredness has been defined as an important common theme.

In the context of Entrepreneurship Education, education is defined as the development of personal initiative (Fayolle & Gailly, 2008). While Entrepreneurship Education is currently making the transformation toward a more interactive and innovative understanding of teaching (Neck & Greene, 2011), Design Thinking has never been taught in a hierarchical setting (Welsh & Dehler, 2013). Referring back to Fayolle and Gailly (2008) education in the context of entrepreneurship is much more about educating than teaching, as it intends to develop e.g., individual initiative and creativity rather than just imparting a specific knowledge or skill (Fayolle & Gailly, 2008). This view is also supported by Neck and Green who claim to teach entrepreneurship as a method as opposed to teaching entrepreneurship as content (Neck & Greene, 2011). Furthermore, the incorporation of student-centred learning is emphasized also in Entrepreneurship Education (Harkema & Schout, 2008; Robinson et al., 2016).

The role of the student in education based on Design Thinking principles is rather active than passive – and students become creators of their knowledge instead of recipients – in fact learning in Design Thinking is a student-driven

process (Welsh & Dehler, 2013). By applying Design Thinking principles, the students develop their action path as part of their learning experience. Due to the nature of design problems (as defined as wicked and ill-defined in Section 3.3.1), the solution of a problem is not yet given and therefore the students learn to find a solution by themselves and by this “contestability of any ideas students become actively engaged in the construction knowledge” (Welsh & Dehler, 2013, p. 778). It is this kind of experience that enables students to move from passive recipients to critical and reflecting individuals.

Along with this comes the collaborative role of the educator. Design Thinking is a non-hierarchical discipline, and this principle of collaboration also affects the role of the educator in Design Thinking education. Therefore educators “serve as collaborators, co-learners, and mentors rather than authoritative figures dispensing factual information” (Welsh & Dehler, 2013, p. 778). By this, Design Thinking employs the ideas of critical pedagogy, where power in the classroom is decentralized. In practice, Welsh & Dehler, for example, describe a course design, which is mostly a student-driven process and the facilitators come in mostly when difficulties arise – in the form of so-called “desk-reviews”, where the teaching team approaches the group to hear about their progress and give guidelines rather than judgement.

Generally, the role of the teacher in this context can be described as passive mentoring, rather than actively advising. It is one important point of design education to let the students maintain the ownership of their idea/projects. Along with the role of the teacher, the question of evaluation and assessment is an important one (Warhuus et al., 2018) and should be considered when designing a teaching program (Fayolle & Gailly, 2008). Regarding Entrepreneurship Education, there is a lack of knowledge regarding the right and effective assessment methods and evaluation criteria (Fayolle & Gailly, 2008; Honig, 2004; Warhuus et al., 2018). Regarding the role of the teacher also, the importance of other relationships is worth mentioning in this context. Especially in Entrepreneurship Education, interactions between students and entrepreneurs play an integral role and are often integrated into Entrepreneurship

Education programmes to e.g., engage them in real problems and raise awareness (Pittaway & Cope, 2007).

As in Design Thinking as a discipline, a studio-like learning environment – or learning space – plays a crucial role in Design Education. Designers and Design Thinkers often work in Design Studios, which are typically open, highly collaborative spaces with different sources of inspiration. The space is a crucial part of a successful Design Thinking project, and should represent the principles of Design Thinking (Collaboration, Prototyping, Creativity) (Thoring et al., 2014). The importance of a studio setup that meets the student's needs is also shown in educational settings. Regarding the creation of the physical environment, Huber et al. (2016) refer back to the similarities and common themes between Design Thinking and experiential learning (Huber et al., 2016; Welsh & Dehler, 2013). Within Entrepreneurship Education, a wide variety of teaching methods and pedagogical approaches exist (Pittaway & Cope, 2007) such as action learning (Leitch & Harrison, 1999), and experiential learning (Sexton & Upton, 1987) but there is not one universal Entrepreneurship Education method, as the choice of methods depends on the specific objectives of each program and the knowledge or experience of the educator about any particular method (Bécharde & Gregoire, 2005; Fayolle & Gailly, 2008).

Moreover, both Entrepreneurship Education and Design Thinking embrace the use of continuous and iterative learning cycles by making feedback from others an integral part of the learning process (Rauth et al., 2010). Neck and Green (2011) propose to emphasize the value of reflective practice as an integral part of the Entrepreneurship Education learning experience. Indeed, reflection as a method fits well into the field of entrepreneurship, as it supports learning within high uncertainty environments and has a focus on the process of problem-solving (Neck & Greene, 2011). Moreover, “given the nature of entrepreneurship as a continuous cycle of action, learning, testing, and experimenting, developing students as reflective entrepreneurs requires reflection-on-practice and reflection-in-practice as part of a pedagogy portfolio” (Neck & Greene, 2011, p. 66).

Iteration and Learning Cycles are another important theme in Design Thinking education. The idea of iterative cycles switching between divergent and convergent thinking modes (see section 3.3.2) is key to Design Thinking and thus “Design Thinking education, therefore, addresses dealing with these cycles from the beginning on. The procedure of learning and the creation of knowledge within Design Thinking education are based on highly iterative proceedings” (Rauth et al., 2010, p. 2). In this case, Rauth et al. (2010) see an analogy between the iterative character of Design Thinking and experiential learning theory and its famous learning cycle by Kolb (1984).

Further, some equate the concept of creative confidence back with the concept of self-efficacy by Bandura (1977), therefore a common theme between both is also the trust in one’s own ability to solve problems in a creative way (Huber et al., 2016; Jobst et al., 2012). Overall, the principles of a design-based pedagogy have been described as supporting the interpretation and tolerance of ambiguity and thus enhancing Entrepreneurship Education (Levick-Parkin, 2014). The previous sections have synthesized the commonalities between Design Thinking and Entrepreneurship within Entrepreneurship Education along with the conceptual (Section 4.2) and educational (Section 4.3) interface. Within the forthcoming section, the conceptualization of the overall nexus will be summarized.

4.4 The conceptualisation of the Interface

As evidenced above, it is not a coincidence that Entrepreneurship Education “has been one of the pioneering fields in the implementation of design thinking” (Sarooghi et al., 2019, p.78). The implementation of Design Thinking in Entrepreneurship Education provides a new approach to learning that supports an entrepreneurial experience (Sarooghi et al., 2019). However, the investigation of the theoretical foundation regarding the key concepts unifying Design Thinking and Entrepreneurship Education has raised the question of which level the concepts overlap at, and what a conceptualization of the nexus might look like. Regarding the interface describing the Entrepreneurship Education/Design Thinking nexus, parallels can be seen on different levels, regarding the core

logics in the conceptual interface and the educational interface (see illustration in Figure 20).

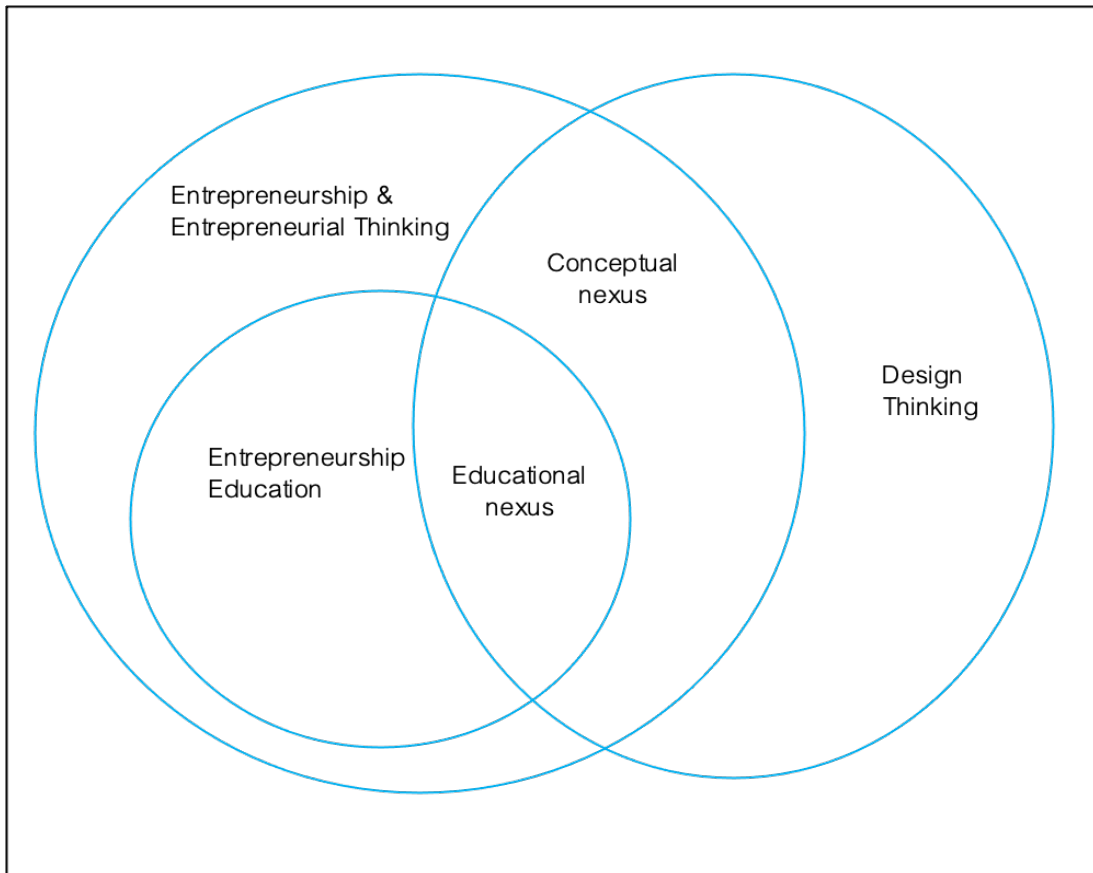


Figure 20: Conceptualisation of the DT/EE nexus

As illustrated in the above figure, the nexus is conceptualized as Design Thinking and Entrepreneurship and Entrepreneurial Thinking share a conceptual nexus and further, there is second more concentrated educational nexus describing the interface between Design Thinking and Entrepreneurship Education. Within the previous sections the unifying logics on both levels – conceptual and educational have been discussed in further detail. In summary, the following table will provide an overview on the main themes which have been identified from the literature.

Perspective	Unifying Logic and Common Themes	Sources/ References
Conceptual	The Value of Multidisciplinary teams, Interdisciplinarity and team-work in general	Nielsen & Stovang, 2015; Huber et al., 2016; Linton & Klinton, 2019; Mansoori & Lackéus, 2019)
Conceptual	The attitude and logic of divergent thinking	Sarasvathy & Vankataraman, 201; Bolland & Collopy, 2004; Dunne & Martin, 2006; Huber et al., 2016
Conceptual	Value Orientation and Creation with limited resources, & Value of Creativity	Nielsen & Stovang, 2015; von Kortzfleisch et al., 2013; Matthews, 2010; Huber et al., 2016; Linton & Klinton, 2019; Mansoori & Lackéus, 2019; Sarooghi et al., 2019
Conceptual	Iterative Problem Solving & Wicked Problems	Nielsen & Stovang, 2015; Huber et al., 2016; Linton & Klinton, 2019; Mansoori & Lackéus, 2019
Educational	Key competence to innovate across disciplines and acquire 21 st century skills	Sarooghi et al., 2019; Henry, 2020
Educational	A Constructivist approach and the value of experiential and project-based learning	Neck & Greene, 2011; Nielsen & Stovang, 2015; Huber et al., 2016; Linton & Klinton, 2019
Educational	Student-Centredness and the collaborative teacher	Nielsen & Stovang, 2015; Linton & Klinton, 2019; McLuskie & Dewitt, 2019; Welsh & Dehler, 2013
Educational	Reflective Practice and Reflection-based Assessment	Huber et al., 2016; Linton & Klinton, 2019

Table 5: Common themes along conceptual and educational perspectives

The review of the literature has illustrated that Design Thinking and Entrepreneurship Education share substantial and elementary common themes and core principles along both conceptual and educational dimensions (see Figure 20). This further reinforces the suitability of Design Thinking as a possible permanent addition to Entrepreneurship Education (Sarooghi et al., 2019). A closer look at the concept of Design Thinking has provided more theoretical

sensitivity towards the concept by comparing the different perspectives (see Section 3.6), namely differing between a tool-, process, - or mindset view (Sarooghi et al., 2019). This richness of the concept is also represented as it pertains in education, differing between the course, toolkit and educational, approaches as a perspective in an analogue way.

The conceptual perspective has discussed the general theoretical parallels and common core principles of Design Thinking in Entrepreneurship Education that can be seen on different levels. Thus, commonalities have been found between the constructs of Design Thinking and Entrepreneurial Thinking regarding their value-orientation, iterative approach and the emphasis on divergent thinking. The educational perspective has identified common themes along educational principles such as the importance of iterative learning cycles (Rauth et al., 2010), project-based learning in the sense of experiential learning (Gordon, 2013) and emphasize the idea of learning as a student-driven process with the teacher in the role of a collaborator (Welsh & Dehler, 2013). Regarding the conceptual and educational nexus, the literature review has discussed the general theoretical parallels and common core principles of Design Thinking in Entrepreneurship Education that can be seen on different levels. Design Thinking principles in educational context include the importance of iterative learning cycles (Rauth et al., 2010), project-based learning in the sense of experiential learning (Gordon, 2013) and emphasize the idea of learning as a student-driven process with the teacher in the role of a collaborator (Welsh & Dehler, 2013). While Design Thinking and Entrepreneurship Education have been similar in the core values of educating discovery processes and creation of innovation, the boundaries between both blurs more recently, due to the conceptual shift of Entrepreneurship Education from venture creation towards a value creation focus.

4.5 Research Gaps and Research Question

Generally, the identified papers discussing Design Thinking in Entrepreneurship Education either present a conceptual model for the interface (Sarooghi et al., 2019; von Kortzfleisch et al., 2013; Zupan & Nabergoj, 2016) or focus

on describing a case study of the utilization of Design Thinking in entrepreneurship course design (Nielsen & Stovang, 2015; Linton & Klinton, 2019). Overall, most studies in the field focus on single case studies and the study of intrinsic cases studies as course design examples (Huber et al., 2016; Kremel & Edman, 2019; Linton & Klinton, 2019). Furthermore, it became apparent that within the existing literature there have been valuable contributions to the field discussing Design Thinking within Entrepreneurship Education from different perspectives (see Section 4.1). However, the recent debate has needed a more profound perspective to contribute greater conceptual clarity. Thus, the core ideas and concepts contributing to the Design Thinking and Entrepreneurship Education nexus have been illustrated here in order to add a more profound perspective to the recent debate. In particular, a theoretical sensitivity towards the concepts of Design Thinking and Entrepreneurship Education was called for (Johnson & Christensen, 2014) and this has been addressed within this work. With this literature review, a contribution has been made towards a more profound perspective on the conceptual clarity of Design Thinking within Entrepreneurship Education (see more in Section 9.1).

While multiple conceptualisations exist that ponder the Design Thinking and Entrepreneurship Nexus and there is a clear lack of understanding of the conceptual interface of Entrepreneurship Education and Design Thinking (Sarroghi et al., 2019). It has been shown in the previous chapter that although recent studies have deepened the understanding of the DT/EE context, they differ in their argumentation on how to conceptualize the Design Thinking and Entrepreneurship Education nexus. While some present Design Thinking as an entrepreneurial method that can be used as a toolbox for Entrepreneurship Educators (Huber et al., 2016; Mansoori & Lackéus, 2019), others argue to use Design Thinking to design Entrepreneurship Education in general (Nielsen & Stovang, 2015). Moreover, there are valuable contributions to the field, which do not directly refer back to Design Thinking, but discuss matters which discuss design as it pertains to entrepreneurship for instance; the value of design-based thinking for Entrepreneurship Education (Neck & Greene, 2011) or the process of design-centred entrepreneurship without a specific focus on

education (Goldsby, 2014; Goldsby et al., 2017). It is apparent that there is a need for increased clarity across the range of methods in order to improve existing practice in Entrepreneurship Education (Mansoori & Lackéus, 2019). Current research focuses on analyzing intrinsic case studies without a curricular or comparative analysis. Most case studies provide relevant insights for practitioners on how to include Design Thinking in the Entrepreneurship Education curriculum, but their conclusions often rely on single examples and have not been replicated or tested in a wider context (Huber et al., 2016; Linton & Klinton, 2019; Nielsen & Stovang, 2015). It appears that there is a need for an understanding of the current implementation of Design Thinking in the Entrepreneurship Education practice (Sarooghi et al., 2019). In particular, there is a gap in the research analysing the integration of Design Thinking in the context of Europe's Higher Entrepreneurship Education Institutions.

Moreover, even though most of the research presented is focused on practice, in a way that it presents case studies and exemplary course design examples (Huber et al., 2016; Kremel & Edman, 2019; Linton & Klinton, 2019), the examples mostly refer on the explicit use of Design Thinking content in the field of entrepreneurship teaching. However, as shown on the Literature Review and Synthesis of the DT/EE nexus, both concepts are connected not only on a pure integration of Design Thinking Content in Entrepreneurship Education, but also, and maybe more importantly, regarding their general approach to pedagogic design. Therefore, it would be valuable to gain more qualitative insights of the educator's perspective on how Design Thinking is integrated in teaching. Especially with a focus on a possible implicit integration including not only the Design Thinking Content, but also a Design Thinking Mindset or a "Designerly Way" of approaching education in general. What current empirical research there is in this field has focused on understanding the application of Design Thinking among educators with a survey-based approach (Kremel & Edman, 2019; Sarooghi et al., 2019). Even though this approach might reveal insights in the current state of practice, it fails to include relevant qualitative aspects such as the actual application in the daily educational practice as well as the contextual factors that might be influencing the teaching approach (e.g.,

experiences with Design Thinking in the past, theoretical understanding or personal background). It is evident that more extensive research is needed in order to deepen the understanding of the culture of practice. Recent research has answered the question of *whether* Entrepreneurship Educators are integrating Design Thinking within their curricula. As stated previously, recent research has applied a survey-based approach in order to demonstrate the application of Design Thinking among Entrepreneurship Educators and the findings suggest that Entrepreneurship Educators are indeed using Design Thinking frameworks (Kremel & Edman, 2019; Sarooghi et al., 2019). But as the analysis of the literature has shown, the existing variety of Design Thinking Definitions and myriad perspectives are calling for a more detailed and deeper examination of the Design Thinking integration. Therefore, the questions need to be raised on how, why, and for what perceived value Entrepreneurship Educators make use of Design Thinking. Thus, the answer to the following research questions will go some way to achieving convergence on a common understanding of the conceptualisation, practice and value of Design Thinking for Entrepreneurship Education. In order to answer the question “What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?” this study will employ a qualitative approach to investigate the three component areas, utilising the guiding questions below :

Overarching Research Question	What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?
Conceptual Perspective – Guiding Questions	What is the educators’ working understanding of Design Thinking? What is their understanding of the DT/EE nexus?

<p>Educational Practice: Guiding Questions</p>	<p>How do educators apply Design Thinking in Entrepreneurship Education (as a method, course and/or general pedagogical approach)? How is Design Thinking integrated into Entrepreneurship Education Practice? On what level is Design Thinking integrated into Entrepreneurship Education? Design Thinking as a course model or pedagogic approach? Explicit or implicit integration?</p>
<p>Perceived Value: Guiding Questions</p>	<p>What are the educator's pedagogical beliefs about the value of integrating Design Thinking in Entrepreneurship Education? Why do educators apply Design Thinking in Entrepreneurship Education?</p>

Table 6: Overarching Research Questions and guiding questions

In order to answer the research question above, the research study follows a qualitative approach. Based on the qualitative interview study, the current direction of the Design Thinking integration in Entrepreneurship Education Curricula will be described. Moreover, the results will include new views and provide new parameters for a future valuable integration of Design Thinking in Entrepreneurship Education. Part II of this thesis moves from the review of the context and existing literature to describe the empirical research undertaken as part of this study. It starts with Chapter 5 which provides an introduction to the research methodology, and approach.

Chapter 5 Part II. Research and Practice

Chapter 6 Research Philosophy and Methodology

6.0 Introduction to chapter

It is the aim of this chapter to demonstrate the research design chosen for this study. In the previous chapters, the literature of the Design Thinking and Entrepreneurship Education nexus has been reviewed (Section 4.1), relevant gaps have been identified and new research questions have been formulated (Section 4.5). When it comes to research design, many choices have to be made by the researcher (Creswell, 2003). In order to answer the research questions, a qualitative approach has been chosen. In this chapter the underlying research philosophy of interpretivism and the inductive research approach will be discussed, and the suitability of the chosen methods for data collection and analysis will be presented.

6.1 Research Philosophy & Theory Development

Research philosophy describes a system of beliefs and assumptions about the development of knowledge (Saunders et al., 2019). Based on those assumptions, the understanding of the research questions, the methods used and the interpretation of the results will be shaped (Crotty, 1998; Grix, 2010). Therefore, this set of assumptions needs to be understood in order to build a consistent and credible research philosophy, which will underpin the research design (Saunders et al., 2019). The researcher's ontological position and the choices made based on philosophical commitments will lead the way on how researchers do research, how they understand the research and what they investigate (Johnson & Clark, 2006). The assumptions guiding the research philosophy include "claims about what is knowledge (ontology), how we know it (epistemology), what values go into it (axiology), how we write about it (rhetoric), and the processes for studying it (methodology)" (Creswell, 1994; Creswell, 2003, p. 6). The ontological and epistemological assumptions define a research paradigm (Mack, 2010) – together they describe a collection of assumptions that orient thinking and therefore research. Within the following an introductory reflection upon research philosophies will be given which will then lead to the discussion of the philosophical position framing this study.

6.1.1 Introductory Reflection upon Research Philosophies

The major part of the meta-scientific debate concerns the two rival philosophies; interpretivism and positivism (Pring, 2004, p. 33). The ontological position of positivism is realism, which posits that objects exist independently from the knower – and therefore, the reality is true and existing without the researcher (Pring, 2004). The positivist epistemology is objectivism within this line, which describes the assumption that knowledge can be discovered concerning an objective reality (Crotty, 1998). Therefore, positivist methodology aims to explain relationships identify causes and outcomes, which lead to the formulation of laws to predict and generalise (Creswell, 2003). In a positivist view, the methodology and the created knowledge are value-neutral (Scotland, 2012). The contrary view to the ontological position of interpretivism is relativism, which describes the assumption that reality is subjective and different persons experience different realities (Lincoln & Guba, 1985; Scotland, 2012). The reality in the interpretive paradigm only emerges if objects engage with consciousness (Crotty, 1998; Scotland, 2012). Therefore, the reality is dependent on the researcher, as each person’s reality is individually constructed. Thus, knowledge and meaning cannot be discovered but are phenomena that are socially constructed and transmitted in a social context, within the interaction of consciousness and the world (Crotty, 1998).

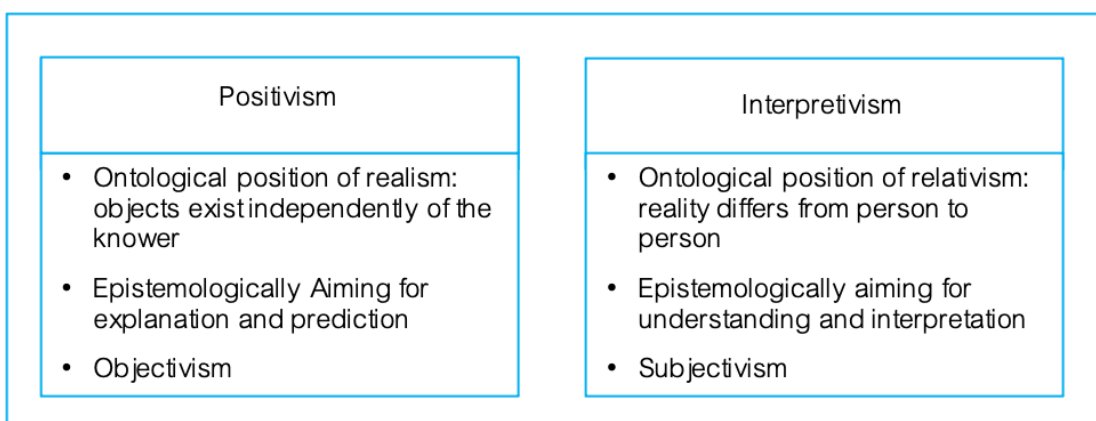


Figure 21: Interpretivism vs. Positivism (Braa & Vidgen, 1999; Bryman & Bell, 2003)

Interpretivism and positivism can be seen as the opposite ends of a continuum of philosophies and in between them, different forms of category for the prominent worldviews exist in research. Wicks and Freeman (1998) have introduced pragmatism as a third alternative (Wicks & Freeman, 1998). In comparison to the epistemological orientation where positivism aims for explanation and prediction while interpretivism aims for understanding and interpretation, pragmatism aims for change and intervention (Braa & Vidgen, 1999). Further nuances exist as to whether research philosophies can be grouped into four or five different types in the social sciences; for example, Bryman and Bell (2003) discuss four different types of philosophies (namely positivism, interpretivism, objectivism and constructivism), Saunders et al. (2019) differ between five major philosophies in the business and management research (positivism, critical realism, interpretivism, postmodernism and pragmatism) while Creswell (2003) discusses four different schools of thought: postpositivism, constructivism, advocacy/participatory, and pragmatism.

Source	Research Philosophies - Differentiation
Bryman & Bell (2003)	Positivism, Interpretivism, Objectivism, Constructivism
Saunders et al (2019)	Positivism, Critical Realism, Interpretivism, Postmodernism and Pragmatism
Creswell (2003)	Post-positivism, Constructivism, Advocacy/ Participatory, Pragmatism

Table 7: Overview on different research philosophies

Within the field of research philosophies, there tends to be a confusing relationship and differentiation between the term's paradigms and philosophies, while sometimes 'schools of thought' are used interchangeably with either of these terms (Saunders et al., 2019). To place the meaning in the context of this work, some of the major approaches outlined in the table above are introduced below. Within the context of this work, two research philosophies have been considered (Pragmatism and Interpretivism), though this researcher

subscribes to the interpretivist worldview. To explain this subscription in more detail, interpretivism and pragmatism are compared in Table 8.

	Pragmatism	Interpretivism
Ontology	Symbolic Realism	Constructivism
Empirical Focus	Actions and changes	Beliefs (socially constructed cognition)
Type of Knowledge	Constructive knowledge	Understanding
Role of Knowledge	Useful for action	Interesting
Type of investigation	Inquiry	Field Study
Data generation	Data through assessment and intervention	Data through interpretation
Role of Researcher	Engaged in change	Engaged in understanding

Table 8: Pragmatism vs. Interpretivism - comparison made by Goldkuhl (2012)

Rooted in the Verstehen sociology of Max Weber (1978), the interpretive paradigm's central aim is to understand the subjective meanings of persons in the studied domain (Goldkuhl, 2012). The core idea of interpretivism is to understand, reconstruct, and work with, the existing subjective meanings and theorize upon them. Interpretivism has evolved from different research strands, such as hermeneutics, phenomenology and symbolic interactionism (Crotty, 1998; Saunders et al., 2019). As highlighted earlier in the comparison of positivism and interpretivism, describing the duality of an objectivist vs subjectivist reality, interpretivist research aims to discover different social realities instead of universal laws that apply to everybody (Saunders et al., 2019).

For several reasons outlined in the following section, an interpretivist approach provides the foundation for this research. In the following, the interpretivist worldview and the underlying assumptions in the context of this research on the conceptualisation, practice and value of Design Thinking in Entrepreneurship Education will be discussed.

6.1.2 Ontological position of this research

In a simplified way, ontology describes one's view of reality and determines what is defined as knowledge and truth. Ontology is the study of being, concerning the assumptions which constitute reality (Crotty, 1998; Saunders et al., 2019). Thus, a dichotomy between different research traditions can be reflected in the contrast between the objective world and the subjective world (Pring, 2004). This divide between objective and subjective research philosophies is also and especially true for the social sciences, as in this case at the interface of educational research (Pring, 2004). However, this dichotomy has also been critiqued as a philosophical trap or an "ancient dualism", while educational research is both and neither (Pring, 2004, p. 33).

First of all, regarding the ontology, this research subscribes to interpretivism as the research itself is seen as complex, and in which a variety of multiple realities need to be included. In line with the interpretivist view, the understanding of the problem, within this study the understanding of the value of Design Thinking in Entrepreneurship, is most important (Creswell, 2003). The purpose of this study is focused on understanding – understanding the value of Design Thinking in Entrepreneurship Education. Thus, this research is looking for complexity and constructions of meaning.

From the literature review, it became apparent that a variety of factors and elements need to be considered, to describe the nexus of Entrepreneurship Education and Design Thinking, not least of which are the personal philosophies and beliefs of educators and students. Therefore, it is appropriate to take the view that multiple realities exist and different perspectives have to be taken to describe the nature of reality. Within this study, a pluralistic approach has been chosen to derive knowledge about the value of Design Thinking in Entrepreneurship Education. Indeed, this research is embracing the richness of differences in the individual understanding of the value of Design Thinking among Entrepreneurship Educators. Thus, regarding the ontological assumptions, reality in the context of this research is socially constructed and based on multiple realities. Thus, the reality of 'what is' Entrepreneurship Education and the

nature of reality of Design Thinking is constituted by convention and constructed by the individual and subjective interpretation of the people, as in this case the Entrepreneurship Educators in Higher Education. There is no one true reality of Entrepreneurship Education, nor Design Thinking or on the potential value of one for the other. Instead, the view of Entrepreneurship Education is a constant and subjective process, and the discipline itself is asking the question 'what constitutes Entrepreneurship Education?' (Blenker et al., 2011). From a more general perspective, these considerations should also include the assumption about the ontological level of Entrepreneurship Education in the context of Higher Education. There are a few contributions which are particularly noteworthy in this context including the work on the influence of ontological assumptions on the different teaching models in Entrepreneurship Education by Béchard and Grégoire (2005), as well as the work on ontology and epistemology of Entrepreneurship Education by Hägg and Peltonen (2014), and the work of Paloniemie and Belt (2005) on the ontological conceptions of Entrepreneurship Education. Furthermore, Remes (2001) makes a noteworthy contribution to the field by connecting the field of Entrepreneurship Education to humanism. Within the following, the epistemological standpoint of this research will be introduced.

6.1.3 Epistemological Standpoint

Epistemology or epistemological beliefs describe our claims on how one acquires knowledge or how we know it (Saunders et al., 2019). Utilizing the definition of Crotty, epistemology is defined as "the theory of knowledge embedded in the theoretical perspective and thereby in the methodology" (Crotty, 1998, p. 3). In other words, epistemological assumptions are concerned with the question of *what it means to know* (Lincoln & Guba, 1985; Scotland, 2012). Simply put, "if ontologists study what we mean when we say something exists then an epistemologist studies what we mean when we say we know something" (Mack, 2010, p. 5). Thus, regarding epistemology, narratives, stories, perceptions and interpretations constitute new knowledge (Saunders et al., 2019). It is the goal of this study to derive a new understanding of the value of

Design Thinking in the specific context of Entrepreneurship Education. Therefore, this research leans towards the philosophy of interpretivism as this study is focusing on narratives in educational practice, aiming to contribute to a new understanding of the perception of the value of Design Thinking to inform future practice (Saunders et al., 2019). Regarding the epistemological perspective, knowledge about Entrepreneurship Education, Design Thinking and the value of the one for the other are not created in isolation. Contributions to knowledge on Entrepreneurship Education can be made based on narratives and attributed meanings. As stated by Lindgren and Packendorff (2009), knowledge in this context is constructed through interaction between individuals, structures and social networks (Hägg & Peltonen, 2014).

6.1.4 Positionality and Axiology

In addition to the philosophical worldview which underpins this research, the researcher's background and the academic journey has to be considered within this context, defining its positionality and axiology. Especially as research decisions in this positionality are influenced by the values and beliefs of the researcher (Saunders et al., 2019). In line with the interpretivist worldview, this research is value-bound and the researcher's interpretation is key to the contribution of knowledge (Saunders et al., 2019). As this research is value-driven, it is initiated by the researcher's doubts and beliefs of the value of Design Thinking in Entrepreneurship Education. Furthermore, the researcher's values drive the reflexive process of inquiry in this research (Elkjaers & Simpson, 2011). As stated by Creswell (2014), it is one of the characteristics of qualitative data to see the researcher themselves as a key instrument. Thus, reflexivity is included in the research in a way that the researcher reflects upon the experiences and background shaping the interpretations (Creswell, 2014). These reflections have been made in the researcher's reflective diary, with a focus on the academic background in Design Thinking and Entrepreneurship Education. More information on this will be given in the following section (specifically see Sections 6.6 on Rigor and Reflexivity). As in this case, the qualitative approach allows a researcher-designed framework

and gives room to be more innovative and creative in the research work (Creswell, 2003). In this section, the research philosophy and the philosophical assumption guiding this research have been explained. In the next section, the methodological choices placed in the research philosophy will be introduced.

6.2 Research Approach and Methodological Choices

In the previous section, the research philosophy and approach to theory development have been depicted. Next, the methodological choices, which are based on the previous decisions, will be illustrated. The methodology shapes all decisions on why and how data is collected and analysed (Howell, 2013) and describes the strategic action plan which lies underneath the methodological choices regarding the use of particular methods (Crotty, 1998). Thus, the methodology describes the specific techniques and procedures which are used to collect and analyse data (Crotty, 1998). Therefore, in the following it is described in further detail, why, what, from where, when and how data has been collected and analysed in order to answer the research question addressed.

6.2.1 An inductive Research Approach

In general, two contrasting approaches exist – deduction and induction, while a third alternative (abduction) is also presented in some conceptualisations. These approaches describe the level at which the research is contributing to theory testing or theory building (Saunders et al., 2019; Brinkmann, 2013). Moreover, the chosen approach is guiding the logic for answering the research questions of a study (Blaikie, 2000). The following Table 9 provides an overview of the three research approaches, adapted from Saunders et al. (2019).

Approach	Deduction / Deductive Reasoning	Induction / Inductive Reasoning	Abduction / Abductive Reasoning
Logic	Deductive interference: when the premises are true, the conclusion must be true also	Inductive interference: known premises are used to generate untested conclusions	Abductive interference: known premises are used to generate testable conclusions
Generalisability	Generalising from the general to the specific	Generalising from the specific to the general	Generalising from interactions between specific and general
Use of Data	Data is collected in order to evaluate hypotheses related to an existing theory	Data collection is used to explore a phenomenon, identify patterns and create a conceptual framework	Data is collected in order to explore a phenomenon, identify patterns, find a conceptual framework and test this through data collection
Theory	Theory falsification and verification	Theory generation and building	Theory generation or modification

Table 9: Comparison of Research Approaches (Saunders et al., 2019)

The distinction between inductive and deductive strategies should be seen as tendencies, rather than clear lines (Bryman & Bell, 2003). Therefore, both, inductive and deductive strategies in this study go hand in hand, informing and completing each other. At its core, this thesis is taking an inductive research approach. As it is often the case in social sciences, this work is combining

deductive and inductive research phases (Saunders et al., 2019; Brinkmann, 2013), however, the inductive approach is overall predominant. This is aligned with the subjectivist research philosophy of interpretivism (Saunders et al., 2019). This work is focusing on understanding the value of Design Thinking for Entrepreneurship Education with a special focus on the educators and their pedagogical integration. Thus, the chosen reasoning approach is not to reveal a cause-effect link but to develop an interpreted understanding.

Following the framework of Creswell (2003) building upon Crotty (1998), four questions along the epistemological perspective (introduced in Section 6.1.3) of the research will be examined in the next section. The four questions structure the approach into the theoretical and philosophical stance, the question on methodology strategy as well as the methods proposed (Creswell, 2003). Thus, those questions inform the three elements of the inquiry: Knowledge Claim, Strategy of Inquiry and Methods of Data Collection and Analysis. For this study, a qualitative approach is chosen, based on interpretivist assumptions, a phenomenological strategy of inquiry and different methods are applied (see Table 10).

Research Approach	Knowledge Claims	Strategy of Inquiry	Methods (planned)*
Qualitative, Inductive	Interpretivist Assumptions	Phenomenological, Interpretive	<ul style="list-style-type: none"> • Narrative Literature Review • Reflective Journal • Semi-structured Interviews • (Teaching Observation)* • (Curricula Analysis)*

Table 10: Overview on Research Approach (Creswell, 2003)

Moreover, in line with the interpretivist approach, this research focuses on a qualitative approach in general and phenomenological research as the specific strategy. Thus, the phenomenology can be marked as both a philosophy as well as a method, in which the understanding of patterns and the creation of meaning build the focus of the research (Creswell, 2003). This phenomenological approach comes with a relation to Interpretivism. Unlike the positivist approach, the understanding of human behavior is at the core of this research. Thus, phenomenological approaches are especially suitable for discovering implicit knowledge and making the “obvious, obvious” (Brinkmann, 2013, p. 69). Based on this, the study on the value of Design Thinking in Education also puts an emphasis on the interpretive understanding of it. The chosen approach to this subject is therefore truly interpretative, as it claims that the value of Design Thinking can only be understood through understanding the meaning of the concept for those involved, who are in this case, the entrepreneurship educators.

**Within this context, the adaption of methods according to the circumstances of the pandemic COVID-19 have to be further elaborated. Within the first considerations of suitable methods, teaching observations had been planned with the goal to observe, research and reflect upon the actual behaviour of the entrepreneurship educators in their natural teaching situation, the classroom. It had been planned to use this additional method as another source of evidence, including direct observations being made throughout the fieldwork (Yin, 2014). Both, direct and participant observations within the context of Entrepreneurship Education had been planned to be made during the process of this research. However, the phase of data collection took place in the year 2020 between May and September, in which all of the Higher Education institutions across Europe had been locked down. These restrictions and social distancing requirements have limited class teaching and have been a significant challenge, also for the field of Entrepreneurship Education (Ratten & Jones, 2021). Based on the local state regulations, at the time of the planned data collection, face to face teaching had been suspended in favour of digital online formats. Thus, the teaching observations could not have been conducted as planned.*

Further, initially planned Analysis of Curricula was discarded. At the beginning of the interviews and data collection phase, the interview participants had been asked to send over their course descriptions in order to collect data for an analysis of the curricula documents. However, the participants claimed the documents as outdated and informed the researcher about the fact, that the written curricular documents and course descriptions did not reflect their current teaching practice in the classroom. Due to the issues of lack of veracity of the data (incomplete and outdated documents) discovered during the data collection, the Analysis of Curricula was discarded. Although there is not rigorous data, it is an interesting anecdotal finding that written curricula does not appear to reflect the reality of educational practice in this discipline in the UK and Northern Europe geography (see further discussion in Section 6.4.7. and 6.4.8.) Even without this additional data, the interview study turned out to provide sufficient and excellent data points to answer the research questions.

6.2.2 Exploratory focus and qualitative methods

In general, the purpose of the research design can be either exploratory, explanatory, descriptive or evaluative (Saunders et al., 2019). The purpose of the research design is strongly interconnected with the research questions. At its core, this research takes an exploratory focus. It has been outlined in the previous chapters (see Section 4.5) that it is the goal of this study to clarify the understanding of the value of Design Thinking in Entrepreneurship Education with a focus on the educator's perspective. The exploratory focus of this study is aligned with the qualitative approach, as the value of Design Thinking within Entrepreneurship Education needs to be understood and little research on this concept has been done so far. Moreover, this exploratory approach is needed as the topic is new and the important variables, which have to be examined, are still unknown (Creswell, 2003). The major objective of exploration and discovery is typical for qualitative research and an inductive mode (Johnson & Christensen, 2014).

Moreover, the explorative research approach has been chosen, as previous research has focused on quantitative or single-case studies studying Design Thinking within Entrepreneurship Education (Huber et al., 2016; Linton & Klinton, 2019; Nielsen & Stovang, 2015; Sarooghi et al., 2019; Kremel & Edman, 2019) and therefore an important contribution can be made by following a contemporary methodological approach cultivating creativity, imagination and exploration as a new opportunity in entrepreneurship research (Kyrö et al., 2013). Thus, in order to answer the question of the value of Design Thinking in Entrepreneurship Education, the research study follows a qualitative approach. In general, qualitative research focuses on participants meanings and relationships to develop a conceptual framework and theoretical contribution (Saunders et al., 2015; Brinkmann, 2013; Breakwell et al., 2000). Thus, qualitative research is studying a phenomenon in an open-ended way (Creswell, 2003; Saldana, 2013) and qualitative researchers therefore aim to develop hypotheses and explanations based on the interpretations of their observations (Johnson & Christensen, 2014).

In the context of this research specifically, qualitative research methods allow the researcher to formulate new conceptual dimensions and understand the education taking place in classrooms (Gerber et al., 1995) as qualitative techniques encourage the exploration through a variety of perspectives (Saldana, 2013). The focus on qualitative research, in this case, facilitates insights into the everyday reality of educators, as in the education context of this research, a qualitative approach seems appropriate due to the humanistic orientation including a reflective discourse of the personal experiences of the contextualized participants (Gerber et al., 1995). This approach has been chosen as methodologically consistent in order to identify new patterns rather than confirming existing ideas on the data (Bryman & Bell, 2003) and therefore open-ended, emerging data is collected with the intent to develop new themes and meaning (Creswell, 2003). Moreover, a qualitative approach allows work within the researcher-designed framework and encourages innovation (Creswell, 2003) as well as being strongly connected to the underlying interpretive philosophy (Saunders et al., 2015).

Referring back to end of the Literature Chapter (see Section 4.5) where the gaps in the research have been summarized, the following section will indicate the value of the chosen methodological approach in the context of the current discussions in the research field. Most recent studies in the field focus on single case studies and the study of exemplary course design examples (Huber et al., 2016; Kremel & Edman, 2019; Linton & Klinton, 2019). As stated beforehand, those examples focus on studying cases that explicitly use Design Thinking in the field of Entrepreneurship Education. However, the literature review and the conceptualization of the DT/EE nexus has revealed that the implicit use of Design Thinking principles in Entrepreneurship Education might be of particular interest.

Furthermore, recent research has applied survey-based approaches in order to demonstrate the application of Design Thinking among Entrepreneurship Educators (Kremel & Edman, 2019; Sarooghi et al., 2019). These have been valuable contributions to the field and the results confirm that Design Thinking is integrated in more than the half of the entrepreneurship curricula (54%), even though there are still many opportunities for further development (Sarooghi et al., 2019). However, the recent debate needs a more qualitative and explorative perspective. Not only is more research required to assess the impact of Design Thinking in Entrepreneurship Education programs (Sarooghi et al., 2019) in general, but the qualitative approach of this research will provide a novel and valuable contribution to the debate. Rather than just proving existing ideas in the data, new patterns can be identified based on an open-ended approach in order to contribute to the common understanding of the value of design thinking. Therefore, this thesis makes use of an explorative approach as an “unexploited opportunity for entrepreneurship research (Kyrö et al., 2013, p.289). The forthcoming Section 5.2.3 illustrates the specific Research process in further detail.

6.2.3 Research Process and Strategy

The research strategy provides the methodological link between the research philosophy and the choice of methods (Denzin & Lincoln, 2013; Saunders et al., 2015). Generally said, the strategy defines a plan of action to achieve a goal. In this case, the research strategy defines the plan of research actions undertaken in order to answer the defined research question. The choice of research strategy is guided by the research questions and the defined objectives but also restricted by realistic concerns regarding the time, access to resources and sources of data (Saunders et al., 2015). In the following section, an introduction to the overall research process is given, while more details regarding the explicit methods are presented in the next main section. As stated in the Section 4.5, this study has identified the overarching research question addressing the value of Design Thinking for Entrepreneurship Educators in Higher Education. Figure 22 provides a representative summary of the research process, all the parts of which are discussed in detail in the later parts of the thesis.

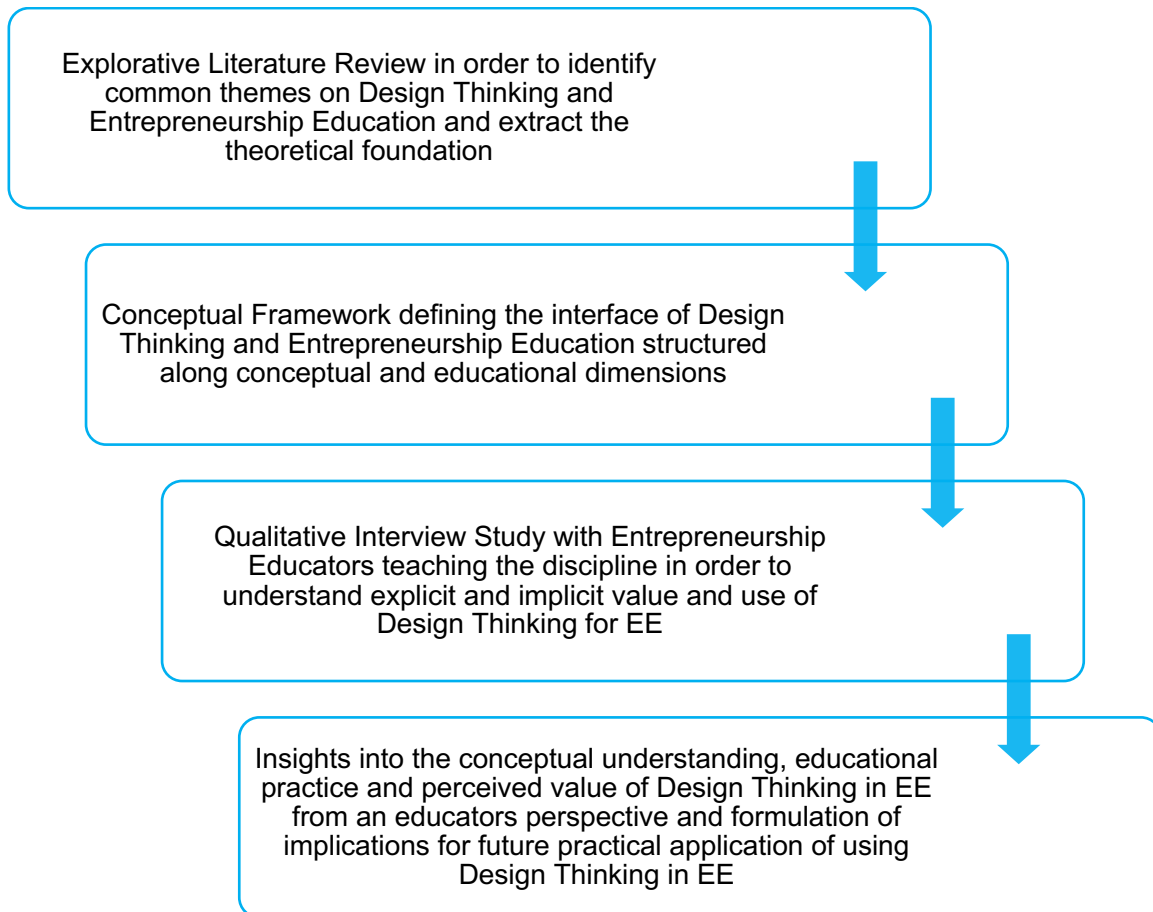


Figure 22: Overview on the research process using qualitative interview study

The conceptual framework has developed as a result from the literature review (Kumar, 2005). Embedded in the theoretical foundation, the conceptual framework builds the basis for the research inquiry, researching the value and use of Design Thinking for entrepreneurship educators along the conceptual and educational perspective. The empirical research process chosen consisted of qualitative semi-structured interviews that were conducted with Entrepreneurship Educators teaching the discipline in Higher Education. The aim being that insights into the conceptual understanding, the educational practice and the perceived value of the Entrepreneurship Educators inform a future practice of integrating Design Thinking within Entrepreneurship Education. In the following, an overview on the timeline of the research, following an iterative approach, is given. This research is designed to be a cross-sectional study as it

involves the study of value of Design Thinking for Entrepreneurship Education (curricular and pedagogical) at this particular time. Even though a longitudinal representation of, for example, the perceived change of value of Design Thinking in Entrepreneurship Education context might be worthwhile research, this was not possible within the constraints of the study. The results of this research however, reflect the value of Design Thinking in Entrepreneurship education in general, based on an analysis of data on a particular time. In the following figure an overarching timeline of the conducted research is shown:

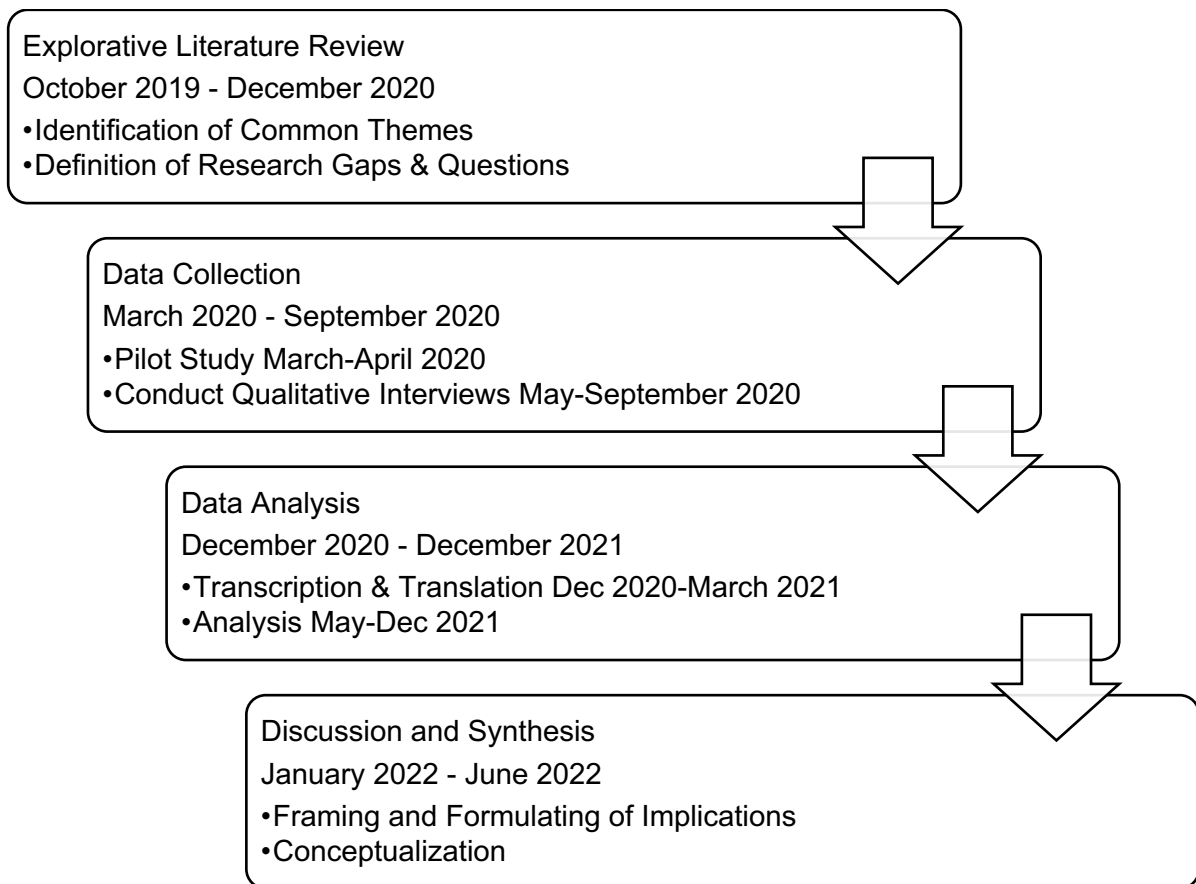


Figure 23: Overview on time horizon of this thesis

In general, the timing of this research follows an iterative approach, by making use of a repetitive interplay between the collection and analysis of data (Bryman & Bell, 2003). Thus, the inductive process of this research is illustrated by the process of working back and forth between the interpretation of data and the development of themes (Creswell, 2014). Unlike in quantitative

research, the process of data collection and data analysis have been run in parallel and influence each other by feeding into the ultimate narrative (Creswell, 2014). In a summary, the forthcoming Figure 24 will provide an overview of the Research Design employed.

As illustrated in Figure 24, a qualitative interview study has been chosen in order to answer the research question and develop insights on the value of Design Thinking in Entrepreneurship Education. In this, the research is seeking to establish the meaning of the value of Design Thinking from the views of the interview participants. Moreover, the use of a qualitative interview study is a valuable contribution to the current debate in the research field of the DT/EE nexus. Therefore, the research strategy of a qualitative interview study provides a new perspective as the study does not only study one, particular, interview participant but makes use of several interviews to understand something else (Stake, 1995) in this case; the overall value of Design Thinking in Entrepreneurship Education. Thus, the approach of semi-structured in-depth interviews has been chosen as the most appropriate data collection method in order to gain qualitative hands-on insights into the value and to explore the current teaching practice.

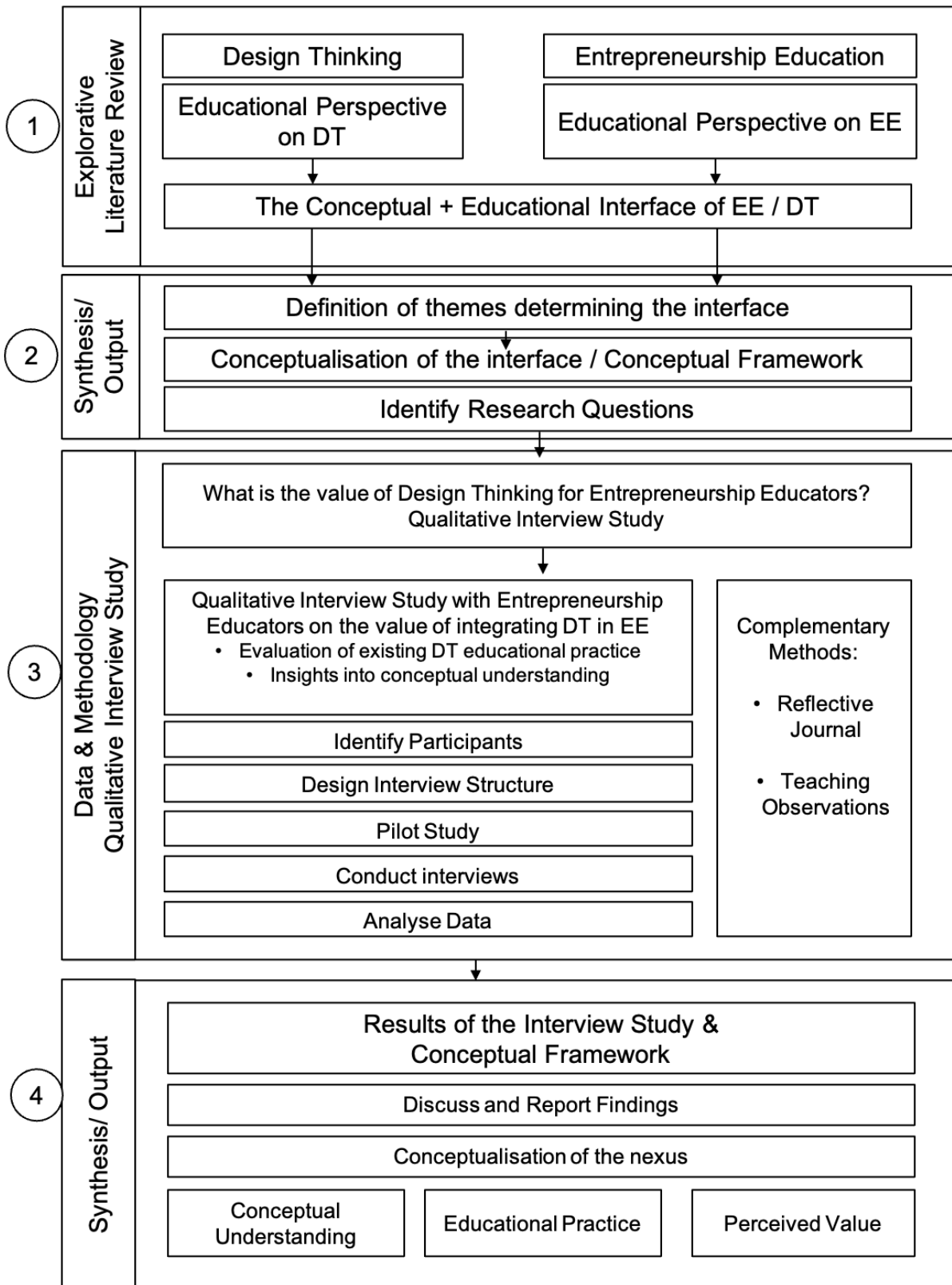


Figure 24: Research Design Overview

Further details on the methodology and instrument design of the qualitative interview study are given in Section 6.4.

6.2.4 Sampling and Scope

In the following, general sampling principles such as the sampling frame and geographic scope, as well as their implications for the generalizability of this research are presented. As stated above, this section is meant to give an overview of the general choices of research design. More information on the specific sampling technique is given in the chapter explaining the methodology in further detail (see Section 6.4). The selection of an appropriate sampling method is key effective research design (Saunders et al., 2015) and should be carefully undertaken in order to enable the researcher to answer the research question. Overall, a distinction can be made between the selection and the sampling (Brinkmann, 2013). Selection refers back to the process of making general decisions on who should be the participants for the interview study, while the process of sampling refers back to the process of finding a sample of the relevant population (Brinkmann, 2013). Given the specific focus of this study, the target population (selection) is clearly defined by:

European Entrepreneurship Educators, teaching Entrepreneurship Education in European Higher Education contexts. Entrepreneurship Educators include e.g. Professors in Entrepreneurship, Lecturers in the field of Entrepreneurship and Entrepreneurship Education Teaching Staff.

As this study is following an exploratory approach, non-probability sampling is appropriate (Clark et al., 2021). To answer the research questions and meet the objectives, a small number of cases, selected for the particular purpose, is suitable. This approach of *purposive sampling* can also be referred to as *information-oriented selection*, which is often used in qualitative inquiry

(Brinkmann, 2013). Especially in the context of this research with a qualitative interview study approach (see Section 6.4), the interviews are not chosen in order to understand other interviews. On the contrary, in a qualitative interview study design, some interviews will contribute more to the overall research question than others, and representative or “typical” interviews will contribute as well as the study of unusual interviews (Stake, 1995). Or, in other words, the interview participants are selected in order to maximize the relevant information and to increase the researcher’s knowledge (Brinkmann, 2013). Thus, by choosing a non-probability sample, the logical relationship between the sample selection technique and the purpose of the research is important (Saunders et al., 2015). The credibility (further elaborated in Section 6.6.1) is shown by the quality of the insights gained from the data collection and analysis, more than just by the size of the sample. In this case, therefore, the credibility is shown by the quality of selection of suitable participants of the interview study.

This study aims to provide a perspective on the European Higher Education System, therefore a geographical cluster is used. For validity reasons (see Section 6.6) a selection of focus on Northern Europe has been chosen. This study aims to focus on insights from the Higher Education Systems in UK and Northern Europe. On the one hand, this geographical scope responds to the methodological contribution of this study as the most relevant studies within this field have been focused on the status quo of the Design Thinking implementation at university departments and entrepreneurship centres in the United States (Sarooghi et al., 2019). Thus, the focus on UK and Northern Europe provides a novel perspective, especially in the context of an acknowledged duality of the European and American Approach towards Entrepreneurship Education (Guzmán & Liñán, 2005). On the other hand, the geographical area of UK and Northern Europe has been chosen as suitable in order to restrict the complexity of the research scope and to increase a valid representation of the target population. Thus, the participants of the qualitative interview study are Entrepreneurship educators from the UK, Germany, Sweden, Netherlands and Denmark – representing educators teaching in the field at Higher

Education in the UK and Northern Europe – a more detailed description of the sample can be found in the Section 6.4.3. Further remarks and reflections on the process of selecting, sampling and recruiting are made in the section on reliability and validity of this research (see Section 6.6). Also, more information on the specific sampling is given in the next chapter explaining the methodology of the qualitative interview study in further details (see Section 6.4).

6.3 Explorative Literature Review

The findings from the explorative literature review have been presented in the early sections of the thesis. The content-related analysis of the existing literature within this field, building the foundation of this work, can be found within the Chapters on Design Thinking, Entrepreneurship Education and the conceptualization of the nexus (see Chapter 2 & Chapter 3 & Chapter 4). Within the following sections, the methodological approach is presented. Thus, the following section identifies choice for an explorative, narrative literature review as well as demonstrate steps of the research process.

6.3.1 Value of an Explorative and Narrative Approach

Literature reviews provide a way to synthesize research findings on a higher level and help to uncover research gaps which build the foundation for creating new theoretical frameworks and conceptual models (Snyder, 2019). Within this study, the literature review has been used to improve theoretical sensitivity towards the concepts of Design Thinking and Entrepreneurship Education as well as to identify common themes which have been identified as meaningful (Johnson & Christensen, 2014). Thus, the explorative literature review provided a detailed outline of the reasoning behind the development of a conceptual nexus of Design Thinking and Entrepreneurship Education. Furthermore, the results from the literature review stimulated the formulation of the research questions, which is often the case in qualitative research (Johnson & Christensen, 2014). The literature review has been a continuous process; from one perspective, the initial literature review was based on the initial research problem, by contrast the ongoing literature review has helped to identify the gaps

in the research and helped to inform the formulation of the research questions (Kumar, 2005). It has been the goal of the narrative, exploratory literature review to provide a synthesis of the relevant literature in a comprehensive and transparent manner. Thus, the literature review brought clarity to the research problem, helped to improve the methodology, informed the knowledge base in the research area and contributed to the contextualisation of the findings (Kumar, 2005). A narrative, exploratory literature review was chosen because this approach offers a breadth of literature coverage and provides flexibility to deal with an evolving field of knowledge. This flexible and iterative approach has been suitable, especially in this very dynamic field. This has enabled new literature to be included in an ongoing way, especially as relevant literature has been published during the process of this study (Sarooghi et al., 2019; Mansoori & Lackéus, 2019; Kremel & Edman, 2019; Lynch et al., 2021; Micheli et al., 2019; Auernhammer & Roth, 2021; Dell’Era et al., 2020; Hölzle, 2022). Overall, the narrative approach was chosen as it is valuable to serve the purpose in the context of this work to synthesize many pieces of information into one overview. It is an important outcome of the literature review to be able to contextualize the findings of the research. In order to do so, a clear definition of the contribution of the research in the context of the existing body of knowledge is essential (Kumar, 2005). Even more, the literature review has been the basis in which the theoretical and conceptual framework has been embedded (Kumar, 2005). Further illustrations of the theoretical and conceptual framework can be found in the previous chapter. Even though this thesis has followed an exploratory and not a systematic approach for the literature review, the following section provides further transparency regarding the steps and structure of the literature search.

6.3.2 Structured Process and Selection of Literature.

The process of finding literature in a narrative approach is iterative and explorative, searching for the literature without an explicit plan (Carey, 2016) and even though the narrative review is the most common literature search in social sciences, this approach has been criticized regarding its lack of structure

or clarity (Snyder, 2019). However, a narrative approach can be effective, if completed with a certain structure and focus. The key to a thorough review is to ensure the inclusion of all relevant literature, and its reliability (Carey, 2016). Thus, this study has applied key selection criteria within the search process in order to provide an adequate foundation. In the following, a summarizing overview of the selection criteria for the literature is given and illustrated in Table 11. For the literature review, data were collected from the databases subscribed to by Swansea University, including Proquest and Business Source Complete, between October 2018 and December 2021, with an intense period of literature search between October 2018 and December 2019. Besides using the database of the Swansea Library, also Google Scholar was used for complementary literature search.

Selection Criteria	Description of Selection Criteria
Language	Included literature must be written in either English or German. With only few exceptions, all literature included has been written in English language.
Geographic Scope	All relevant conceptual and theoretical literature has been included. Only regarding the case studies, a selection based on the geographic scope has been applied with a special focus on Higher Education in Northern Europe. Thus, case studies with a very specialized focus on e.g. Business Schools in India have been excluded.
Focus on Educational Context/ Higher Education	The abstracts were screened for additional keywords, indicating the relevance of the article within an educational context / focus on higher education. Thus, e.g. case studies on Design Thinking within small businesses or within the context of e.g. corporate entrepreneurship were excluded. Moreover, this implies of studies discussing the phenomenon from a meta-perspective, e.g. taking a design-science perspective on Entrepreneurship.
Reliable & Rigorous Publications	Focus on peer-reviewed articles and academic, reliable literature, exclusion of non-scientific sources, newspapers or magazines.

Relevance and Topicality	The relevant literature was screened regarding relevance and topicality. As the topic of Design Thinking has been identified as dynamic, the literature review mostly focused on relevant literature between the last 10 years from 2011 – 2022.
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Table 11: Inclusion and exclusion criteria for literature review

Relevant publications were collected using the search strings “Design Thinking + Entrepreneurship Education”; “Design Thinking Education + Entrepreneurship”; “Design-based Entrepreneurship Education”; “Design Thinking + Entrepreneurial Education”. Overall, it can be stated that while the concept of Entrepreneurship Education is tagged very differently, using different terms, such as “Entrepreneurial Education; Entrepreneurship Curriculum, Entrepreneurial Pedagogy etc.”, while the term “Design Thinking” was rather used uniformly. Thus, the approach for the literature review focused on a topic search and was not limited to specific journals, to allow a broader data coverage. However, it became apparent in the process of the literature search, that specific journals were a good indicator for providing relevant content, especially covering the focus on an educational perspective of the topic. Among the most relevant Journals were the Journal of Innovation and Entrepreneurship; Education & Training; Journal of Small Business Management, The Design Journal, Small Business Economics, Industry & Higher Education. Thus, a focus has been laid on peer-reviewed publications to include quality aspects in the literature search, even though some of the most relevant literature regarding the DT/EE nexus has been identified as solely conference proceedings (e.g. Huber et al., 2016). However, the critical appraisal of any literature included is significant for the quality of the review. Therefore, all the literature included has been carefully and critically evaluated (Carey, 2013). In Figure 25 the process of the literature review is presented:

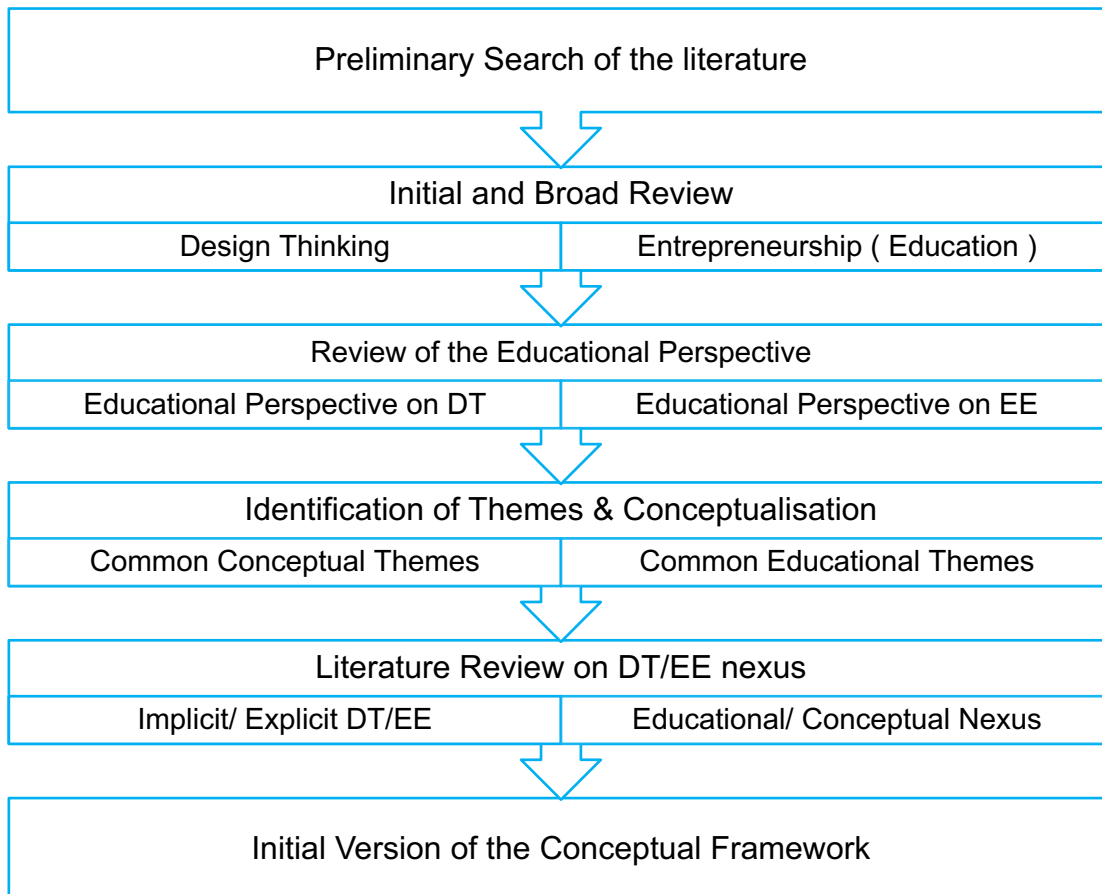


Figure 25: Approach and Process of Explorative Literature Review

At the very beginning, an initial search of the literature on Design Thinking and Entrepreneurship Education was conducted to get a sense of the potential in this research area. Based on the results, which showed that only a few relevant peer reviewed papers had been published in this context, the decision to dive deeper into this topic was validated. As a first step, the literature in the broad area of Design Thinking and Entrepreneurship Education was reviewed to gradually narrow down to define the research problem (Kumar, 2005).

Firstly, the research area of Design Thinking was reviewed. This included the historical development of Design Thinking based on the research of Designerly Thinking and the collection of relevant Design Thinking Models. Based on this review, common themes of the Design Thinking concept were identified. Secondly, the research area of Entrepreneurship was reviewed. The different

perspectives on the concept of Entrepreneurship as well as important and influential Entrepreneurship Models have been identified. Based on that, common themes of entrepreneurship elements have been determined. At this stage, based on the literature review on Design Thinking and Entrepreneurship, the development of the theoretical framework has been started. In the first place, the important elements defining both concepts were distilled, which later informed the definition of the conceptual nexus of both concepts. The next step was to dive deeper into the educational perspective on both concepts. The focus on the educational perspective was essential, especially as there has been a considerable amount of literature published on the intersection of Design Thinking within Entrepreneurship, without specifically referring to the field of Entrepreneurship Education.

Therefore, new keywords have been identified to search for literature providing an educational and pedagogical perspective on the concept of Design Thinking and Entrepreneurship. In the following, the initial keywords have been listed:

Initial Keywords on the Educational Perspective on Design Thinking	Initial Keywords on the Educational Perspective on Entrepreneurship Education
<i>Design Thinking Education, Design Thinking Pedagogy, Design-based Education, Design Thinking didactics, Design Thinking Higher Education, Design Thinking Educators, Design Thinking curriculum, Design Thinking Learning,</i>	<i>Entrepreneurial Education, Entrepreneurship Education, Entrepreneurship Pedagogy, Entrepreneurial Learning, Entrepreneurship Education, Entrepreneurial Curriculum</i>

Table 12: Initial Keywords for the Explorative Literature Search

In addition to collecting relevant literature through the search for keywords, the citations in selected articles, as well as searching for recent papers that have cited them, have yielded further relevant literature (Snyder, 2019). Regarding the content orientation of the review, relevant educational theories and

concepts on the educational perspective have been examined. As this study has put the educator's perspective as the central theme, another round of literature research was conducted at a later stage in order to dive into the perspective on the entrepreneurship educator (see Section 2.4).

Based on this review, common themes regarding the educational and conceptual nexus were developed. Within the last step, the most relevant literature on the Design Thinking and Entrepreneurship Education nexus was analysed in further detail. The previous sections illustrated the approach and process of finding and integrating relevant literature for this study. A thematic analysis of the most influencing literature in the field can be found in the previous chapter on Common Themes (see Section 4.1).

6.4 Qualitative Interview Study as suitable research strategy

A qualitative interview study with entrepreneurship educators was chosen as a suitable research strategy in order to examine the state of practice and potential value of Design Thinking for Entrepreneurship Education. In the following section, more specific information on the research process of the qualitative interview study among entrepreneurship educators is given with the aim of further elaborating the instrument design and the pilot study, as well as more detail on the data collection and analysis and coding process.

6.4.1 Instrument Design

As stated in the previous sections, this research aims to investigate and understand the value of Design Thinking for Entrepreneurship Education from an Educator's perspective. Thus, the qualitative, semi-structured, in-depth interviews were conducted in order to gain insights into the educator's theoretical knowledge, pedagogical beliefs and actual classroom practice of Design Thinking integration in Entrepreneurship Education. In line with the interpretivist view (see the Section 6.1 on research philosophy) the aim was to gain a great depth of data in order to provide detailed and rich answers to the research questions. Qualitative interviews provide the possibility to dive into the respondents' narratives of their worlds (Denzin & Lincoln, 2000), and are especially suitable for a flexible and inductive research logic, guiding qualitative research (Brinkmann, 2013). As a result, the use of semi-structured interviews was considered the best method to find answers to the research question. Semi-structured interviews usually invite responses to open-ended questions (Hsieh & Shannon, 2005). As is common, the semi-structured interview guideline consisted of several key questions that helped to define the core areas to be explored but allowed the interviewer to diverge into specific areas in order to gain more detailed insights.

Figure 26 gives an overview of the main topics addressed in the interview. The full version of the original interview guideline can be found in the Appendix.

Personal Background	<ul style="list-style-type: none"> • Discipline Background • Career Development
Perspective on Entrepreneurship Education	<ul style="list-style-type: none"> • Definition/Perspective on EE • Goal of the Courses
Pedagogical Perspective and Teaching Approach	<ul style="list-style-type: none"> • Role & Self-Image, Teaching Style • Practical Approach in the Classroom
Perspective and Experience with Design Thinking	<ul style="list-style-type: none"> • Theoretical and practical understanding of DT, Experience and Associations
Integration and Practice of Tools and Models	<ul style="list-style-type: none"> • Implicit/ Explicit of Design Thinking Tools/Methods/Principles • Level of Integration
Interface and Value	<ul style="list-style-type: none"> • Similarities and Differences on conceptual/ pedagogical interface • Perceived Value of integrating Design Thinking in EE
Institutional Context and Meta Perspective	<ul style="list-style-type: none"> • Institutional Perspective and Meta-Integration of Entrepreneurship at the University

Figure 26: Main topics addressed in the interview guideline

The interview guideline covered contextual information regarding the personal background, career as well as the institutional context which framed the interview from the beginning to the end. The main topics of the interview focused on exploring the perspective on Entrepreneurship Education in general, as well as the specific teaching approach and role in the classroom. The formulation of the semi-structured interview questions and interview topics were based on

the identified themes from the explorative literature review. Besides understanding the perspective of Entrepreneurship Education, the perspective and experience of Design Thinking, the current practice and the level of integration, especially the perceived value in practice, has been at the core of the interview study. This approach made it possible to explore how Entrepreneurship Educators understand Design Thinking as a concept and on what level they integrate it in their teaching as well identify the perceived value Design Thinking has for them and therefore answer the Research Questions (as outlined in Section 4.5) accordingly. Previously, a pilot study was conducted in order to test for the suitability and clarity of the design of the research instrument as well as address issues of the length of the interview. More information on the pilot study is outlined in the following section.

6.4.2 Pilot Study

In order to test the semi-structured interview as a suitable method, a piloting and pre-testing of the questions was conducted in form of a pilot study with three interviews. Piloting in this case has the function to ensure the functioning of the overall research instrument as well as to gain experience and confidence in the interviewing technique (Bryman & Bell, 2003). For practical reasons, it was essential for the pilot study to test the length of the interviews (aiming for 60-90 minutes) as well as the use of software for video calls (Zoom). Furthermore, the flow and order of the questions as well as their comprehensibility and potential to be confusing was tested. The most important function of the pilot study was to clarify problems in the question formulation (Bryman & Bell, 2003). The participants of the pilot study were chosen as comparable to the sample of the full study. Participants therefore included Entrepreneurship Educators at Lecturer and Professor level from Germany and the UK. Overall, three pilot interviews were conducted in the period between March and April 2020.

Participant	Role and Location	Date of Interview	Length of interview
Participant 1	Lecturer in International Entrepreneurship, University in United Kingdom	23.03.2020	59 minutes
Participant 2	Professor in Finance and Entrepreneurship, Polytechnic University in Germany	03.04.2020	42 minutes
Participant 3	Lecturer in Social Entrepreneurship, Polytechnic University in Germany	06.04.2020	65 minutes

Table 13: Description of participants of the pilot study in March-April 2020

Overall, the pilot studies were conducted as expected and confirmed the general approach to the research. The number of questions and the general order of the questions maintained the intended flow. However, the following revisions were made based on the piloting and pre-testing of the interview study (see Table 14).

Issue	Description	Revision
Uncomfortable Definition	It became apparent that the participants felt uncomfortable/insecure when asking for their definition of Design Thinking	Instead of asking promptly for the definition of DT, the word "association" replaces definition. "What do you associate with Design Thinking/What do you think of when you think of Design Thinking"
New Value of DT	Based on the analysis of the pilot interviews, a new theme was discovered as participants were talking about the value of the Design Thinking mindset for themselves as educators	A set of new questions were added to the interview guide, specifically asking the participants whether they embrace a Design Thinking Mindset by themselves.
Design Thinking	It became apparent that participants struggled to answer the question which Design	A slide with a list of tools, methods and models of Design Thinking was prepared in order to show the list during the

Tools and Methods	Thinking Tools they use in their teaching	interview in order to help the participants to recall them.
Different levels of experience with Design Thinking	The pilot interviews revealed the distinctly different levels of knowledge and experience with Design Thinking and therefore a different suitability of the questions	A new question was added to the interview guide asking the participants to self-assess their experience with Design Thinking. Two interviewing strands have been developed, based on the level of experience and knowledge of the participants regarding the concept of Design Thinking.

Table 14: Revision based on the feedback from the pilot study

Firstly, in the first version of the interview guideline, the participants had been asked to give a definition of Design Thinking. This aspect was adapted towards asking for the association and explanation of Design Thinking as the participants felt uncomfortable and under pressure to provide a perfect definition as if from a textbook, resulting in unreliable responses. Secondly, a set of new questions were added after a new and interesting theme (value of Design Thinking as an educator's mindset) was discovered within the pilot interviews. In order to support the participants to recall certain Design Thinking Tools (only used if needed as a conversation starter) a visual guide was prepared. Most importantly, the pilot interviews revealed that the interview guideline was in need of a further distinction regarding the level of experience and expertise with the concept of design thinking. Thus, two slightly different versions of the interview guideline were set up in order to better target the interview questions to the participants. Overall, the general flow and length of the interviews turned out as expected and did not need further revisions.

6.4.3 Sample and Data Collection

Within the following section, a detailed description of the sampling and the recruitment process of the qualitative interview study is given. Moreover, a descriptive overview of the participating Entrepreneurship Educators is given in

order to provide a rich and transparent overview on the collected interview data. As introduced in the previous sections regarding the general research approach (see Section 6.2.4), the sampling technique for the semi-structured interviews was chosen as purposive. This decision was made, as purposive sampling is known to be particularly suitable for research areas with a lack of prior empirical evidence (Creswell, 2012; Bryman & Bell, 2007). Participants were chosen for their suitability based on the purpose of this study (more explanation on the general sampling strategy has been given in the previous section - see Section 5.2.4). Besides purposive sampling, snow-ball sampling techniques have been applied by asking the interview participants for possible contacts of interest for this study. Based on the requirements regarding the target population, the geographic scope and the language restrictions, the following basic criteria was applied in the selection of participants (see Table 15).

Required Criteria for Participant Selection	Description
Language	The interviews will be held in either English or German, due to the geographic scope and language of the researcher. Therefore, it is a basic criterion that the participants of the interview study should be capable of either expressing them in English or German.
Target Population	Entrepreneurship Educators, teaching Entrepreneurship in Northern European Higher Education (for more than three years). Entrepreneurship Educators include Professors in Entrepreneurship, Lecturers in the field of Entrepreneurship and Entrepreneurship Education, Teaching Staff.
Geographic Scope	Based on the geographic scope applied in this study, the participants teach Entrepreneurship at a university or polytechnic in Northern Europe.

Table 15: Description of required criteria for participant selection

The interviews were held from May until September 2020, although most of the interviews were conducted in the months of May, June and July. The

potential contributors were initially contacted via email. After a positive reply, the participants received a research information sheet one week in advance of the interview for prior information, including the ethical consent form. The sessions took place via the video conferencing tool Zoom at a pre-agreed time and lasted between 45 and 90 minutes. In compliance with ethical and legal requirements, confidentiality and anonymity were guaranteed. Verbal and written consent of the educators to video-record the sessions for transcribing purposes was obtained in advance (more information on the ethical considerations in Section 6.5).

In total 29 semi-structured interviews were conducted. Initially, the study aimed for 20 participants and the final sample of 29 was a result of the overall positive response rate on the email request sent, as well as the snowball sampling. Thus, the interviews were conducted and the point of data saturation was reached, whereby the new data collected did not provide any new themes (Saunders et al., 2015). As stated in the selection criteria above, the geographic scope of the sample was focused on Northern Europe, including the focus countries of Sweden (8 Participants), Germany (7 participants), United Kingdom (9 Participants) as well as the Netherlands (3 Participants) and Denmark (2 Participants). Based on the selection criteria, the educators had to be experienced in the teaching of Entrepreneurship – with more the three years of experience teaching in the field, either at a university or – especially relevant for Germany – at a polytechnic university, also known as universities of applied sciences. This included different levels of expertise from Lecturer, Senior Lecturer to Assistant/Associate Professors and Full University Professors. The final mix of participants resulted in 11 participating Full Professors, 4 Associate/Assistant Professor Position and 14 participants holding a Lecturer/Senior Lecturer position within Entrepreneurship. A rich description of each interview participant is also given in order to determine credibility (Denzin & Lincoln, 2013; Creswell & Miller, 2000) – more details on the validity and reliability of this research are outlined in the Section 6.6. The forthcoming Table 16 provides a more detailed and descriptive overview on the participants of the interview study, however further detail is withheld to preserve anonymity.

No.	Country	Institution	Gender	Position	Background / Context
1	Sweden	A	M	Professor in Entrepreneurship	Technology Management / Economics / Engineering
2	Sweden	B	M	Senior Lecturer & Head of Innovation Lab	Business Administration
3	Sweden	C	M	Professor in Innovation & Entrepreneurship	Business Administration & Organisation / Technology
4	Sweden	A	W	Associate Professor Technology Management and Economics	Engineering / Entrepreneurship / Technology Transfer
5	Sweden	D	M	Lecturer & Postdoctoral fellow at Entrepreneurship	Business Administration / Entrepreneurship
6	Sweden	A	M	Senior Lecturer	Economics / Entrepreneurship
7	Denmark	E	W	Associate Professor	International Business Economics / Administration and Politics
8	Sweden	F	M	Professor for Innovation & Entrepreneurship	Industrial Engineering and Management
9	Denmark	G	W	Professor for Entrepreneurship	Business Administration / International Business
10	Denmark	G	M	Associate Professor	Marketing & Economics
11	Netherlands	H	W	Assistant Professor	Management / Marketing / Economics / Entrepreneurship
12	Netherlands	H	M	Professor for Entrepreneurship	Innovation / Technology Adoption / Marketing
13	Netherlands	I	W	Lecturer & Academic Coordinator of Entrepreneurship	Business & Consumer Studies / Management and Entrepreneurship
14	Germany	J	M	Lecturer	Linguistics / Consulting / Social Entrepreneurship
15	Germany	K	M	Lecturer & Coordinator	Physics / Astronomy / Innovation Ecosystems

16	Germany	L	M	Professor for Entrepreneurship	Business Administration / Communication and Media Science
17	Germany	M	M	Professor for Digital Transformation and Entrepreneurship	Business Administration & Management
18	Germany	N	M	Professor for Innovation & Entrepreneurship	Business Administration, Management & Entrepreneurship
19	Germany	O	M	Lecturer	Communication / Business Communication
20	Germany	P	W	Professor for Entrepreneurship	Electronic Business, Communication, Innovation
21	UK	Q	W	Senior Lecturer in Business Strategy	SME/ Innovation/ Creative Industries
22	UK	R	M	Professor for Entrepreneurship	Business Administration / Rural Economies
23	UK	S	M	Assistant Professor in Enterprise and Innovation	Visual Arts / History of Design / Television & Creative Industries
24	UK	T	W	Senior Lecturer in Business and Enterprise	Politics, Social Research and Entrepreneurship
25	UK	U	M	Senior Lecturer & Program Director Entrepreneurship & Project Management	Business Administration, Marketing & Management and Business Innovation
26	UK	U	W	Senior Lecturer Entrepreneurship	Business & Management
27	UK	V	W	Senior Lecturer & Reader in Enterprise	Sustainability Management & Entrepreneurship
28	UK	W	M	Lecturer	Urban Planning / Innovation Ecosystems
29	UK	X	m	Professor of Creative Entrepreneurship	Design and Entrepreneurship

Table 16: Descriptive information about the sample of interview participants

Table 16 above provides descriptive profiles of the interviewees. Regarding the gender distribution, the sample consists of 19 Men and 10 Women participating in the interviews. Within this context it needs to be mentioned that this gender distribution is shown in order to provide a mix of gender for the sample. However, that interview data is not analysed according to gender differences, as this has not been the focus of this study. Besides the gender distribution, the sample represents also a variety of experiences with Design Thinking in Entrepreneurship Educators. While some of the participants had quite some experience with Design Thinking, other educators had limited experience with Design Thinking (more details outlined in the Analysis chapter – see Section 7.3.9). Overall, the sample is expected to represent the full diversity of Entrepreneurship Educators within Higher Education in Northern Europe. This underlines, in a practical sense, the universality of the findings which can be applied in order to conceptualize the value of Design Thinking for Entrepreneurship Education. Within the following, the process of transcription, coding and data analysis are presented in further detail. This will provide transparency of the process of analysis in the reporting of this research.

6.4.4 Transcription

In order to analyse qualitative data from the semi-structured interviews, the audio data first needs to be transformed into typed text, a process called transcription (Miles and Huberman, 1994). Therefore, all interviews were digitally recorded and transcribed. Field notes and memos were taken immediately after each interview in order to provide context and individual case descriptions to inform the qualitative analysis. The method of transcription involves some sort of interpretation (Magnusson & Marecek, 2015) therefore the transcript should not be treated as the data itself, but as a selective rendering of the data (Ten Have, 2004). The process of transcribing can be constituted as the activity of conversation analysis as displayed in the following schema (Figure 27):

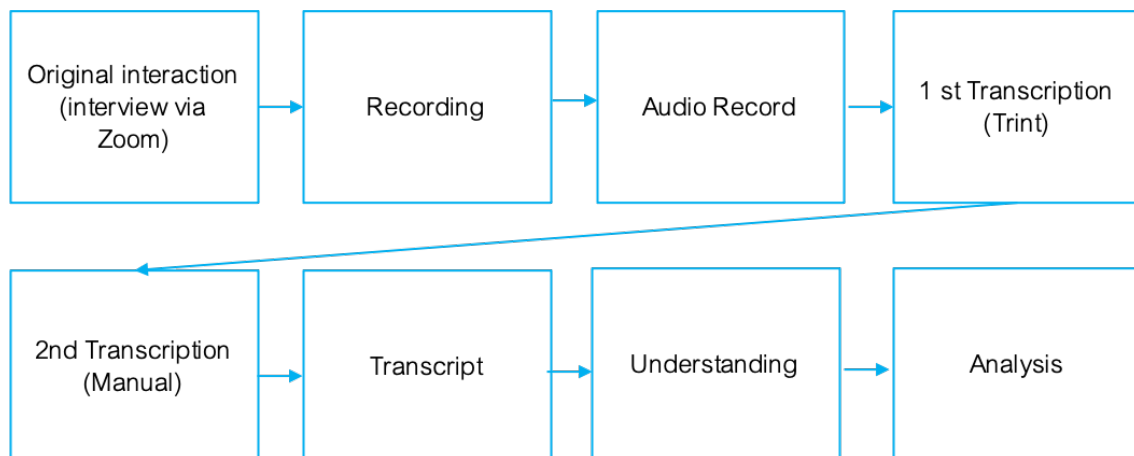


Figure 27: Sequential schema of transcription (Ten Have, 2004)

The process of transcription is to find a balance between analytic utility, realistic rendering and preservation of readability (Ten Have, 2004). Further, it is a challenge in interview transcription to avoid the influence of the researchers' theoretical assumptions in the process of transcribing (Potter & Hepburn, 2012). However, even though too much influence should be avoided, the transcription process itself should be seen as an interpretative process (Brinkmann & Kvale, 2018; Gibbs, 2007). Transcription means to transform information from one form to another, from oral to written language and therefore transcripts are decontextualized renderings of the original interview (Brinkmann & Kvale, 2018).

Within this research, the process of transcription followed several steps. In a first step, the audio format was transformed in a first version of the transcript by making use of an online speech recognition and transcription software, namely TRINT. In a second step, the automated transcript of TRINT was checked for accuracy and amended as a result, with a second round of transcription by the researcher. Based on the adapted transcript, a final check of the transcript was made with a third round of listening to the tape and comparison with the transcript.

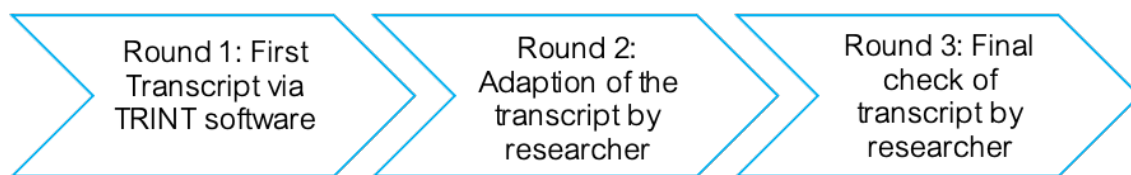


Figure 28: Three steps towards the transcript

The level of transcription as well as the chosen transcription style should be appropriate for the purpose of the research (Gibbs, 2007, Brinkmann, 2013). In this context, it is the purpose of this interview research to learn about the perceived value of Design Thinking for Entrepreneurship Educators. In this case, the factual content of what is said is more relevant than, for example, emotional expression. Therefore, the transcripts were edited in a consistent way, following grammatical rules in order to increase readability. An intelligent verbatim transcription style was chosen in order to remove distractions and focus on what was said, rather than how it was said. Therefore, all stutters, pauses and repetitions (unless repeated for emphasis) were removed. This decision was made in line with the intended use of the transcript (Brinkmann & Kvale, 2018). Moreover, the use of the intelligent verbatim transcription style was suitable, as the majority of participants (all non-UK participants), as well as the interviewer, were non-native speakers of the English language. All the interviews were conducted in English, with the exception of one interview conducted in German. As mentioned in the section on confirmability (see Section 6.6.4) the researcher kept a reflective research diary also during the interview and transcription process in order to collect further information from the interviews.

6.4.5 Data Analysis and coding

Overall, the data analysis applied is embedded in constructivism, which uses the interpretative, narrative analysis as its main methodological principle (Breakwell et al., 2000). In general, the data analysis in qualitative research can be defined

by the activity of data reduction, data display and verification, which all flow together (Miles and Huberman, 1994) as illustrated in the following figure:

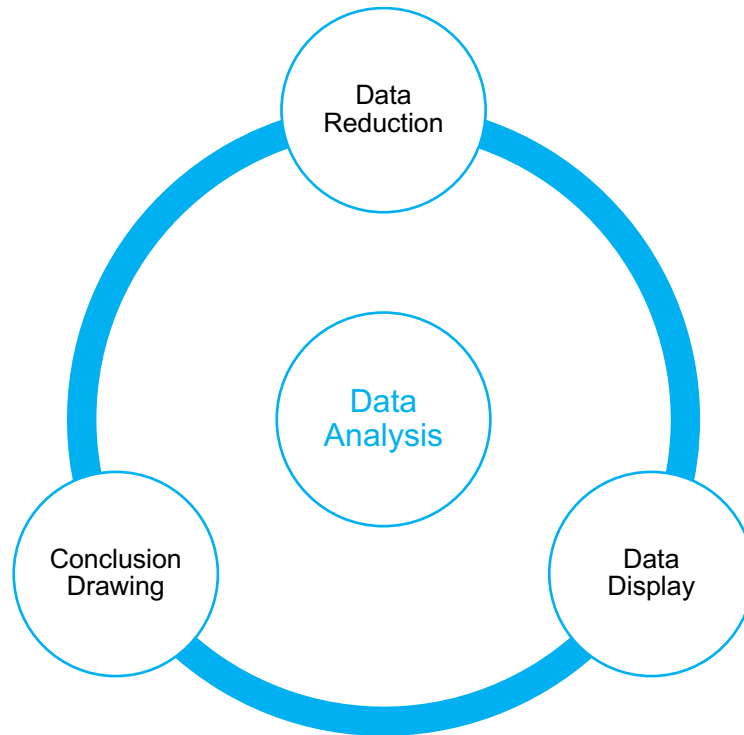


Figure 29: Three components of data analysis (Miles & Huberman, 1994)

Based on this holistic perspective of the data analysis, all three different components of the data analysis are further elaborated in the following section. As an overarching theme, the data analysis of the qualitative interviews was an on-going iterative process. As is often the case in qualitative research, the data analysis proceeds in parallel to the data collection and the write-up of findings (Creswell, 2014; Breakwell, 2000). Thus, during the first analysis of previous interviews, further interviews were conducted (Creswell, 2014). Two stages of coding were applied, while first codes were derived prior to the data collection based on the literature review, an inductive category development was derived from the semi-structured interviews. Within the following section, an overview of the different tools and methods is given which helped to reduce the data and draw meaning

from it. These tools of data display informed the process of taking the data beyond description into explanation (Breakwell, 2000).

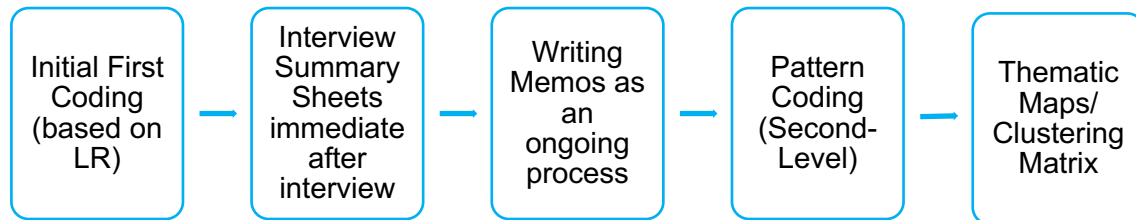


Figure 30: Overview on methods for data analysis from a process perspective

Coding is known as an inductive process of structuring and narrowing data into manageable codes and themes (Bryman and Bell 2007). Thus, themes, or categories, are similar codes aggregated together to convey a major idea that follows from the data. In alignment with this research approach explained in the previous chapter, the analysis of the data follows an inductive approach even though deductive processes are integrated. As is often the case in qualitative research, patterns, themes and categories are built from the bottom up by organizing the data from small bits to abstract units in an inductive process (Creswell, 2014).

Data Analysis in qualitative research consists of examining, categorizing and re-combining evidence with the goal to produce empirically based finding (Yin, 2014). In the development process of the analytic strategy, “playing” with the data is a helpful starting point (Yin, 2014). Therefore, at an initial stage, especially in the pilot study, the “play” with the data has been used in order to search for promising patterns, insights and concepts – still grounded in the overall research aim. Initially, the coding process started by using the first 3-4 transcripts for open coding and then coding the rest according to it and developing the data.

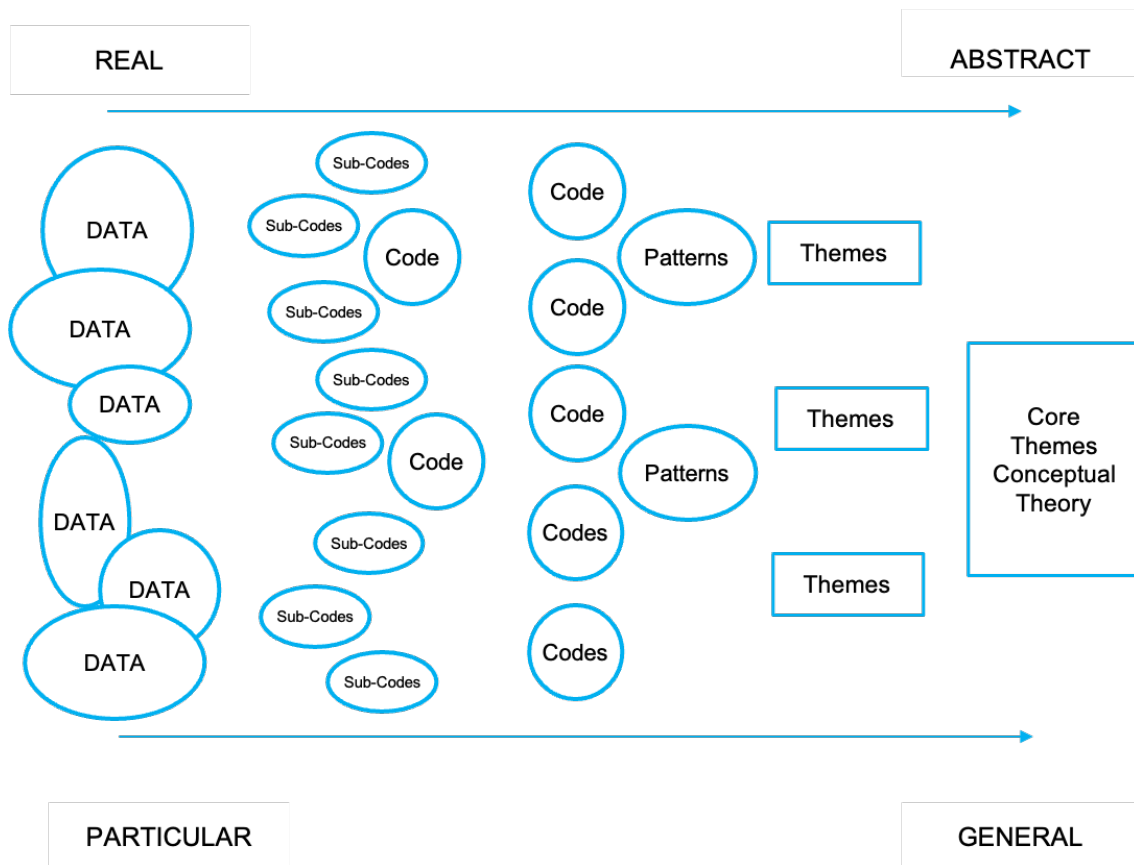


Figure 31: Coding process - own figure inspired by Saldana (2015)

Initial codes were formulated based on the themes and dimensions which were identified based on the initial literature review (see Sections 4.2 and 4.3). Therefore, some of the codes were derived prior to the data collection (Breakwell, 200). At a very early stage of the research process, before the interview data was transcribed and right after the interview, an interview summary sheet in form of an excel was set up in order to document initial thoughts and reflection on the data by the researcher (Miles & Huberman, 1994).

To complement the approach, it was important to document the researchers' thoughts and interpretations in an ongoing way. The data analysis was therefore accompanied by reflexive exercises in order to reflect on the researcher's experiences and perceptions. These reflections were important in order to reflect on the interpretations of the researcher, which may shape certain themes (Creswell, 2014). Additionally, to the reflective journal that was kept in order to practice an overall reflectivity, memos were written. Thus, memo writing and diagramming

was used for preliminary interpretation and in order to conceptualize the data (Lempert, 2011). This process of memo writing was important in order to indicate the elaboration of the conceptual framework to interpret and make sense of the data (Breakwell, 2000). Besides these accompanying methods for data analysis and display, the actual data – the interview transcripts – were analysed after the transcription by using a narrative and interpretative analysis.

In order to strengthen the rigour (more in the forthcoming Section 6.6) of the coding process, the software program DOVETAIL was used to facilitate the analysis of the interview transcripts. DOVETAIL fulfils similar functionalities as the qualitative data analysis software NVivo. However, DOVETAIL was chosen because, as well as being secure and reliable, it was found to be more intuitive for the researcher to enter and code the data in the user interface and to create data displays to aid analysis than other alternatives. This intuitive user interface provided value to the researcher as the ease of use led to an effective way to “play” with the data as proposed by Yin (2014) and support to enter internal thinking processes (Saldana, 2013). Within this context, it needs to be mentioned, that even though computer programs might support the process of data analysis, they are never a substitute for the researcher’s thought (Brinkmann & Kvale, 2018).

Thus, DOVETAIL was used to help with the coding and the categorization of the relevant text passages in the interviews using a thematic approach. With the help of code-and-retrieve programs such as DOVETAIL, relevant passages can be coded but also retrieved and inspected again (Brinkmann & Kvale, 2018, Miles and Huberman, 1994). This process can be defined as pattern coding (Breakwell, 2000). Thus, explanations are developed inductively, and the coding process aims to create overarching categories to explain phenomena (Kettley, 2010). The identified codes and themes were later visualized and drawn into thematic maps as well as conceptually clustered matrixes. With the use of the DOVETAIL software, it is possible to cluster codes (named Tags) into groups and insights and visualize them (see Appendix). This process of data display has been widely considered as an important part of the data analysis (Verdanelli et al., 2011; Miles and Huberman, 1994). It is the purpose of the conceptually clustered matrix to provide a tool for the researcher in order to bring together items and cluster them

together on a theoretical and empirical basis (Miles and Huberman, 1994). Some of these matrixes are displayed in the following chapter, discussing the results and analysis of the interview study (see Section Chapter 7). Further, this study was governed by important considerations in relation to this research project. This includes the reflection of research ethics, as well as regarding the methodological rigour and the reliability and validity of the data, which are presented and discussed in the following sections.

6.5 Research Ethics

Ethical issues can occur at different stages of the research project and should be considered carefully in order to foster the integrity of the research (Bryman & Bell, 2007). Thus, this study is governed by ethical considerations. In general, the research design should not subject those who are being researched to the risk of embarrassment, harm or any other disadvantage (Saunders et al., 2015). For this research project, Swansea University granted ethical approval upon submission of a Research Ethics Assessment (see Appendix). Therefore, the research project was conducted in compliance with Swansea University’s Research Integrity Framework. This Research integrity framework includes the security of participants’ consent, a minimum of potential of harm as well as compliance with legal, safety, and data protection obligations. The research integrity framework by the university was set up in accordance with the guidelines of the UK policy framework for health and social care research, the concordat to support research integrity and the UK Research and Integrity Office Code of Practice (*Research Integrity Swansea University, 2020*).

Principles for Ethical Research	This study
Research participants should take part voluntarily, free from any coercion or undue influence, and their rights, dignity and (when possible) autonomy should be respected and appropriately protected.	<p>The participants were invited to take part of this study.</p> <p>The participants were provided with a written consent form and reassured that their participation is entirely voluntary, that they can withdraw at any time without providing reason and that their data will be destroyed if they wish.</p>

Research should be worthwhile and provide value that outweighs any risk or harm. Researchers should aim to maximise the benefit of the research and minimise potential risk of harm to participants and researchers. All potential risk and harm should be mitigated by robust precautions.	The participants of the interview study are only adults in an appropriate position of responsibility. No health and safety concerns were identified for participants as a result of this study.
Research staff and participants should be given appropriate information about the purpose, methods and intended uses of the research, what their participation in the research entails and what risks and benefits, if any, are involved.	The participants received an information sheet on the purpose, method and intended use of this research one week in advance of their involvement in the study (semi-structured interview).
Individual research participant and group preferences regarding anonymity should be respected and participant requirements concerning the confidential nature of information and personal data should be respected.	The anonymity of the data subjects is ensured meeting the requirements for data safety of Swansea University. All data is retained on a secure server. Confirmation of confidentiality was issued in all communications with the participants.
Research should be designed, reviewed and undertaken to ensure recognized standards of integrity are met, and quality and transparency are assured.	As discussed throughout this chapter, a robust process of designing this research was conducted in order to meet the standards regarding integrity, quality and transparency.
The independence of research should be clear, and any conflicts of interest or partiality should be explicit.	This research was conducted independently at any time.

Table 17: Six principles of Ethical Research in this study (ESRC, 2015)

Furthermore, the ethical considerations taken have been followed by the structure of the six principles for ethical research defined by the Economic & Social Research Council (*ESRC Framework for Research Ethics*, 2015). An overview on the application of the six principles of ethical research and how they have been addressed in this study is given in the Table 17. The recruitment of the participants took place by direct recruitment based on purposive sampling: All participants were asked and invited (via e-mail) to contribute to the study by being

interviewed in semi-structured qualitative interviews. Potential participants and participants were reassured that their participation is entirely voluntary, that they can withdraw at any time without providing a reason, and that their data can be destroyed if they wish. The participants received an information sheet (see in the Appendix) which explicitly explained the research, one week in advance. Moreover, the participants received a written consent form, and the confirmation of confidentiality was issued in all communications with the participants. Table 17 displayed a summary of the six principles for ethical research based on ESRC (2015). Overall, all the different processes at the different stages of the research project aimed to ensure that the ethical issues were carefully addressed. Besides the ethical considerations, further criteria for increasing the quality of this research were applied, which will be discussed within the next section.

6.6 Research Rigor & Reflexivity

Overall, it is an important principle of qualitative research, and this study in particular, that it is based on the premise that reality is not objective but rather socially constructed (Breakwell, 2000). Even so, despite its potential for discovery and richness, qualitative research has been critiqued for lacking qualitative rigour (Goia et al., 2012). Indeed, reliability and validity are important criteria in order to establish the quality of research (Bryman & Bell, 2003; Saunders et al., 2015) but although those criteria are central to the judgments of quantitative research, their relevance and role for qualitative research have been contested (Bryman & Bell, 2003; Saunders et al., 2015). Thus, the concept of reliability refers to the replication and consistency of the research, while the validity refers to the appropriateness of the measures and the generalizability of the results. Even though the concepts of validity and reliability are established terms in the research sphere, their meaning for qualitative research has been reinterpreted (Bryman & Bell, 2003; Lincoln & Guba, 1985). As such, the viewpoint for establishing validity is different with qualitative inquiry than within traditional, quantitative studies (Creswell & Miller, 2000) and thus, there are other ways than reliability and validity to give credibility to the findings of qualitative research (Breakwell, 2000). The

forthcoming Table 18 provides an overview on the employment of the defined criteria within this study.

Criteria	Explanation	This study
Credibility (Parallels internal validity) =Truth/ Value	Truth of the findings	<ul style="list-style-type: none"> • Thick descriptions • Documentation, • Transparency of the process of analysis • Keeping close to the data
Transferability (Parallels external validity) =Applicability	Transferable findings, Findings can be transferred to similar contexts	<ul style="list-style-type: none"> • Thick description used, details provided by all the conducted interviews • Memo writing • Documentation
Dependability (Parallels reliability) =Consistency	The methodological decisions are appropriate and well demonstrated	<ul style="list-style-type: none"> • Purposive and Snowball Sampling • Protected Confidentiality
Confirmability (Parallels objectivity) =Neutrality	The results are linked to the data and not too heavily linked to personal subjectivity of the researcher (even though a complete objectivity is impossible)	<ul style="list-style-type: none"> • Reflexivity: A reflective Journal has been written during the research process in order to reflect on the subjectivity • Acknowledgments of study limitations • Precise Data Management and Maintenance of methodological logics

Table 18: Criteria for trustworthiness in this study (Lincoln & Guba, 1985)

Within the context of this study, the alternative criteria, proposed by Lincoln and Guba (1985) was applied in order to assess the quality of this study (Lincoln & Guba, 1985). Namely, those criteria are trustworthiness and authenticity, each of them defined by several criteria. Within the following section the application of trustworthiness and authenticity (each in its various dimensions) is illustrated. The forthcoming sections will provide details on the application and research rigor along the defined criteria summarized in the Table above.

6.6.1 Credibility

As the interview study especially is based on a non-probability sample, the internal validity, or in this case credibility (internal validity), of this research is dependent on the quality insights gained from the data collection and analysis, rather than the size of the sample (Saunders et al., 2015). The credibility of this research therefore is related to the quality and suitability of the entrepreneurship educators participating in the interview study, as stated beforehand in the chapter on the underlying sampling principles (see Section 6.2.4). Thus, a rich description of each interview participant has been provided in the earlier sections in order to determine this credibility (Denzin & Lincoln, 2013; Creswell & Miller, 2000). Moreover, in order to determine the credibility of this study, a clear geographic scope was set before in order to reach robust, rich and well-developed data for the context of Higher Education in Northern Europe (see Section 6.4.3). Furthermore, the credibility – according to the definition by Lincoln and Guba (1985) is established by the acceptability of others.

In order to increase the credibility (internal validity) in this case, thick descriptions and a wide transparency of the process of data collection and analysis was provided. Within the context of transparency, Yin (2014) suggests maintaining a chain of evidence. According to this principle, the conclusions of the research should be able to be traced back in steps in both directions (Yin, 2014). Therefore, it is one of the objectives of this research to provide an evidentiary process in order to clearly cross-reference the methodological procedures and the resulting conclusions. As one part of this principle, the method design has been demonstrated in further details in the previous section. Moreover, the principle to keep the analysis and conclusion *close to the data* (Breakwell, 2000; Miles and Huberman, 1994) has been considered thoroughly.

6.6.2 Transferability

Within qualitative research, the concept of transferability is a suitable substitute to the concept of external validity (Breakwell, 2000). The arguments and decision to utilise purposive sampling have been made in the previous sections (see section 6.2.4). Due to the nature of qualitative research, which typically works with

small sampling sizes, the results show limitations regarding the generalizability. For example, the results are not generalizable on education in general by, for example, applying it into schools, because the sampling decision is not representative. By this, the sample includes multiple perspectives embracing the interpretivist view in order to construct meaning (further explanations have been carried in Section 6.1.2 on the interpretivist view).

Thus, the transferability of this thesis allows it to address larger audiences with the findings, results and concepts of this work (Gioia et al., 2012). Even though this study applies an interpretivist view, this qualitative interview study including 29 interviews with Entrepreneurship educators from Higher Education in Northern Europe has generated concepts or so called “principles that are portable” (p. 24) which are indeed relevant to some other domains and settings (Goia et al., 2012). Thus, even though it has been not the aim of this work to generate a superior truth (Kettley, 2010), the results represent a set of meanings about the value of Design Thinking for Entrepreneurship and are therefore transferable. In general, previous sections have provided a rich description of research questions, design, results and context in order to provide a basis to judge the transferability (Saunders et al., 2015). Further thoughts on the boundaries and limitations of this research – also in the context of the transferability – will be presented in the concluding chapters (see Section 9.3). Regarding the qualitative interview study, the intersubjective reliability of transcription processes might be a research project of its own (Brinkmann & Kvale, 2018). For the transcription, the assurance of validity is more complicated than the assurance of reliability. Transcripts are decontextualized conversations and therefore represent rather an interpretative abstraction than the reality (Gibbs, 2007). However, within this research, it needs to be acknowledged that transcriptions are never valid or objective – but the transformation into the literary style follows the purpose of this research and facilitates the communication of the meaning of the relevant aspects (Brinkmann & Kvale, 2018).

6.6.3 Dependability

The third criterion is dependability, which parallels the reliability and refers to the consistency of the methodological decisions made. In interpretivist research as such, dependability can be determined by recording all changes in order to provide reliable research that can be traced back and evaluated by others (Saunders et al, 2015). The documentation of the interview database consisted of two separate collections, including the data base and the report of the researcher (in this case interview sheets) (Yin, 2014). By keeping the raw data and the interview report separately, it is possible to retrace the interpretations and conclusions made by the researcher (Yin, 2014). For the interview study report, a rich description of each interview and its context is necessary in qualitative research (Johnson & Christensen, 2014). Thus, the sampling principles and data collection processes have been documented in detail within the previous chapter (see Section 6.2.4). Moreover, the ethical considerations that have been taken in account (Section 6.5) provided anonymity to the interview participants and therefore protected their confidentiality in order to increase the dependability.

6.6.4 Confirmability

Lastly, the confirmability (which parallels objectivity) of this research will be discussed which determines the neutrality of this study. In order to address this, a reflective research journal has been set up in order to provide an option for early and regular reflections on influencing assumptions, beliefs and biases (Creswell & Miller, 2000). Reflexivity is an essential element within this research process. In qualitative research, the investigator is an integral part of the research process (Breakwell, 2000), or the researcher themselves is a crucial instrument (Creswell, 2014). Especially in the context of this research, the reflective diary enables reflection upon the researcher's personal academic journey, especially with background experience in Design Thinking and Entrepreneurship Education. The importance of reflexivity in the context of axiology and positionality of this research has been discussed beforehand (see Section 6.1.4 on interpretivist view of this research). In qualitative, exploratory studies such as this, there is the potential for bias and constraints and occurring errors of judgement. Thus, the researcher kept

a reflective diary to include reflection at all stages within the process of this work (Creswell & Miller, 2000). This reflective diary enabled reflection and explicitly facilitated the discuss of the impact of their own theoretical beliefs and practical orientation of the study (Breakwell, 2000). Thus, especially in the context of this research, it is an essential element of social research to reflect upon the implications of methods, values, decisions, and the position of the research in the research situation (Bryman, 2015).

6.6.5 Authenticity

Besides the trustworthiness criteria through credibility, transferability, dependability and confirmability, methodological rigour can be established through the assessment of authenticity (Shannon & Hambacher, 2014). Thus, an illustration of the application of relevant criteria for authenticity will follow:

Criteria	Explanation	This Study
Fairness	“Does the research represent different viewpoints among members in the social setting?”	The interview study involves different perspectives from different Entrepreneurship educators (also different levels)
Ontological authenticity	“Does the research help members to arrive at a better understanding of their social milieu?”	It is the overall purpose of this research to contribute to a better understanding on how Design Thinking is valuable in the Entrepreneurship Education context This research helps Entrepreneurship educators to better understand the value of Design Thinking in their own work
Educative authenticity	“Does the research help members to appreciate better the perspectives of other members in their social setting?”	This research provides an overview on the different understandings of the perspectives of Entrepreneurship educators on the value of Design Thinking in Entrepreneurship Education

Table 19: Criteria for authenticity (Lincoln & Guba, 1985; Bryman & Bell, 2003)

Regarding the evaluation of authenticity, only three out of five criteria have been identified as relevant for this study. Thus, catalytic and tactical authenticity have

been excluded within this analysis, as they are especially suitable within the context of action research, which does not imply this study. As illustrated in the table above, the criteria of fairness ontological and educative authenticity have been applied in this work. Besides the discussed aspects of criteria for authenticity and trustworthiness, the quality of qualitative research can also be judged by its fruitfulness (Breakwell, 2000). Therefore, the value of this research is defined as well by its usefulness from a theoretical as well as an applied level. Thus, this research has meaning as it has developed and extracted transferable concepts and principles to guide further research (Goia et al., 2012). This contribution to the interpretation of the data towards the development of the field will be further discussed in the concluding chapters of this thesis (see Section 9.1).

6.7 Summary

Following the outline of the research gaps and research questions at the end of Section 4.5 as a result of the literature review, this chapter presented a detailed description of the research approach and method design chosen to answer the research question. The past sections have illustrated the research approach theoretically, discussing the ontological and epistemological considerations within this research. This has been the foundation of the argument for an interpretivist view and an inductive approach towards the theory development. Moreover, the research approach and the methodological choices were introduced in Section 6.2 . With even more detail, the concrete steps regarding the instrument design, sampling, data collection and methods of analysis have been described for the explorative literature review (see Section 6.3) and the qualitative interview study (see Section 6.4), which build the core of this research.

In summary, it has been made transparent that the literature review brought clarity to the research problem and formed the basis in which the conceptual framework has been embedded. Next, choosing a qualitative interview study to gain insights into the value of Design Thinking in Entrepreneurship Education, focusing on the Educator's perspective, has been made transparent. Along with the detailed description of the research steps taken, this chapter introduced further discussions on the ethical issues (see Section 6.5) and the reflection upon rigour

(see Section 6.6) within this research. Furthermore, the role of the complementary methods and the researcher`s reflexivity has been outlined. In the following chapter, the results from the analysis of the qualitative interview study will be presented.

Chapter 7 Results & Analysis

7.0 Introduction to chapter

As the analysis of the literature has shown, the existing variety of Design Thinking Definitions and myriad perspectives is calling for a more detailed and deeper examination of the Design Thinking integration. Therefore, questions need to be asked of how, why and from which perspective Entrepreneurship Educators make use of Design Thinking. Thus, the answer to the following research question will help to achieve convergence on a common understanding of the value of Design Thinking for Entrepreneurship Education.

Overarching Research Question	What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?
Conceptual Perspective – Guiding Questions	What is the educators' working understanding of Design Thinking? What is their understanding of the DT/EE nexus?
Educational Practice: Guiding Questions	How do educators apply Design Thinking in Entrepreneurship Education (as a method, course and/or general pedagogical approach)? How is Design Thinking integrated into Entrepreneurship Education Practice? On what level is Design Thinking integrated into Entrepreneurship Education? Design Thinking as a course model or pedagogic approach? Explicit or implicit integration?
Perceived Value: Guiding Questions	What are the educator's pedagogical beliefs about the value of integrating Design Thinking in Entrepreneurship Education? Why do educators apply Design Thinking in Entrepreneurship Education?

Table 20: Overarching Research Questions and guiding questions

Within the following chapter, the findings and the analysis of the qualitative interview study will be presented in order to determine the current direction of the Design Thinking integration in Entrepreneurship Education. Moreover, the results will include novel insights on how educators can develop a curriculum design for Entrepreneurship Education in the future, with the valuable integration of Design Thinking. The results and analysis chapter is structured as displayed in the following Figure 32.

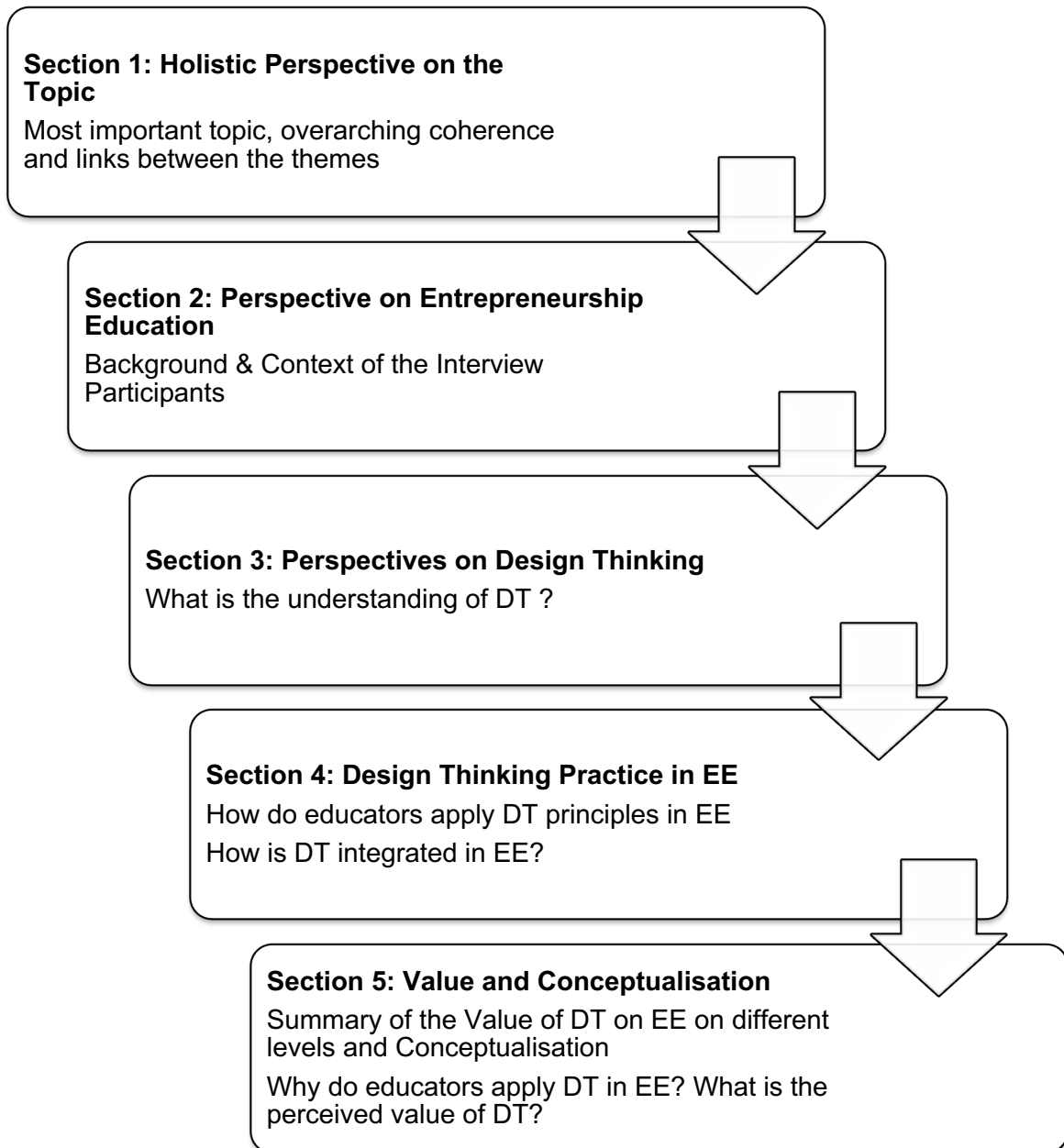


Figure 32: Overview on chapter flow of results and analysis

The primary aim of this research is to create a richer and more profound understanding of the value of Design Thinking for Entrepreneurship Education within Higher Education. This chapter, therefore, is structured so as to present the main themes that were emergent from the data: first of all, a holistic analysis of the topic is given, then the educators' perspective on Entrepreneurship Education

(Section 7.2) is presented, followed by the Perspective on Design Thinking (Section 7.3) and The Design Thinking practice in Entrepreneurship Education (Section 7.4). In the final section 7.5, the value and conceptualisation of Design Thinking principles in Entrepreneurship Education will be summarized.

7.1 Holistic Perspective on the Topic and Overall Analysis

Within the following, a holistic perspective on the insights from the interviews will be given. Thus, this chapter presents a reflection on the most important subjects and overarching coherence and links between the themes. A total of 29 interviews with Entrepreneurship Educators teaching Entrepreneurship in Higher Education in Northern Europe have been conducted, transcribed and analysed. This resulted in over 300 pages of transcribed text with each interview ranging between 10 and 18 pages. This data set has been coded with 380 different codes which have been later synthesized and structured into core themes as described in section 6.4.5. The following graph illustrates the number of counts per code and provides insights into the most important codes with more than 12 notes per code:

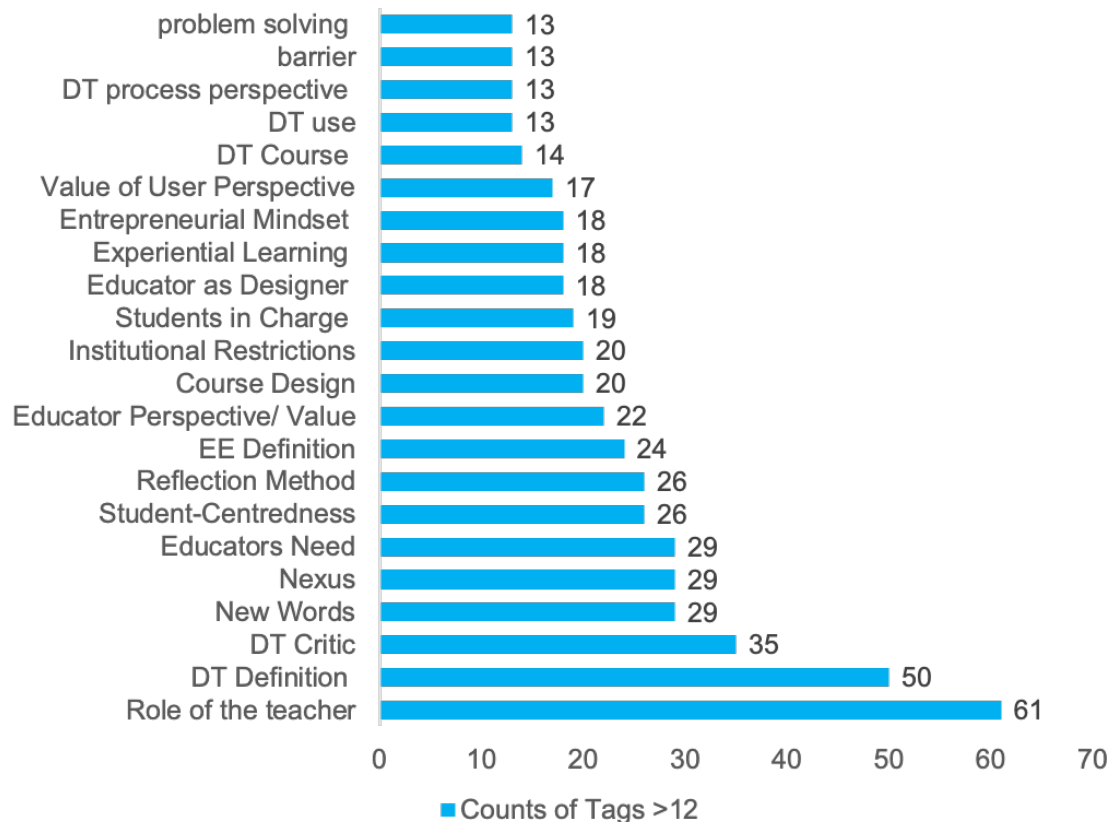


Figure 33: Highlight codes with more than 12 Counts

Among the most important codes was the ‘Role of the Teacher (Educators)’, with 61 highlight counts. This reflected the overall perspective of the qualitative interviews in investigating the value of Design Thinking for Entrepreneurship Education with a special focus on the educator’s perspective. Furthermore 50 counts were coded with the tag “DT Definition” which highlighted the text areas defining the perspective of the participants on the concept of Design Thinking. In a later step, given codes have been grouped and re-grouped in the process of allocating pre-identified themes as well as developing new themes from the code. More details on the coding process have been further explained in the previous chapter on the research methodology (see Section 6.4.5). Within this section a short overview on the most important codes, sub-codes and themes, as well as their alignment with the research question, is given, as illustrated in the following table:

Core Themes	Example of Sub-Codes and Themes	Alignment to Research Question
Value of Design Thinking	Student perspective Value for the educator Value of Structure Value of Prototyping Value of Process Value of Communication Divergent Thinking	What is the Value of Design Thinking for Entrepreneurship Education in Higher Education?
DT Definition Design Thinking Perspective	Process Perspective Mindset Perspective Tool Perspective Educational Tool Education Design Idea Development Creativity	What is their understanding of Design Thinking? What is their understanding of the DT/EE nexus?
Course Design DTinEE	DT approach DT use DT Course DT integration DT teaching Explicit / Implicit Unconscious	What is the educational practice of DT in EE? How do Entrepreneurship Educators apply DT in EE practice?

	...	
Critics	Simplification Clash of Culture Only Creative Fear of Fad Conceptual Level Wrong Label ...	Context
Role of the Educator	EE Perspective Teaching philosophy Educators mindset Facilitator Entrepreneurial Teaching Informal ...	Context

Table 21: Core themes and sub-codes in alignment to the research questions

From a holistic perspective, it was found that all of the entrepreneurship educators were familiar with the concept of Design Thinking, despite showing differences in how they perceive, understand and apply the concept. As intended from the data sample, it was found from the interviews that there is not a single, agreed, view of Entrepreneurship Educator on Design Thinking. Rather the different perspectives can be mapped on a scale differentiating three groups of Design Thinking Practitioners. On the one end of the scale, there are the Design Thinking advocates who define Design Thinking as their overall educational guiding principle. On the other end of the scale, some Educators can be assigned to the Design Thinking Detractors who criticize the concept e.g. for its simplification (see Section 7.3.7) even though they value underlying principles or tools such as Prototyping and Creativity (see Section 7.5.2 and 7.5.5) without naming it Design Thinking (see Section 7.3.6). However, the majority of the Entrepreneurship Educators interviewed can be assigned to an opportunistic Design Thinking perspective and practice, which is characterized by a rather selective application of Design Thinking to fulfil certain needs of the educators such as the use of a process (see Section 7.5.8 on Design Thinking Process Application) or the Integration of Design Thinking Tools to foster critical thinking, such as Problem Understanding among the students (see Section 7.5.1 on Value of Problem Exploration). On a very general perspective, it appeared that the role and value of Design

Thinking for Entrepreneurship Educators was discussed in the context of its nexus between dichotomy and convergence. The forthcoming sections display the results of the interviews, while the findings are later discussed in comparison to the current academic literature (see Discussion Chapter in Section Chapter 8). The perception and practice of Design Thinking was also dependent on the Entrepreneurship Educators' Background and Perspective on Entrepreneurship Education. This contextual aspect will be discussed first in the following section.

7.2 The Entrepreneurship Educators in Context

The goal of this study was to explore the value of Design Thinking in Entrepreneurship Education with a clear focus on the educator's perspective. As introduced in the literature chapter, the educator (see Section 2.4) plays a central role. Moreover, based on the Teaching Model for Entrepreneurship Education from Fayolle & Gailly (2008) the entrepreneurship educators' decisions are connected to their philosophical belief system (e.g., on an ontological level) and further contextual factors. Thus, the Entrepreneurship educators always act within their own context and the insights into their context add richness to the qualitative data by adding depth to the narratives of the respondents (Denzin & Lincoln, 2000), which underlines and embraces the interpretivist approach of this research. Following this interpretative approach, it became apparent that the value of Design Thinking can only be understood through understanding the meaning of the concept for those involved. In this case, the entrepreneurship educators. Therefore, the following sections present the results of the analysis regarding their personal background, their perspective on entrepreneurship as well as their teaching approach and role in the classroom.

7.2.1 Predominant perspectives on Entrepreneurship Education

In order to gain a better understanding of context and background of the entrepreneurship educators, the interviews included specific questions on the perspective on Entrepreneurship Education. Thus, the following section will provide an overview on the predominant concepts and perspectives on Entrepreneurship Education as stated by the participants.

One very common concept to explain their view on Entrepreneurship Education has been the use of the About-For-Through perspective (Hannon, 2005). From the interviews it became apparent that this framework is widely used in order to categorize different approaches towards Entrepreneurship Education. Besides the About-For-Through categories the participants also used the concept of the “wide vs. narrow” distinction in order to place their own perspective in the field. The following quotations exemplify the use of categories to name the perspective on Entrepreneurship Education:

Participant No.	Quote	Use of Category/ Concept	Assigned Perspective
27	“So I probably go for a broader definition in the sense that I would say I would aim to inspire students to become more entrepreneurial and enterprising in their everyday life. ... So it's a broader definition of entrepreneurship and then enter into entrepreneurship education that I probably stand for.”	Wide vs. Narrow Perspective	Wide Perspective, Focus on becoming entrepreneurial/ enterprising behaviour
24	“And I feel like that is a, you know, a very narrow definition of what enterprise education is about. For me, it's a much more about mindsets and a much more holistic perspective on the development of things like skills and competencies and attributes. ”	Wide vs. Narrow Perspective	Wide Perspective, Focus on Entrepreneurial Skills and Competencies
10	“I mean, to make a distinction between sort of a narrow understanding of entrepreneurship education, ...And that's my understanding of the enterprise, education. And really the broader question is about that is pretty much sort of to train students to be able to deal with and develop their own opportunities in life.”	Wide vs. Narrow Perspective	Wide Perspective, Focus on Creation and Self-Efficacy
5	“It is to develop thoughtful, thoughtful action . So, develop individuals that are able to engage in thoughtful judgments, decision making, so when they take action they know why they take action.... It is to create and aware individuals that are able to justify the action they take.”	Subject oriented domain vs. Development of Capabilities	Focus on engaging individuals

15	Yeah, so therefore for me, and entrepreneurship education is something where I teach people how to manage themselves better. So it's about to learn. So entrepreneurship is for me more much more than just founding a new company. Otherwise it would be called startup education and not entrepreneurship education.... it's not about that you create the greatest startup ever, it's about that you learn how you learn about the skills .”	Startup Education vs. Entrepreneurship Education	Focus on Entrepreneurial Skills
8	“... seeing it as something that everybody needs in order to develop and to be a part in developing society. So for me, it entrepreneurship ... I always see it more as a. It's more about human development and transformation ... everybody has entrepreneurial potential and that everybody and I would say need to have some entrepreneurial elements in their lives”	Entrepreneurship as a method	Focus on personal development and entrepreneurial potential
14	“I think for me, the Entrepreneurship education is not about how to start a Start-Up. It's also about developing a mindset.”	Startup Perspective vs. Mindset Perspective	Focus on developing a mindset
26	“it's a it's about attitude, mindset . Entrepreneurial behaviour is it's about a behaviour pattern that happens in all walks of life. It's not just about business Start-Up Business Start-Up is one of the potential outcomes, but those on the entrepreneurial decision makers, the people that are willing to take responsibility, stand up, take action, have a certain attitude.”	Entrepreneurial behaviour as an attitude	Focus on developing a mindset/ attitude
21	“there's two very different things. There is enterprise education there's entrepreneurship education , they are distinctly different things for me.” ... “a definition at three three angles of how we teach is about entrepreneurship (..) these are basically three perspectives that exist for me. And I use all of them where appropriate .”	Enterprise vs. Entrepreneurship Education // About/ For / Through	Holistic
20	“I would not have a general definition. So, what I think is common sense here that we are unleashing and shaping entrepreneurial mindset	Startup Creation vs. Entrepreneurial	Focus on Entrepreneurial Skillset/ Mindset

	and behavior. So, it's not a defined goal to create startups. It is a nice to have, but it is our true belief that an entrepreneurial skill and mindset and skillset is the base for good business. And also, a kind of a good life in a sense that you are in charge to design and to create”	Skills & Mindset	
6	“To make people more entrepreneurial ? (..) And I define that as people creating new kinds of value in society for others.”	Holistic	Focus on Value Creation
4	“There's entrepreneurship education, that's about entrepreneurship. So it's to gain knowledge about the phenomenon. There's entrepreneurship education that's for through so it's more applied and for can be either with attention to become an entrepreneur or to become entrepreneurial.”	About / For / Through	Holistic Perspective

Table 22: Perspectives of Entrepreneurship Education

The majority of participants assigned themselves towards a broad perspective on the goal of Entrepreneurship Education, with a strong focus on developing an entrepreneurial mindset or skillset. Only some of the participants were referring to existing concepts when articulating their perspective on Entrepreneurship Education and it became easy to identify to which extent the Entrepreneurship Educators have been aware of existing literature and academic concepts when being asked to define the goal of Entrepreneurship Education. Thus, some of the participants were capable of articulating the details of the academic perspective on the definitional discourse on Entrepreneurship Education (e.g. Participants 4, 21, 10) and were actively referencing academic definitions and literature from the field. In contrast, other participants did not feel familiar with existing concepts from the literature, instead backing their own perspective by referring to e.g., “common sense” (see Participant No. 20). This reflects the variety of backgrounds among entrepreneurship professors and lecturers within the field of entrepreneurship education (see Section 2.4) and those varieties of backgrounds

among entrepreneurship educators were also represented in the sample (see Table 14).

Furthermore, as part of the Interview guideline the participants were asked about their personal background and career development as well as the institutional context and their perspective on the overall integration of Entrepreneurship at the university. Overall, a descriptive overview on the participating Entrepreneurship Educators has been given in the previous chapter on the research methodology (see Section 6.4.3 on Data Sample). Even though all Participants fall into the category of “Entrepreneurship Educator” (as defined in the Criteria for the Participant Selection as described in Section 6.2.4) it became apparent from the interviews that the participants came from diverse backgrounds and therefore had to be regarded in very different contexts. As illustrated in the Literature Section (see Section 2.4 on the Role of the Entrepreneurship Educator), this reflects the reality of Entrepreneurship Education, which evolved from different fields and disciplines (Fayolle & Gailly, 2008; Vanevenhoeven, 2013). Thus, it became apparent that some scholars have not studied Entrepreneurship but rather joined the field from different disciplines, which results in their practice-based view on Entrepreneurship Education. This aspect was criticized by some of the participants who expressed their worries about this lack of theoretical knowledge on entrepreneurship among some of their teaching colleagues. Such as Participant 3 who stated *“I am not sure that everyone in the entrepreneurship teaching field has read any entrepreneurship at all ... I have discovered that some teachers in entrepreneurship have never ever touched upon the entrepreneurship theory”* (3). Furthermore, the participants expressed their awareness of the different influences on the educators: *“Entrepreneurship Education is also a reflection of the educator and what he or she priorities for us ... the whole idea of the habits of the educators”* (27) as well as *“it really depends on the person and educator”* (11).

Overall, the perspective on Entrepreneurship Education within this research is important to put the perceived value of Design Thinking for Entrepreneurship Education into context. Thus, it has been an observed tendency of this study that educators with a rather wide perspective towards the subject find it easier to integrate Design Thinking. Or in other words, it appeared that Educators with a very

narrow understanding of Entrepreneurship had the tendency to decline a Design Thinking Integration in their teaching. Moreover, on a more general perspective Entrepreneurship Educators with a Non-Entrepreneurship Background (e.g., coming from Business Administration (18) or Business Communication and Electronic Business (20)) had a tendency to work more often, and more intensely, with Design Thinking, possibly because this reflected their practice-based perspective on teaching Entrepreneurship. Further insights on the factual integration of Design Thinking in the classroom will be given in the following sections (see Section 6.4: Design Thinking Practice). Before this, Section 7.2.2 provides further context on the self-understanding and conceptualisation of the participants about their own role as educators.

7.2.2 Self-Understanding and Role of the Educator

As part of the qualitative interview process on the Design Thinking Practice in Entrepreneurship Education many participating educators reflected upon their own role as an educator. Therefore, the code “#roleoftheeducator” has been used often in the coding process with over 50,279 word signs (text volume) of coded text with this code and 61 highlight counts. As part of the Interview Protocol, participants were asked about their self-image and teaching approach in order to get more qualitative insights on the role and style of the educator in the classroom. Thus, it has been the goal to provide further context and understanding on how the entrepreneurship educators interact and perceive themselves in relation to the students. From the analysis of the interviews several themes emerged as shown in Figure 34.

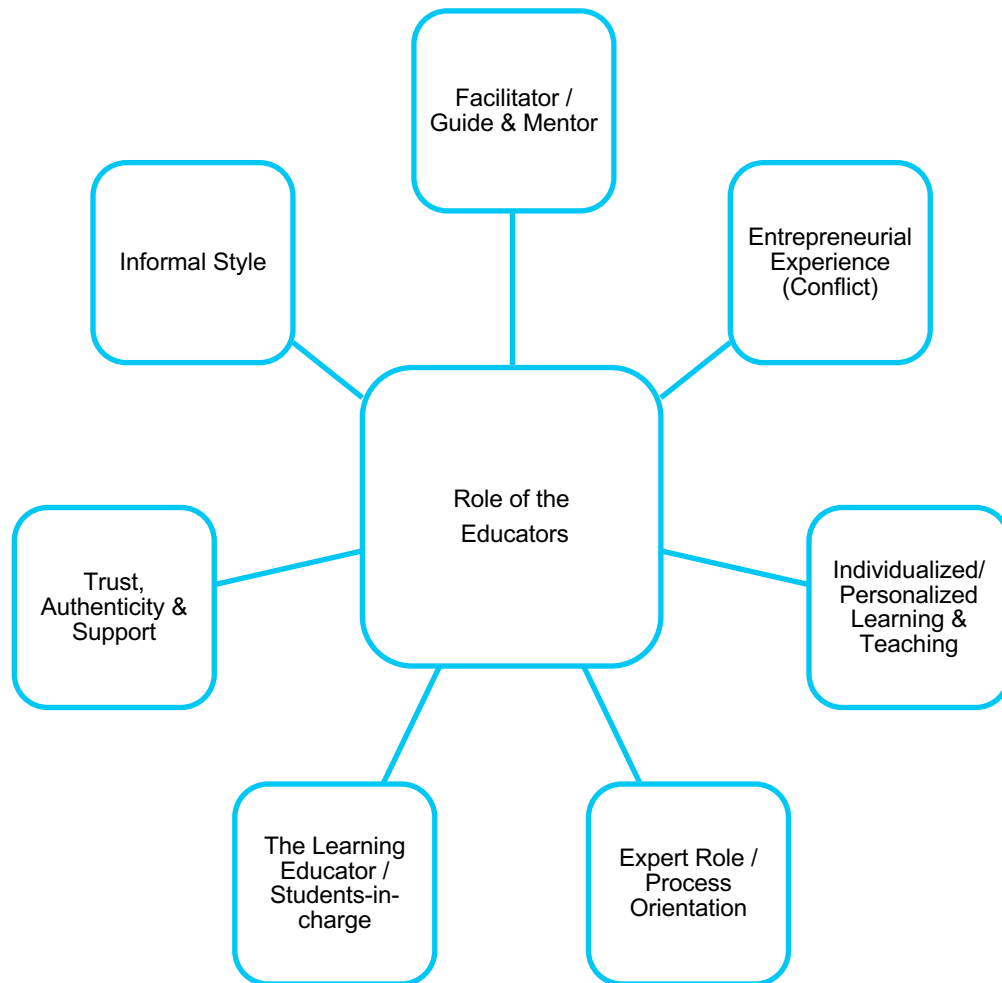


Figure 34: Overview core themes on the role of the educators

Although each educator had a unique narrative about their role as an educator in the classroom, there were some commonalities. Overall, the participants reflections upon their own role in the classroom centred around their role of facilitating the learning process of the students and taking rather the role of being an expert in the entrepreneurial process instead of transferring knowledge in a traditional, didactic, lecture setting. Furthermore, the participants valued active participation of the students and reflected upon a setting in which the students are in charge of their own learning, while the educator takes the role of being the enabler in the background. Moreover, a number of the educators perceived the importance of the focus on the individual and providing a personalized learning as an important

aspect. Further it was found that the focus on a “hands-on” experience and a rather “informal” teaching style was emphasized by several educators. Within the following, a closer analysis of each of the themes will be given in order to provide a deeper understanding of the perception the entrepreneurship educators have about their own role in the classroom and teaching setting.

One of the predominant themes has been that the participants reflected upon their own role as a cooperative facilitator instead of a traditional lecturer. As further illustrated in Table 23, the participants expressed their self-conceptualisation of taking on the role of a “facilitator” (3, 24, 9, 10, 11, 23) a “guide” (29, 5) and a “coach” (13) as well as an “enabler” (1). By this, they shared their understanding of an Entrepreneurship Educator’s role to guide and facilitate the learning experience and “guiding them through the different stages” (5). This aspect is strongly connected to the practice of project-based learning activities which have been mentioned widely.

Table 23 summarizes the most important exemplary quotes on the theme.

Theme	Keywords	Exemplary Quotes
Role of the Educator as a Facilitator / Guide/ Mentor	guide	<i>“As an educator you work more as a guide on the side ... and in the final year you become more of a mentor” (29)</i>
	mentor	<i>“You have to look at yourself as an enabler ... we are Co-Creators” (1)</i>
	enabler	<i>“It’s facilitator and networker and co-teacher” (3)</i>
	Co-creator	<i>“I see my role as a facilitator (..) giving them a framework (theory) to act on it” (24)</i>
	Facilitator	<i>“I am a facilitator, a moderator” (9)</i>
	Networker	<i>“I try to be a guide” (5)</i>
	Co-Teacher	<i>“One is to be a knowledgeable person and (..) the other part is about being a facilitator” (10)</i>
		<i>“I don’t consider myself a lecturer (..) rather a coach” (13)</i>
		<i>“I try facilitating the process” (11)</i>
		<i>“First of all its facilitating – its helping them to learn” (23)</i>

Table 23: Keywords and quotes on the educator’s role as a facilitator

In relation to the facilitating role of the educator, Participant 18 reflected upon the conflict of credibility in teaching entrepreneurship without having practical experience as an entrepreneur: *“Every hiring committee ask for: So you want to teach entrepreneurship? Are you an entrepreneur then? So my answer is not really, but that’s not my job. My job is to facilitate entrepreneurial learning”* (18). Few participants reflected upon their own experiences as a student and justified their rather *“informal”* teaching approach with their own experiences in the past as, e.g., Participant 18: *“When I started teaching, I kind of emulated how I was taught. And that was very kind of content and teacher-centred. So I try to move away from that”* (18).

The following table (Table 24) provides a further condensed information of the themes and reflections which centered around the active role of the student and the rather informal role of the educators with the goal to support the student’s personal development.

Theme and Keywords	Exemplary Quotes
Individual/ Personalized Learning Personalized Learning Focus on the individual Personal Development Individualized Teaching	<i>“I’m all about personalized learning, so its all about seeing the individual”</i> (1) <i>“I have got a focus on the individual”</i> (27) <i>“It is about developing the person”</i> (23) <i>“I do very much of individualized type of teaching”</i> (5) <i>“My role is actually to get the best out of the person”</i> (27)
Students in Charge Agentic Taking Control Educator in the background	<i>“I always think of the student as becoming more agentic so they take control of his or her destiny”</i> (1) <i>“I like to listen what they have to say”</i> (2) <i>“I have to do whatever I can to empower. I am always in the background. This is how I see myself”</i> (14)
Trust & Authenticity and Support Parental Trust Supportive Process Build Trust	<i>“Once you created that parental trust, which has come from kind of authority (..)”</i> (1) <i>“I spend quite a lot of time reassuring them that there is a supportive process”</i> (24) <i>“I think it is very important to build some trust with the students”</i> (2)

Informal	<p><i>"My teaching style is very informal" (3)</i></p> <p><i>"So it's a little bit more informal" (27)</i></p>
Action-oriented Hands-On	<p><i>"Well you have to be action-oriented and actionable" (1)</i></p> <p><i>"There has to be some hands-on exercises" (9)</i></p> <p><i>"It is quite hands-on" (15)</i></p>

Table 24: Core themes and quotes on the role of entrepreneurship educators

The table illustrates the core themes mentioned by the participants on the role of the entrepreneurship educators in the classroom. As mentioned before the participants preferred to discuss the importance of individual teaching, the active role of the student in their personal development as well as the informal but actionable supportive process provided by the educators. Besides those aspects, further participants stressed the role of the educators to transfer (theoretical) knowledge about entrepreneurship first before moving into a rather experience-based education setting. This perspective of putting content knowledge before action was often described with the use of various metaphors, which referred to the need of theoretical knowledge before the experience such as learning how to swim (7), learning how to climb a mountain (5) or learning how to fly a plane (16).

Moreover, few educators expressed their very personal challenge of representing different roles and credibility that entrepreneurship educators have to play:

"We are in a very conservative format because ... this gives credibility and ... it's okay for theory ... but when you are at the end of the continuum and trying to get people into action, you probably have to adopt the style ... I actually have to tell you that this is a challenge".
(16)

Thus, Participant 16 expressed this challenge to switch between roles in the field of being an entrepreneurship professor: *“Adopting the role of a standard university professor and then you get into another room and have to switch to one of those startup guys.”* (16). A conflict that has also been echoed by e.g., Participant 7 who mentioned *“You have many different roles ... sometimes you have to take the control of the room and be a more traditional teacher (...) and other times you have to really like motivate them and maybe even be funny and create a good atmosphere in the room”* (7). This challenging experience of being in a conflict of establishing the right relationship with the student and balance a certain closeness and distance on the same time. Even more, e.g., Participant 5 emphasized that it is *“sometimes it is too much if it becomes a very, very close relationship with the students”* (5). Moreover, several participants expressed the challenge of being a *“trustworthy guide”* on the one hand and on the other hand grading the performance of the student at the end of the process – this conflict of authority has been best summarized by e.g., Participant 5:

“That is the hard part because in the end of the day you have to grade ... and then we have to take the step back and not be the guide that walks with them but then you´re the authority that actually decides what kind of grade they get” (5)

This inner conflict of the entrepreneurship educator in the role of navigating the student between taking responsibility and grading the assessment has been also echoed by e.g., Participant 10.

“This is a particular problem of entrepreneurship education, where you want to train people into sort of taking their destiny in their own hands and ... in many ways they probably trust me (...) but I hold the grading and the ECTS points in the end” (10)

Furthermore, when talking upon the challenges and different roles the entrepreneurship educators have to fulfill in the classroom, for example Participant 1 reflected about the need for a better education for the educators itself. *“We are in*

the beginning of understanding the need to train the trainers, because ... it is too much business coaching, but it's actually entrepreneurial coaching that is needed" (1). This question upon the training and background of entrepreneurship educators was considered as important, especially in relation to the context of the educator, which will be further discussed in the following section.

In summary, to reflect upon their own role as an educator was one of the most dominant codes among all 29 interviews. In total, the coded text on this theme consisted of 50,279 letters on text volume. Thus, the previous analysis focused on the most important themes and quotes, which helped to provide further context when answering the research questions. To do so, the following section presents the findings on the different perspectives on Design Thinking and how the Entrepreneurship Educators expressed their conceptual understanding of the term.

7.3 Perspectives on Design Thinking

Within the following section a perspective is given on how entrepreneurship educators understand, define and evaluate Design Thinking. Thus, the following section displays the data results from the interviews, which helped to answer the Research Question on how Entrepreneurship Educators understand Design Thinking and what they associate with the concept. The section is structured as followed: First a general overview will be given on what kind of attributes have been used by the participant to describe Design Thinking (Section 7.3.1), followed by a short section on the definitional ambiguity, then the different views on the tool- process and mindset Perspective on Design Thinking will be given. As Part of the Analysis two new Perspectives (Design Thinking as a fad and Design Thinking as an approach to education) have been retrieved which will be presented lastly. A summative overview on the Design Thinking Perspectives can be found at the end of the Chapter (see 7.6).

7.3.1 Definitional Attributes of Design Thinking

Within the following an overview is given on how entrepreneurship educators describe their understanding of Design Thinking in their own words. First of all, it needs to be stated that all of the participating interviewees had heard the term

Design Thinking before. Thus, 29 out of 29 participants answered “Yes” on the question of whether they have heard the term Design Thinking before. This represents the wide application and prevalence of the term. Even more, one of the participants expressed their perspective on the omnipresence of Design Thinking by answering:

“... And my first question is, have you ever heard of design thinking?”

Participant: Have you tried not hearing about that?”

This is just one example of an answer relating towards the ubiquity of the concept. Within the following a more detailed analysis of the actual words and attributes used to describe Design Thinking will be given. The radar plot is the result from a word count analysis derived from the free definition of Design Thinking by the entrepreneurship educators (Interview Question from the Interview guideline: “How would you describe Design Thinking in your own words? What is your understanding of Design Thinking? What do you associate Design Thinking with? How would you explain the concept to a friend?”) – see forthcoming Figure 35

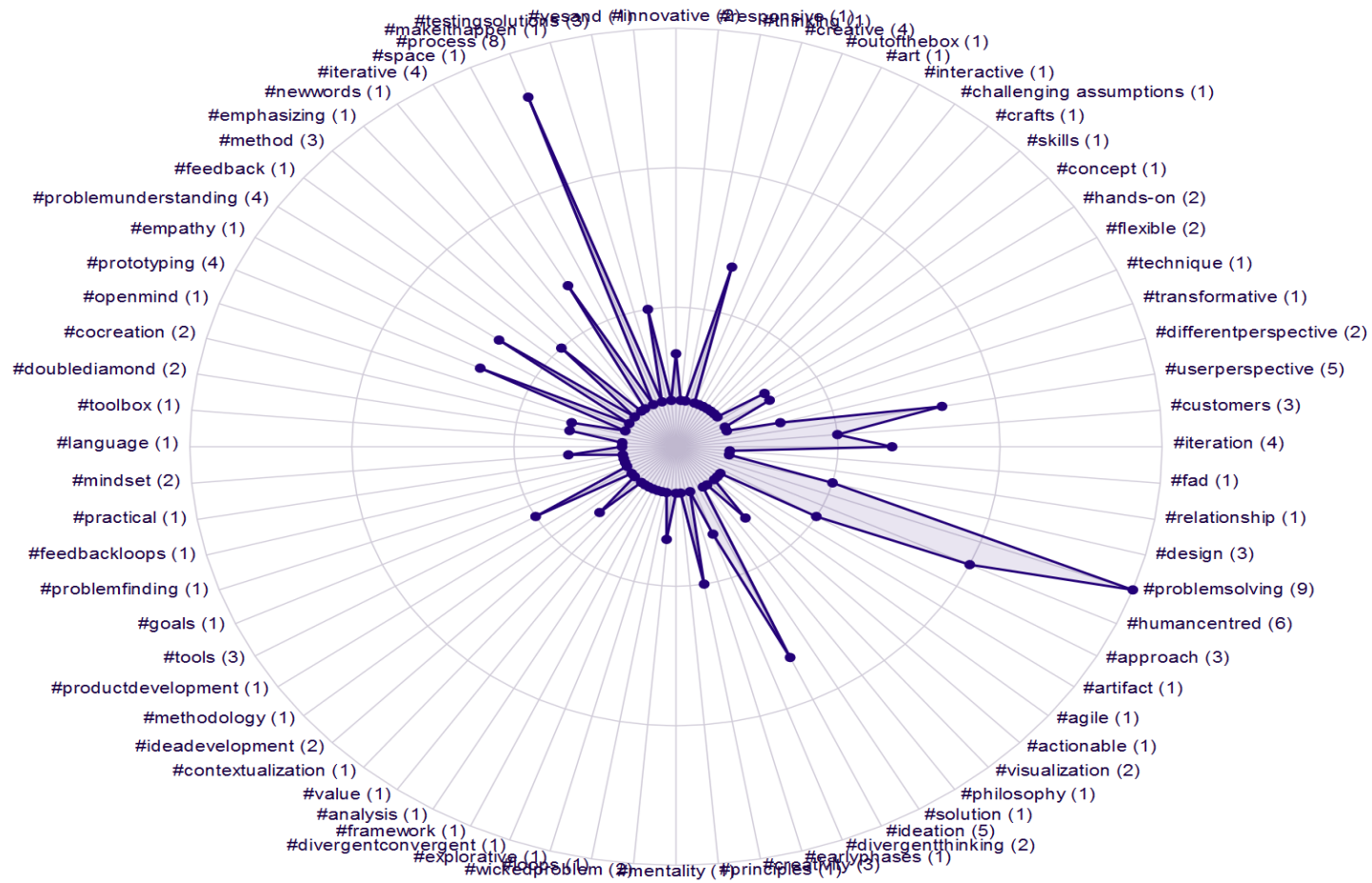


Figure 35: Illustrative screenshot of radar plot on core codes within Design Thinking definitions by entrepreneurship educators

The radar plot in Figure 35 illustrates the magnitude of key codes such as problem-solving and user-perspective. As shown in Table 22 the list of codes is large, leading to the need for theming. The core codes used to describe the concept show a general congruent perspective with the conceptual dimensions identified in the literature review (see Section 3.3 on the Conceptual Dimensions of Design Thinking). The core themes have been:

Core Theme	Exemplary Codes – Attributes used
Problem Solving	#problemunderstanding #problemsolving #wickedproblems #solution
Innovation / Creativity	#outofthebox #innovative #challengingassumptions #newperspective #creativity
Hands-On	#actionable #practical #prototyping
Iteration	#iterative #iteration #feedbackloops #flexible #agile
Human-Centredness	#human-centredness #userperspective #empathizing
Ideation	#ideation #divergentthinking #explorative #ideadevelopment
Toolbox	#tools #toolbox #methodology #technique
Mindset	#mindset #openmind #philosophy #concept

Table 25: Core Themes and codes for used attributes in defining DT

From this it becomes apparent that entrepreneurship educators associate Design Thinking with the themes of Problem Solving, Innovation, Ideation, Human-Centeredness, Toolbox, Mindset, Hands-On. Foremost, Entrepreneurship Educators associate Design Thinking with some sort of Problem Solving, a theme that is best represented in the following quotes:

“I think it is, so when I introduce what is design thinking, it’s a philosophy, a human-centered approach for problem solving.”(20)

“Design Thinking is to understand the real problem and to test possible solutions, yeah, that's probably it.” (15)

“(..) I do say that by way of my understanding of Design Thinking is that it is all around kind of the problem and going back to the problem and then finding the solutions to that problem” (24)

“Design Thinking is an approach to find the problem, find a solution for a problem, make it happen, and make the solution work.” (14)

This problem-solving theme is also dominant within the analysis of the perceived value of Design Thinking, an aspect further discussed in one of the later sections on the value of Design Thinking for the problem understanding and problem-solving skills of the students (see Section 7.5.1). Furthermore, entrepreneurship educators associate Design Thinking with being human-centred, an aspect that is well discussed within the literature (see Section 3.3.3). The following quote best represents this theme:

“So it's a human-; customer-; user centred approach to designing certain characteristics or design a certain part of the solution, the problem, the way it is experienced by the user and customer.”

Besides, further predominant themes have been Ideation, Innovation as well as Iteration, Hands-On (see Table 25). The following sections on the expressed

practice and perceived value of Design Thinking underlines these findings and provides further examples (see e.g., Design Thinking as a Toolbox in Section 7.3.2 or Value of Prototyping in Section 7.5.2).

Even though all of the participants stated they heard the term Design Thinking before, many of them expressed their struggle for grasping the concept and coming up with a definition. This reflects the definitional insecurity even though of its omnipresence.

“But I'm still struggling. I've actually also reviewed one or two articles of Design Thinking in education, but I still have to see how it works and how it is different from the way I work. But I'm quite... I'm still grappling with the idea. So I would be very careful and sort of saying too much about that.” (27)

“I guess it depends if we're talking Design Thinking or design science, which I don't really have a clear delineation of” (4)

“I have to admit that I can not tell you where I see a fit and the whole idea is for me rather abstract” (16)

Thus, the educators felt confused about the difference between Design Thinking and their own way of working, as well as had struggles in separating Design Thinking from other similar concepts such as Design Science or Designerly Thinking. Further, from the participants it had been mentioned that there exists a variety of perspectives on Design Thinking and *“whatever book someone is trying to sell right now has another definition of design thinking” (18)*. Within the following, the different perspectives on Design Thinking, structured around the tool-, process, - and mindset perspective on Design Thinking is illustrated in more detail in order to analyse the understanding of Design Thinking of Entrepreneurship Educators.

7.3.2 The Tool Perspective: Design Thinking as a toolset

Some of the participants were seeing Design Thinking mostly as a toolset/ toolbox that could be used within Entrepreneurship Education, a perspective which could be best described by the following quotes from the interviews:

Theme	Keywords	Quote
The Tool-Perspective: Design Thinking as a toolset	Tools to fit the purpose / help to promote the entrepreneurial mindset	<i>“Design Thinking are tools that we can use in the entrepreneurial education, right. To help promote the mindset, but we will fit the tools to our purpose. So, we will use, we will maybe not use them in the pure form that they have been proposed.” (9)</i>
	Tools for creating an entrepreneurial atmosphere	<i>“You can use the tools for creating an entrepreneurial atmosphere (..) I think this is tools we use for teaching and training entrepreneurship” (3)</i>
	Tool approach, Practising Tools can develop mindset	<i>“It sounds to me like a tool approach. Yeah, that’s the way I would say see its tools. ... so maybe if I was practising it on an everyday basis or more frequently, I would say, then it becomes the mindset” (27)</i>
	Tools organized in in a particular process	<i>“I tend to see it as a collection of tools. But having heard the question again, I would also say that these tools, when it comes to what makes these tools to some kind of thinking, is also that when we’re talking about design thinking, these tools are organised into some kind of a process so it is both: tools are organised into a particular process.” (10)</i>
	Tools for the students	<i>“If the educator primarily see this as a collection of tools or. And so, as I see it, the way often Design Thinking is performed in the sense that this is primarily about letting bringing the students into trying these tools and using it to train them to use the tools” (10)</i>

Table 26: Toolset-perspective: keywords and quotes

Regarding the background and context of the participants, it can be said that all of them (3, 27, 9 and 10) had rather less experience with the application of Design

Thinking in their own teaching. Furthermore, participant No.9, for example, expressed the value of the adaptability of the tools so, they fit “to our purpose” by applying Design Thinking Tools not in their “pure” form but in a way that is most suitable to the entrepreneurial education context. This aspect and wish to personalise, adapt and design the “ingredients” for their entrepreneurship courses has also been echoed by other participants (see Section 7.4.8 with more details on the Educator’s Need for Autonomous Course Compilation). Moreover, the participants were regarding the tools from both the educators as well as the student perspective. While Participant no. 3 and 9 rather focus on the educator’s perspective in stressing the point that Design Thinking provides tools for entrepreneurial teaching, Participant No.10 for example has taken the student perspective by articulating Design Thinking as “nice tools” for the students to apply and train them.

Furthermore, within the context of tools, also rather critical opinions have been stated by e.g., participant No. 16 stressing the role of the overarching principles as being more important than being trained to apply the tools: *“I don't think that I use any tools at all but I understood the principles. So I'm developing my own way of thinking about the world and making sense of it ...”*. A topic, that is well connected with the expressed wish of educators for autonomy and applicability as one of the main barriers (see Section 7.4.8). Thus, the importance of deriving principles is further discussed in a later section (see section 7.4.5 on the Application of Design Thinking Principles as Educational guidance). Additionally, the participants further expressed their understanding of a possible “wider picture” of the tool perspective by describing that the tools as part of a particular process (10) and the opportunity to construct a “Design Thinking Mindset” based on a more regular use of the tools (27). Next, the following section presents more findings focusing on the “Process Perspective” on Design Thinking.

7.3.3 The process perspective on Design Thinking

A third of the participants (9/29) were deciding for taking the process perspective on Design Thinking and the following quotes reveal more insights on their

answers. By their answers, the participants express their view on Design Thinking a process, that is very structured, stepwise and applicable (5, 24). Moreover, participants were emphasizing the process-orientation of Design Thinking by stating that it is *“at least about the process”* (8) and interpreting the process as a tool itself (16). Even more, one of the participants has underlined their wish for a greater process-orientation in Entrepreneurship Education compared to Design Thinking.

“I think it's actually a very, very structured process ... So, I think it is a process that is highly applicable.” (5)

“Sometimes difficult to differentiate between a tool and a process because you could interpret the process as a tool as well ... So it's a process with an underlying idea” (16)

“A process. That's what I've always thought of as is that it's kind of a stepwise process.” (24)

“I think about it as a process developing and evaluating ideas. (..) I'd think process ... I mean the process is easy to sort of follow the mindset thing should then follow through the process so process if you keep doing it, it begins to build a mindset.” (23)

“I see it every now and then and I would say it's something it's a process with a certain toolset.” (15)

“My feeling would be it's a process, or at least it's about the process.” (8)

“I do think there are tools involved. But not so dominantly available as maybe in Entrepreneurship Education. So I think it's more of a process approach. And that's also what I like about it, because that's

something what I miss from Entrepreneurship education, which is heavily tool driven, but less emphasis on the process.” (13)

“I would say more, I would think, my understanding of it ... is a little bit more of a process more than a mindset” (4)

“It’s a process for me” (21)

The educators were expressing their perspective on Design Thinking as a process by describing very visual images they memorize when thinking about Design Thinking, e.g., *“I get a number of images up, you have these five boxes and then you have a lot of arrows between them” (6)*. This reflects that the process models of Design Thinking (further explained in the literature Chapter; see Section 3.2) are well distributed and communicated. Most of the entrepreneurship educators have shown their understanding of Design Thinking as a process that is perceived as iterative and dividing the problem and the solution phase, as well as Design Thinking as the process from a problem to a solution, heavily connecting it to the concept of ideation (23). However, participants were also expressing their criticism of the process perspective by stating that *“You can talk about a process without actually being in the process. Right. So that word sometimes becomes almost an excuse for not actually doing something. So I think process for me has that ugliness to it. A tool you want to apply, a mindset you want to at least express and apply. I think those two are pretty fruitful words actually. Whereas I would be a bit more cautious about the word process. It can be used by anyone who knows nothing about design” (1)*. Hence, the motive of this participant can be regarded as a criticism of Design Thinking to rely too much on the structure and the step-wise process. Regarding the context and background, most of the educators who define Design Thinking as a process had rather little experience with applying Design Thinking within their lectures. Further, many educators were valuing the structure and the process elements of Design Thinking – an aspect which is further analysed in the section on the Value of Process Elements (see Section 7.5.8).

7.3.4 Design Thinking Mindset - Perspective of Entrepreneurship Educators

The mindset perspective has been described within the literature as focusing on the cognitive and behavioural characteristics of the problem-solving agent, focusing on different dimensions (Brenner et al., 2016). As part of the interviews, six out of 29 participants were explicitly understanding Design Thinking as a mindset. However, their approach towards the DT perspective did not exclude their understanding of Design Thinking also as a tool and a process. Rather, especially the participants who were assigning towards a Mindset Perspective were showing a quite holistic view on the DT concept. Overall, it can be observed that the participants within this category were most Design Thinking experts or had quite lots of experience with integrating and working with Design Thinking.

“So I definitely think that, first of all, it is a mindset.” (7)

“Probably am I say it’s a mindset. It’s becoming more of a tool/ educational tool ... But I think it probably evolved from a mindset. (26)

It’s a mindset. Many people think Design Thinking is there to, I don’t know. To create a product or something, yeah, it’s also there to create a product, but mainly it’s the mindset, it’s a customer centric mindset, it’s an iterative mindset ... So it’s a problem solution mindset.” (17)

“And then if you do this long enough and if you and if it works for you, it kind of becomes a mindset ... So it becomes your “Haltung”, your approach, mindset, thinking.” (18)

“So, I think, for me, it is a mindset.” (20)

“To me, it’s a mindset, OK? Most things on mindset, because tools are what you need to create from mindsets in order to explain for

some people because they don't feel satisfied just having the mindset, they give us tools. OK, then we create tools.” (2)

Some of the participants gave more details on how they define the Design Thinking Mindset. Thus, participants were describing it as “It's about moving forward” (2). Within the context of speaking about the Design Thinking mindset, one of the participants made rather critical comments about it, referring to their experience of low tolerance and flexibility with other approaches. *“From my experience with my colleagues who are using that, it's more of the religion”* (11). When being asked on why the participant perceived Design Thinking as a “religion”, the observation was reported that “Design Thinkers” focus on using Design Thinking “for every solution” and were perceived as narrow minded as for them “there is no other way”. This viewpoint has been shared by others, who criticized that some educators see Design Thinking as *“kind of an overarching philosophy of everything” and “is presented as the only solution”* (Participant 23). Even more, this one-sidedness of some Design Thinking advocates made Participant 23 “slightly removing” from Design Thinking. The comparison of Design Thinking as a religion was also mentioned by Participant 10 who stated that “I don't have to subscribe to Design Thinking as some of my religion” (10). Moreover, a new theme emerged from the interviews as many participants expressed their association with Design Thinking being a “fad”, a “hype topic” and a “buzzword” that is making use of “new words” to describe existing principles. Thus, the following section highlights this negative perception of the omnipresence of the term.

7.3.5 The Trend Perspective: Design Thinking as a fad

One of the reoccurring themes and critics on the concept of Design Thinking has been the attribution of Design Thinking being a fad. This evolved as a new perspective, which derived from the interview data and not from the literature review. Thus, participants described Design Thinking as a “fad” and a “catchword”, and therefore expressed their view of Design Thinking as being a “hype topic”, that is currently “trendy”.

“How would you define what Design Thinking is?”

Participant: I don't know. I understand that it is an approach and it's a fad, as we say, you know, I mean, it's a lot of sort of new things coming on the market ...” (3)

“On a very, superficial level, I think it has become a catchword, and a catchphrase, especially from the American viewpoint, especially after being at conferences over there” (5)

“OK, yeah, it's a trend. It's super arty and so on. The art and design is very posh and it is very makes you look very good.” (21)

“I think that because it's such a hype topic that more and more universities are getting in and just feeling it because of the interest of individuals. And I just think this is just a part of the problem when it comes to Design Thinking that you have people in business because it's trendy.” (20)

“So, what I associate with is currently a buzzword. It's a marketing thing from IDEO that wonderfully helped them to differentiate to other design companies.” (20)

“When it becomes a fad is if people do as if that is enough to set up a business and you don't need to do all kinds of complex entrepreneurship stuff, because you've done Design Thinking” (12)

Thus, the interviews reflected the negative side of the omnipresence of the Design Thinking concept. This aspect is further connected with the fear of some of the educators of Entrepreneurship Education being replaced by Design Thinking or of Entrepreneurship Education to be strongly associated with Design Thinking, which in turn might result in Entrepreneurship Education being associated with a fad itself. When diving into the critical perspectives on Design Thinking, it became

apparent that some of the Participants explicitly expressed their fear of Entrepreneurship Education being replaced by Design Thinking, as both compete in the area of fostering innovative teaching approaches from the perspective of external stakeholders, such as Policy Makers. *“What I’m bitter about is that decision makers sometimes think that this is a trend, well, one for the other end and replace (Entrepreneurship Education for Design Thinking) now ... there’s value in each of the approaches, but I disagree with the equality of, the two concepts ... Entrepreneurship is more than design thinking. So stop replacing the one with the other, it’s not going to be enough.”* (Participant 11). Even more, Participant 11 described that Design Thinking has been taken up the topic on creating a more innovative Mindset among students, a topic that has been occupied by Entrepreneurship Educators before *“we owned that position”* (11). Furthermore, educators were expressing their viewpoint or fear of other methods and approaches to “take over” the label of entrepreneurship *“Many people would try to label that entrepreneurship, I would disagree completely and to say, that’s not entrepreneurship, that’s something else but let’s not put that label on that.”* In an explicit way, some participants argued that Entrepreneurship is in danger of becoming a fad by itself, if it is over-relying on concepts such as Design Thinking which, as expressed by the participant, is a fad itself. Furthermore, Participant 6 explicitly mentioned a “competition of perspectives” within Entrepreneurship Educators when talking about Design Thinking: *“There are so many other methods out there and there’s so many other perspectives and it’s a competition of perspectives and Design Thinking has never won that competition in my head or in my practice“* (Participant 6). This narrative has been echoed by Participant 20 but in a rather critical way – *“I do not get this silo thinking ... I do not understand this fight between the churches”* (20).

Moreover, Design Thinking has been described by the participants as “just a marketing thing” which relates to the perception of Design Thinking being used to sell things. By referring to the fact that the use of Design Thinking “makes you look good” Participant 21 expressed the view that entrepreneurship educators apply Design Thinking in their own course, in order to fulfil their own need to be recognized as an educator who is teaching ‘state of the art’. Further, the theme of

Design Thinking being a buzzword has been reported from both sides of Entrepreneurship Educators, those who heavily apply Design Thinking as well as from those who seemed rather critical towards the concept. Thus, with the buzzword theme participants expressed their understanding of Design Thinking being very popular and “mainstream” and on the other hand being a concept that is lacking a profound theoretical foundation (see also Section 7.3.7 on Lack of Theory).

7.3.6 Implicit understanding of Design Thinking: New Words for Old Principles

One of the reoccurring themes constituting the implicit use of Design Thinking has been that participating educators were expressing their perception of Design Thinking as a concept that made use of “new words for old principles”. Overall, this theme “#newwords” has been mentioned by 11 out of 29 participants. Hence, participants perceived Design Thinking as a concept that was kind of using new words for principles or methods that they were using before they had been aware of the concept:

“I picked up to these methods earlier, but not in a structured way ... I had been doing this for many years and then there were these methods that describe this thing” (6)

“So I like it, but I haven’t really used the words” (1)

“I feel I am very familiar with this concept but maybe use different words” (3)

“You can see some presentations about people, who have sort of now found out that they can sort of rethink Entrepreneurship Education by using design thinking. And then they do the same thing as the rest of us. They just call it design thinking.” (10)

“I do ideation but as I say I don't work the word ideation” (8)

“As I say, the steps are not new, but giving them a label is what is new about it. So I wouldn't say Design Thinking” (29)

“And for me that has been around much longer than Design Thinking as as such ... I am used to all of that in my teaching before I ever heard of Design Thinking” (21)

“I'd say at that time we weren't talking...we weren't using that language. This is when the language he used to define the education techniques we use ... People have been doing it for many years, but we now have a particular name for it.” (26)

Thus, it appeared that Design Thinking is recognised as concept which principles has been applied “much longer” than the “label”. On the contrary, some of the participants were describing this as a negative aspect and expressing their thoughts with a negative connotation (“They just call it Design Thinking”, e.g., Participant 10) while others stressed the important role of Design Thinking as a communicator and terminology tools (e.g., Participant 26). Thus, it appeared that some of the participants were seeing this as critical, while other were expressing the value of Design Thinking in providing a vocabulary to their work (see further insights on this in the Section 7.5.7 on the Value of Communication). Besides, this also can be regarded as an example of the implicit use of Design Thinking Principles in Entrepreneurship Education, as stated by Participant 13: “So maybe it is not the term Design Thinking what they use but it's there in a lot of programmes” (13). Moreover, Participant 3 expressed doubts that there is anything new about Design Thinking by stating that “I have a feeling that Design Thinking is something special. And I don't really know what that is, to be honest ... So, for me, it's just bread and butter (3). Other, Participant 18 explicitly mentioned that he perceived others as neglecting the theoretical foundations of Design Thinking “Where I think People are getting it wrong now is like: Design Thinking

is not new, you had lots of this principles before. And it came from something. And that something came from something else” (18).

Others preferred to discuss the irrelevance of definitions and different names in this context. While they have been aware of the different names, words and definitions, they explicitly expressed their opinion that it would not matter to them which terminology should be used – as expressed by Participant 2: “So as I said, call it whatever you like” (2) and Participant 13: “I don't mind using those terms, you know, again, form follows the function. Doesn't matter what you name the content, the content still stays the content, the name is different. So I think its ok naming it design thinking, though.” (14). This theme has also been mentioned in the literature by e.g., Sarooghi raising the question “whether we, as entrepreneurship faculty, are really teaching Design Thinking or, rather, if we are simply using the term while relying on our traditional teaching methods.” (Sarooghi et al., 2019, p.20). A further discussion of this aspect is in the forthcoming Section.

7.3.7 Lack of Theory and the tendency of simplification

One of the most reoccurring criticisms of Design Thinking regarding the conceptual understanding was the perceived lack of theory described by the participants. Explicitly, the lack of theory was addressed by Participants 14, 6, 10, 24, 3, 13. Especially Participant No. 10 elaborated the difference of entrepreneurship being a “discipline” which is “old” and “filled with theoretical walls, which Design Thinking is still not” (10). Even though this participant has shown quite reflective knowledge on the Design Thinking literature, the theoretical foundation of Design Thinking is perceived as rather weak: “And I mean and I'm not saying that Design Thinking is lacking any kind of theoretical foundation. I mean, for instance, I tend to see Herbert Simon's classical book, *The Sciences of the Artificial*, as a very, very central philosophical background for design thinking. But I don't think that the corpse of literature is so strong, I mean, if there were more (..) but there's very little bit of solid work, actually, in that sense. That's why I see it more as a fragmented collection of tools.” (10).

This viewpoint was shared by other participants, who criticized Design Thinking as being *“more of a methodology or a process but it is not a discipline by itself because it needs a context in which its employed”* (13). Participants related the lack of theory back to the *“reduced focus”* on being a *“hands-on approach”* (14) and being an *“eclectic collection of ideas from a practitioner-oriented field”* (6). An aspect, that has been described as being valuable to other educators (see e.g., Section 7.5.6 on the Value of Interactive Workshop Methods).

Connected to the lack of theory is the critique that Design Thinking simplifies complex concepts. Thus, one of the core criticisms mentioned by the participants has been that Design Thinking has the tendency of simplification – an aspect described by both Design Thinking advocates as well as Design Thinking sceptics. On the one hand, some participants explicitly stated their critic of perceiving known Design Thinking Frameworks as a simplification of rather complex models. *“Double Diamond...Yeah...I think is interesting, but it's such a simplification. I think, this, that's what you do all the time. Who came up with a silly idea that it should be done twice, and then you're done. I mean, it's such a simplification!”* (Participant No. 6). Furthermore, Participant Nr. 14 shared this viewpoint on simplification: *So it's design thinking, it's the short work cycles, loops, iterations - very simplified ideas of things. So I don't know, you can simplify, but not to this amount.* (Participant 14). Also, Participant No. 1 expressed its critical perspective on Design Thinking that has become *“popularised and too simplistic”* (1). Moreover, e.g., Participant 24 reported to imagine a Design Thinking Coach could replace her facilitation role in the Entrepreneurship Education but not the theoretical perspective. Thus, the participant described that while a Design Thinking Coach might be helpful in Entrepreneurship Education to *“facilitating an individual's journey”* and *“facilitate people to think about problems and ideas”* and to cover the *“action”* they miss to cover the *“theory”* e.g., the *“fundamentals of business”*. In summary *“I think the theory is what's missing from the Design Thinking (..) and the Enterprise Educator's job is to give the student the theory”* (Participant 24). Hence, this aspect is connected to the critic on Design Thinking to lack theory and be rather focus on practitioner-orientation, which has been illustrated in this section (further discussion in the context of the current literature in the

forthcoming Section 8.1). On the other side, Design Thinking advocates reflected explicitly on this critical point and therefore shown awareness of Design Thinking as being perceived as a simple construct, which they disagreed with, even though they acknowledge the value of also being “easy at first sight” (7):

“They always say, like it's something everybody can do. You have this easy process and related tools and you can just step been through these toolboxes. And then you are a design thinker. Like, based on my own experience, that's certainly not the case ... it's not that easy (..) But the reason why it's so popular, I think, is because of the process and models and the message, which is sort of easy to, at first sight, you say, OK, it's easy to use as everybody can do it and so on (..)” (7)

Moreover, also other Design Thinking advocates defended the concept and addressed the issue, that Design Thinking is perceived as something that could be trained in “three days instead of three years” (Participant 29) and misunderstood as “colourful”, “fun” and “nice” instead of being a “serious business” (Participant 20). Furthermore, the participating interviewees were referring back to the problem of e.g., shortening up the process of learning about design thinking:

“For example, we teach Design Thinking in the four-week course, whilst in art school, they might teach the same thing in a three-year program. So, it's about how you put something, a model, or a process from one context into another that is something that needs to be discussed more I think.” (5)

On the contrary to the critical view of Design Thinking being a “fad”, another emerging theme has been the view of DT as an approach to education. This perspective is further discussed below.

7.3.8 Design Thinking as an Approach to Education

From the analysis of the interviews, a new theme emerged which centred around the perspective to see Design Thinking as an educational tool or as an approach to education. This perspective emphasized the role of Design Thinking from an Educators perspective – e.g., by using Design Thinking to design Entrepreneurship Education Courses as expressed in the following quote by Participant 20:

“You asked if and how entrepreneurial educators apply design thinking. And I would say in two ways, on one hand, when I design, I use Design Thinking to design the program. So, who are my stakeholders, what are their needs? And then I prototype and test and iterate. And on the other hand, I’m using it as a way for my students to conduct their projects. So, it’s two levels. So, I have to apply to, or I’m going to apply it to build up their program. And on the other hand, we’re applying it to their projects too.” (20)

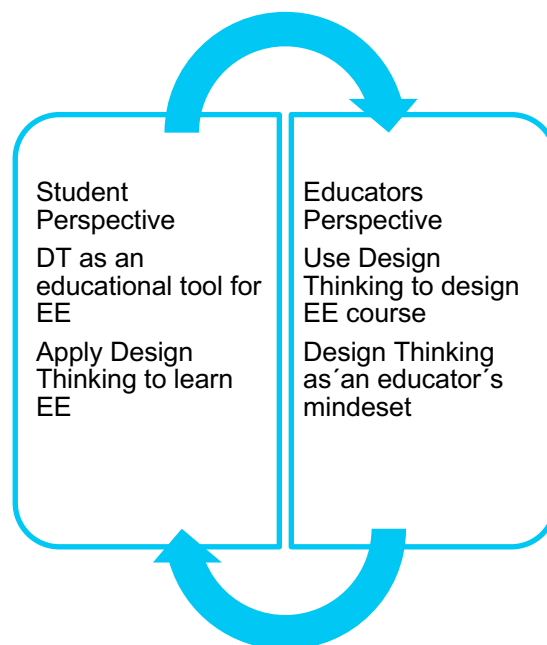


Figure 36: Student and educator's perspective as two ways for DT in EE

Therefore, educators expressed their understanding of Design Thinking “becoming more an educational tool” (26). This view on Design Thinking has also been shared by Participant No. 3 who stated: “*When I think of Design Thinking, I’m thinking of how we design entrepreneurship courses*” (3). In general, it became apparent that mainly educators who already assigned themselves towards the mindset perspective of Design Thinking have expressed this view on Design Thinking. However, they introduced a new focus regarding the mindset, in a sense, they focused on the mindset of the educator as opposed to a – future mindset of the students. This perspective to use Design Thinking as an Educational Tool is strongly connected to the Practice to apply Design Thinking in a rather holistic way as is described in the section on the application of Design Thinking as an Educational principle in Practice (see Section 7.4.5).

7.3.9 Understanding and explicit perspective of the DT/EE nexus

The previous sections have illustrated the different perspectives Entrepreneurship Educators expressed on the concept of Design Thinking. The literature review has discussed the parallels and common core principles of Design Thinking in Entrepreneurship Education that can be seen on different levels. In addition to the literature, it has been one of the research questions to further explore the Educator’s understanding of the DT/EE nexus. Thus, in the following the educator’s explicit perspective on the conceptualization of the nexus is further described. Indeed, many educators described that they were seeing a nexus – or “strong synergies” (23) between both - core themes are summarized in the forthcoming table.

Educators perspective on the DT/ EE nexus	Similarities in the approach to entrepreneurial learning	<i>"I think Design Thinking and our approach to entrepreneurial learning is very similar, there are so many overlaps" (9)</i>
	Similarities between the Designer & the Educator	<i>"I think designers as well as entrepreneurs like to be in that kind of divergent thinking space" (23)</i>
	Similarities regarding the pedagogical process of experiential learning	<i>"I think the fundamentals between Design Thinking and Experiential Learning are quite similar in the scope of the process and ... the idea is mainly to get students into actually experiencing something" (5)</i>
	Similarities in the "Way of Working"	<i>In terms of the entrepreneurial way of working and the Design Thinking way of working I would say you could maybe substitute one for another (13)</i>
	Similarities on Ideation and Wicked Problems	<i>"There is absolutely an aspect of ideation that is very similar across both spaces. ... Ideation is one of the very similar components there (4)</i>
	Similarities in the iterative learning process	<i>"I think similarities in the pedagogic approaches as sort of the iterative steps through a process" (4)</i>

Table 27: Educator's explicit perspective on the DT/EE nexus

As illustrated in the Table 27 above, the educators explicitly mentioned similarities between Design Thinking and Entrepreneurship Education regarding the approach to entrepreneurial learning, the characteristics of the change agents (designers vs. entrepreneurs) and their way of working, the role of Ideation in general as well as regarding the emphasis on an iterative and experiential learning process in general. Further, some of the educators expressed their thoughts on describing the nexus as a nexus between "the fundamentals of Design Thinking and experiential learning" as there are "many similarities between progressive education and design thinking" (5).

Some of the scholars expressed their perception big overlaps between Design Thinking and Entrepreneurship Education and described their difficulties with making a distinction by referring to a "Chicken and Egg" Paradox:

“Entrepreneurial Education has this big interface with Design Thinking ... of course this is a chicken and egg question, but it is not about what was first” (29). Regarding the framework of a possible nexus, Participant 20 expressed the view that *“Entrepreneurship always has elements of Design Thinking but not the other way around – so Design Thinking does not necessarily have elements of entrepreneurship in it”* (20). A perspective that expressed the fundamental importance that Design Thinking played for this educator– even though this view has not been shared by others (see previous sections which illustrated the various perspectives on Design Thinking). Being asked about possible similarities, Participant 29 described the nexus seen in the task (solving problems); characteristic (creative) and purpose (for someone else) between the designer and the entrepreneur: *“A designer, however, is creative to solve someone else’s problems. Isn’t that what an entrepreneur is trying to do?”* (29). Thus, this reflects the interface seen in the context of value creation on an individual level, an aspect which has also been echoed by e.g., Participant 23. The above comments and exemplary quotes reflected the explicit expressions from the educators on the DT/EE nexus and shared the answers from the educators who explicitly reflected upon the nexus in their own words. Within this context, it needs to be mentioned that rightly, one of the participants raised the question on the possible directive question on asking for unifying logics and similarities of both as *“It depends on whether we answer if they are similar or whether they should be similar”* (10). Thus, the thoughts of the educators are further discussed in relation to the theoretical perspective. Therefore, further thoughts on the holistic synthesized version of the educator’s perspective on the conceptualization of the DT/EE nexus are discussed in the Discussion Chapter (see Section 8.1).

7.4 Design Thinking Practice in Entrepreneurship Education

Within the following the thematic analysis centering around the Design Thinking practice within Entrepreneurship Education is presented. Thus, the following results of the analysis help to find an answer for the research question on how educators apply Design Thinking within their Entrepreneurship Education Practice – both on an individual as well as on an institutional level. Thus, the following

sections focus on the insights discovered under codes of #DTintegration #DTuse #DTcourse #DTinEE and #CourseDesign and provide insight on the different ways Entrepreneurship Educators apply Design Thinking in practice.

7.4.1 Explicit vs. Implicit Integration of Design Thinking

From the interviews it became apparent that Design Thinking and Design Thinking Principles can be applied in an explicit as well as in an implicit way within Entrepreneurship Education. This means, that Design Thinking can be integrated in an explicit way, which refers to the clear and plainly stated use of Design Thinking in Entrepreneurship Education course or curricula, - or can be integrated implicitly, meaning that the integration of Design Thinking Principles in the Entrepreneurship Education curricula is implied but not stated directly. Overall, it can be said that nearly all of the participants were mentioning an either explicit or an implicit use of Design Thinking. This further reinforces the wide application of Design Thinking among Entrepreneurship Educators – in one way or the other. Even though some of the participants stated to not explicitly teach or apply Design Thinking, they often touched upon this topic again later in the interview and shared their reflections on their possible implicit use of the Design Thinking principle. As expressed by Participant No. 8:

“Why I have not yet integrated Design Thinking...maybe because ... but I, I think I partly do it ... so maybe it is there implicitly” (8).

Thus, the participant expressed first to not use Design Thinking in the teaching but then changes its mind and considers the option to integrate Design Thinking implicitly. Besides, participants emphasized to implicitly applying Design Thinking as e.g., stated by Participant No. 9:

“I consciously don’t use design thinking, right. But I use tools that you will also find in design thinking, but when I started out teaching I didn’t realize that there was anything called design thinking” (9).

This aspect represents the educator’s relation towards Design Thinking as a concept that can be regarded as putting new labels on existing practice (see previous section 7.3.6 on Design Thinking as providing new words for existing Principles).

Moreover, while some participants were reflecting about the implicit and explicit integration of Design Thinking within their Entrepreneurship Education courses, other discussions, from e.g., Design Thinking advocates, were more centering about the implicit application of “Design Thinking” in a way of a rather intuitive, shared understanding and a way of working and thinking. As expressed by Participant No 18 who referred to the aspect on a rather intuitive integration of Design Thinking principles: *“So all of these things they just happen because everybody aligns in the way of thinking. So it’s not even something you do. You don’t have to make it explicit again. It is implicit” (18).* This intuitive application of Design Thinking Principles is strongly connected to the strong infusion of Design Thinking in the Entrepreneurship Education, as presented in Section 7.4.5 on Design Thinking principles as educational guidance. First, the next section highlights the findings on the Entrepreneurship Educator’s practice to integrate Design Thinking in the beginning of an Entrepreneurship Course in order to serve the purpose to generate ideas for the project-based course structure.

7.4.2 Design Thinking in the beginning of the Entrepreneurship Course

One of the very common reported practices among Entrepreneurship Educators has been the application of Design Thinking as a method in the beginning of an (often project-based) Entrepreneurship course.

“I use Design Thinking in the start, rather in the beginning of the entrepreneurship course journey, then at the end” (15).

In this context, Educators described often a project-based course structure in which it was the goal for the students to work in teams, generate an idea for a problem and develop a suitable business model during the course. In this practice, the educators reported to make use of Design Thinking as a tool or procedural toolbox, which can be used for supporting the process of Problem Finding and Ideation within the students. Thus, the educators described Design Thinking as to be used in an early phase to understand the problem.

“Pretty early on, I think because it is about how you conceive the things you are going to design like the problem you are trying to design for ...” (4)

Furthermore, the participants shared to use Design Thinking first, in order to develop an “idea” which will at a later stage, transform into a greater focus on business model generation:

“Design Thinking is like before that, but it leads into a business model” (17).

The behavioral practice to include Design Thinking in the beginning of an Entrepreneurship Education project-based course was often connected to the predominant perception of Design Thinking as a toolbox or method for early phases such as Problem Understanding, Ideation and Idea Development (see also Section 7.5.1 on Perceived Value of Design Thinking for Problem Understanding). This aspect has been expressed by e.g., Participant No 4:

“I would say in the idea evaluation course (..) we used material by IDEO to help present that and we walk them through sort of the concept space (..) and the iteration (..) Those will be the only specific, I would say Design Thinking slides that I’ve ever utilized in education. (4)”.

Overall, other participants described their understanding of the nexus as having the most similarities within the early, hereby described as rather chaotic phases of entrepreneurship as stated by participant No: 13: *“I do see the similarities mostly in the kind of the very first process parts”*. Thus, this educational practice reflected the conceptual understanding of Design Thinking as toolset supporting creativity and concept development. Contrary to the integration of Design Thinking only in the “beginning” of the Entrepreneurship Course, other scholars reported to make use of the Design Thinking process as the overall backbone for the whole course. This educational practice is further discussed in the following section.

7.4.3 Design Thinking Process as the overall backbone of the course

One of the reoccurring themes regarding the actual Design Thinking practice in the classroom has been the use of Design Thinking Process Elements (further described in the Literature Chapter on Design Thinking Processes in Section 3.2) as an overall procedural structure of the Entrepreneurship Course. Thus, participants described Design Thinking as the “backbone” or the “skeleton” (14) of their Entrepreneurship Course. This application of Design Thinking is not surprising as many Educators were expressing their understanding of Design Thinking as a process as described in the previous section (7.3.3). In practice, participants described to e.g., follow the Design Thinking process steps by using them as a weekly structure for their Entrepreneurship classes:

“Sometimes I structure the teaching week by week – so the first week is empathizing, the second week is defining, so every week is structured around (DT) process” (23)

“We are actually in a Design Thinking process during the course ... we have the Design Thinking process going on all the time” (7)

Even though Participant 14 referred back to Design Thinking as providing an overall procedural structure for the course design he equally emphasized the

need for flexibility: *“Design Thinking is the backbone of this ... program at our university ... I have to be very flexible. That's why I say the Design Thinking process is not fully applicable. I have topics like agility, topics like financial opportunities, topics like sales, networking, legal aspects ... and those I have to shift accordingly ... so it's never the same order. The backbone is the same.”* This illustrated that entrepreneurship educators were making use of the Design Thinking process element as an overall structure, while at the same time adapting it to their needs – an aspect which has been further elaborated in the section on the educator’s need for autonomous course design (see Section 7.4.7). Moreover, participants mentioned making use of Design Thinking as a structure and method for self-directed application by the students, as Participant No. 7 was applying Design Thinking as a method for teaching workshop facilitation in an entrepreneurial context: *“during the course, they (students) sort of planned and designed their own Design Thinking workshops and then at the end of the course, they conducted these for first semester students. So then the students, the first-semester student had an entrepreneurship camp where they have to, like, create new business ideas.”* (7).

Within the context of using Design Thinking as a process for Entrepreneurship Education courses, one of the participants is criticizing the approach to teach Design Thinking just in a “two or three-day course”. This should be seen as critical, as it misses to teach the iterative aspect of the learning process, as in an ideal way “you force the students to not just go through this process but bouncing between the steps when things don’t work” (29). This aspect is further discussed in 8.2. In summary, it appeared that quite a few participants were making use of the Design Thinking Process structure to structure their teaching – or give an existing structure to the students. Moreover, many educators emphasized the value of the Design Thinking process steps, which are further demonstrated in one of the forthcoming sections on the Value of the Process Structure (see Section 7.5.8). On the contrary to the procedural integration, another educator reported applying Design Thinking in a rather selective and opportunistic way, which is further introduced in the following section.

7.4.4 Design Thinking Tools applied in a scattered and selective way

One very common practice that the participating Entrepreneurship Educators reported has been the rather selective and occasional use of Design Thinking:

“There's number of tools along the way, which I sort of stolen from Design Thinking as well, I mean, on the way they do prototypes(..) and all these classical Design Thinking tools ... so in that sense, I use Design Thinking elements. I do not sort of subscribe to Entrepreneurship Education as a Design Thinking logic. I can steal from design thinking, I can steal from a lot of other places. And Design Thinking is definitely one of the places we steal most from. But it is not sort of the central logic of the course” (10)

“But we don't really call it Design Thinking (..) but we basically take parts of it to make the lecture” (15)

Thus, the participants reported to make use of Design Thinking Tools in an opportunistic way, wherever they might need a tool to support their teaching. Thus, this educational practice is connected towards the Tool Perspective on Design Thinking as well as other educators stated to integrate Design Thinking Tools without naming them Design Thinking (an aspect which was further explored in the previous section on the Perception of Design Thinking as putting new names on existing practice - see Section 7.3.6). On the contrary, Participant No. 5 confessed to apply Design Thinking as a tool even though this might neglect the theoretical foundation of the concept:

“You can see it as a tool that you use ... but think that is kind of making a little bit of violence towards the fundamentals of what Design Thinking aims to be...I don't know...But it's, of course, we use a lot of tools in entrepreneurship, or at least we call it tools. It's catchy. It's easy to learn, and it's easy to apply.” (5)

Thus, this participant reflected upon the possible misconception of Design Thinking as a Tool, while also referring back to the value of the easy application. Further, one of the reoccurring sub-themes in this Design Thinking practice was, that Participants stated that the students had to decide for themselves when and where to apply Design Thinking tools (once they learned it in e.g., an introductory course or day). This aspect of student's autonomy in the Design Thinking application has been discussed by Participant No. 15:

"We have basically one certain day where the idea is to give the participants the Design Thinking in a nutshell ... So therefore we are just giving them the different steps of a Design Thinking process, so that they understand what it is and then they can decide on the process of the lecture, how much of that they want to implement and use." (15)

Other participants have also echoed the self-directed application of Design Thinking Tools by the students e.g., by making use of Design Thinking in setting where e.g., "students teach students" (7). Overall, participants shared their educational practice to make use of Design Thinking in a scattered, selective and self-directed way and reported to apply this practice not only by themselves but also instruct e.g., their students to apply Design Thinking Tools whenever needed during their Entrepreneurship Course. The following section highlights the findings on a very contrary educational practice, which describes the examples of educators who reported to apply Design Thinking principles in the form of an "Educator's Mindset" among all the different aspect of their Entrepreneurship Teaching.

7.4.5 Design Thinking as educational guidance - Educators as a Designer

From the analysis of the interviews a new theme emerged as, especially entrepreneurship educators with a strong background in Design Thinking communicated the influence of Design Thinking on their own understanding as an

educator. Thus, they perceived Design Thinking as overarching guiding principles which they used as a conceptual framework for all of their entrepreneurship courses.

“So, I think this changed the way I positioned myself also as an educator. So how I design and what my role is heavily influenced by design thinking“
(20)

While they reflected on Design Thinking principles as providing educational guidance in general, they reported a rather holistic practice of Design Thinking in Entrepreneurship Education – they not only applied it as a framework, but also in the sense of tools or processes for the students, whenever suitable. Participant No. 18 – a heavy Design Thinking advocate – described its holistic approach of integrating Design Thinking within Entrepreneurship Education by making a reasoned use of all the different levels of Design Thinking: *“So I will start teaching tools because it's easy. Process Models helps you to guide your learning principles. We can reflect on by applying principles. Hopefully that develops into mindset. So that's how pedagogically also we structured the programme* Moreover, Participant 18 described different stages the students can reach in different courses which build one each other – with the ultimate goal to develop a Design Thinking Mindset, which then could be applied in a self-directed way *“all of this entow and help them solve the problem. I don't care which process. I don't care which tool. So we kind of trained them upwards this spirit and then hopefully later on (..) they apply it the other way around”* (18). Thus, Participant 18 referred back to Design Thinking as describing as the participants *“general mindset”*. Furthermore, Participants shared their practice to apply Design Thinking when designing their Entrepreneurship Course in the sense of curating the content, etc.:

“Design Thinking has so many faces, you know, one thing I show to actually practice teaching in general. And how to create content or how to create a new course” (17)

Thus, this viewpoint expressed the understanding of the educator as a designer. And can be described as an educational practice that is strongly related to the previously mentioned viewpoint of applying Design Thinking as an approach to education (see Section 7.3.8 on Perspectives on Design Thinking). Moreover, the wish to “design” the Entrepreneurship Courses was stated by further participants, even though many of them mentioned feeling restricted by institutional barriers (see the forthcoming Section 7.4.8 on the Barriers for Design Thinking integration).

Further, it became apparent from the data, that while experienced Design Thinking advocates apply Design Thinking Principles as their guiding educational principles, some rather inexperienced educators still reported using Design Thinking to fulfill their missing need for educational guidance in their Entrepreneurship Teaching practice. Thus, a new theme emerged from participants who described Design Thinking as a bridge they used to develop their way of teaching. Especially Participant No. 7 very openly reflected upon the development from being an “*insecure young teacher*” that “*imitates what you have seen other teachers do*” into a teacher that has a “*huge reservoir of different methods right now*” .

“It did change my own teaching because I got new methods and I got a new structure and I got a new logic and I got new theories to present. ... So Design Thinking is a very different approach. And of course, it has changed a lot. And the way I teach and also the way it facilitates and yeah, everything. And suddenly you have specific literature that frames the whole thing, and that also makes it linked up to a business way of thinking” (7)

The aspect to kind of abuse “other methods” to find suitable principles which guide the course design of Entrepreneurship Educators has also been described by Participant No. 13 – even though in this case she refers back to Effectuation and not talking about Design Thinking: “*We teach effectuation as a decision-making logic that you can teach to students. But we also now are shifting towards*

trying to put in the kind of DNA of how we design a course. And it's quite hard because the theory was not developed as an educational design principle. It's designed as a decision-making logic.” (13)

Furthermore, Participants were expressing their thoughts on a need for an underlying philosophical orientation that is guiding entrepreneurship educators within their decision-making (an aspect that has been discussed in Section 2.4 on the role of the Entrepreneurship Educator). As an example, Participant No. 10 described Design Thinking as a “religion/logic” that some educators “subscribe” to: *“I've been inspired also by seeing Design Thinking and I can easily see sort of the resemblance between Design Thinking and some entrepreneurship education logic ... But I don't have to subscribe to the Design Thinking as some of my religion, of my particular approach to entrepreneurship education.” (Participant 10).*

Overall, it appeared that the participants expressed their need for pedagogical guiding principles, orientation and methodological support in Entrepreneurship Education. Further, the background and educational culture of the educator was identified as one of the important influencing factors in the Value of Design Thinking in Entrepreneurship Education. Thus, the following section further highlights the importance of context within the educational practice.

7.4.6 The Importance of Context

One of the reoccurring themes has been the importance of context when evaluating the value and use of Design Thinking within Entrepreneurship Education. From the interviews it became apparent that the context and culture of the students – and teachers – as well as the discipline in which Design Thinking is applied – is important when evaluating the value of Design Thinking for Entrepreneurship Education.

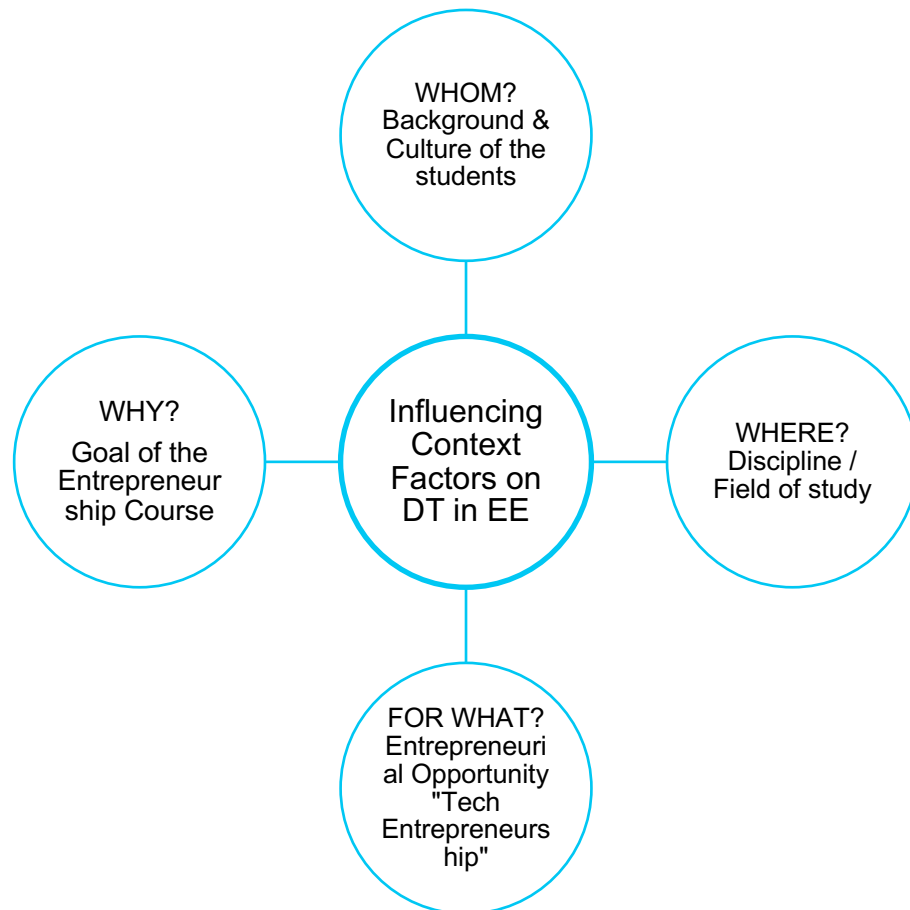


Figure 37: Influencing context factors on DT in EE

On the one hand, the educators described the importance of context in relation to the background and culture from the students by e.g., referring towards the “completely different types of students” (3) regarding the discipline from which the students come from. Thus, some educators expressed their viewpoint that it is dependent on the culture of the students as e.g. “*some hate it and some love it*” (7) and there are certain disciplines of students who found it harder to access and accept Design Thinking as a methodology “*but if you get students from accounting, it is really pretty hard*” (7). Furthermore, the participating educators reflected upon the context of the Application of Design Thinking. Thus, some of the participating educators reflected upon the non-value of Design Thinking within their specific context as e.g., Participant 11 described the perspective that Design Thinking would rather “*work when you do a consumer product*” but would not be

suitable for e.g., the entrepreneurial context of e.g., “hardcore medical or medical drug development”. The main criticism has been that the unique focus on the ‘human-centred’ perspective towards innovation implies a certain ‘bottom-up perspective’ that is not applicable for any kind of context. This need for contextualisation of Design Thinking principles as a perspective has been shared by Participant 1, a professor of entrepreneurship with a strong technological background who criticized the missing applicability of Design Thinking in the context of Tech Entrepreneurship:

“And the problem I have is that ideation ... we have also to care about new technologies coming into that ideation thing ... if you do tech entrepreneurship you have to acknowledge that things come not only through the design process of trying to understand what problem to solve for the customer” (1)

Furthermore, this aspect is connected to another critical aspect mentioned by Participant 12 who also perceived Design Thinking as a method, which misses to include market orientation but solely focusses on the product development:

“Because (with Design Thinking) you can make such a nice product, but if you cannot defend yourself against any competitor then you’re not getting into the market” (12)

Thus, it became apparent that some scholars felt that Design Thinking with its human-centred core principles would not match with their specific context of teaching entrepreneurship (as shown e.g., in Tech Entrepreneurship or Entrepreneurship for the Medical/ Health sector). Hence, this referred to a rather narrow understanding of Entrepreneurship in the sense of venture creation (see also Perspectives on Entrepreneurship Education as introduced in the Sections 2.2 and 7.2.1). Overall, this theme feeds into the scholarly discussion on a more attentive consideration of context within Entrepreneurship Education (Thomasson

et al., 2020), which is further discussed in the forthcoming Discussion Chapter (see Section 8.2). Further, Educators expressed their need for adaptability regarding their educational practice. Thus, the following section introduces this theme as it emerged from the interviews.

7.4.7 Autonomous Course Compilation and Adaptability

Several participants mentioned implicitly and explicitly their need for autonomy and their wish for flexible adaptability of the methods. It appeared that while some of the participants quite openly shared that they use Design Thinking Tools within their teaching, they reported they were not using Design Thinking in the genuine sense. This was expressed in the statement of Participant 9: *Design Thinking are tools that we can use in the entrepreneurial education ... but we will fit the tools to our purpose. So, we will use, we will maybe not use them in the pure form that they have been proposed (9)*. This viewpoint has been shared by Participant 17 stating that educators must find their “own way” and their “own logic” as “... the idea is not that you take a theory and you make exactly what the theory says. It's not never possible to do it like that. So the idea is that you build your own logic, you will fit yourself into it. You know, you adapt things” (17). Regarding the adaptability of the methods, Participant 16 went even further, by referring back to the application of overarching principles instead of tools in order to develop “my own way of thinking”. Moreover, Participant 16 refuses to teach pure Design Thinking as this would not meet the defined criteria:

“But we want to have our own approach, never fake them. We don't teach standard textbooks that other people have written ... So I probably would never subscribe to delivering just a Design Thinking class” (16)

Similarly, Participant No. 27 described this autonomous approach as “*I draw from different fields and I can see that in Design Thinking has definitely links to some*

of the things that I experiment with but I wouldn't want to be branded as a person who applies Design Thinking in Entrepreneurship Education" (27).

Thus, participants expressed their wish for autonomy and claimed their own demand on being a unique creator of their own content and structure of Entrepreneurship Education. On the contrary, other participants were expressing their need for structure and methods, a need which has been fulfilled by relying on the framework of Design Thinking (see previous Section 7.4.5). Both sides expressed their general wish for more freedom regarding their overall design of the Entrepreneurship Course, which often affected also the integration of Design Thinking. Thus, the following section provides further insights into the institutional barriers mentioned by the educators.

7.4.8 Barriers to integrate Design Thinking in Entrepreneurship Education

Another theme that came up from the interviews has been the institutional barriers on integrating Design Thinking within the Entrepreneurship Curricula. Several Entrepreneurship Educators mentioned the difficulties on an institutional level to change and adapt the education they deliver. Thus, there seems to be an institutional barrier on integrating Design Thinking in Entrepreneurship Education curricula. From the interviews it became clear that there exists a field of tension for the educators in creating the education they would like to deliver and following the rules and academic standards of the university. The following exemplary quotes from the interviews illustrate this theme in further detail:

Theme	Quote No.	Exemplary Quote	Participant No.
Institutional Barriers to apply Design Thinking within EE	1	<i>"How I design programs... if I am allowed to design"</i>	20
	2	<i>"You probably, you cannot use those (DT) principles in all the ways you want to, because you are restricted by the institutional settings"</i>	18
	3	<i>„I think I have some limitations in terms of materials and in terms of space, like I only have traditional teaching rules. So we, for instance, we can't leave</i>	7

		<i>what we have produced hanging on the walls. And so we have to, you know, take it down, bring it with us home. And that's really a huge barrier to this kind of teaching.</i>	
	4	<i>"... and ... I'm also bound to being steered by the ones that are program responsible, and course responsible. So that could also be one of the arguments that why we haven't had it in that way."</i>	5
	5	<i>"So you have to have the learnings goals ... You are less flexible"</i>	18
	6	<i>"From top-down policies. And then you have different sort of authorities that we are dependent upon. So. So of course we have a degree of freedom. And of course you can also be creative in handling that. But I'd like it to be even more free in order to make people understand that they actually are responsible for their own learning"</i>	2
	7	<i>„But there's a large difference, I think, between what the politicians would like to have, what university managements say, yes, we will deliver that. And then what actually what I'm doing with a number of other colleagues ..."</i>	10
	8	<i>„...and you have rules and you study books and you do assignments based assignment and whatever happens, you have to submit the curriculum. But now I think this is bullshit"</i>	14
	9	<i>"You probably, you cannot use those principles in all the ways you want to, because you're restricted by the (institutional) setting."</i>	18
	10	<i>„I'd love to be in more in that situation, but then we also are in Sweden that there's been an authority. So we have to comply to the laws that guides us so we can actually do whatever we'd like, even if I can do this as a professor to some extent. But people can always tell me that I'm doing things wrong because I don't follow the laws."</i>	2
	11	<i>„The only thing that maybe we don't do a lot of at the moment is the interdisciplinary cross disciplinary perspectives. That is, I think, more of a structural issue within universities" ... So cross disciplinary perspectives. I think those are very important, but something that is quite difficult to do sometimes in universities just because of the way they're structured.</i>	24

Table 28: Barriers for Design Thinking integration

The participants mention – explicitly and implicitly – that they felt restricted in application of Design Thinking principles within their education. Thus, the interview participants emphasize their dependency from other colleagues, structures or authorities as well as the conflict to align and fulfill different interests regarding the course design (see e.g., exemplary Quotes in Table 28). Within this context, the interviewees mentioned also the use of different strategies on how to create more freedom and flexibility for themselves by e.g., simply ignoring restrictive rules and showing a certain grade of “creativity” in overcoming barriers (e.g., Quote No. 6 & 7). On a more explicit level, the participants mentioned the access to suitable spaces and material in order to deliver adequate Design Thinking Training as a hindering barrier (see Quote No. 3). Furthermore, the participating educators named institutional restrictions as the reason that prevented them of integrating more interdisciplinary and cross-faculty courses (e.g., Participant 24). Thus, traditional teaching rules and settings were perceived as huge barriers for the implementation of the so-called “studio-based learning concepts” or other settings that support the learning in innovative and creative environments. The following graph illustrates the different levels of barriers, which educators face to integrate Design Thinking principles into their Entrepreneurship Education:

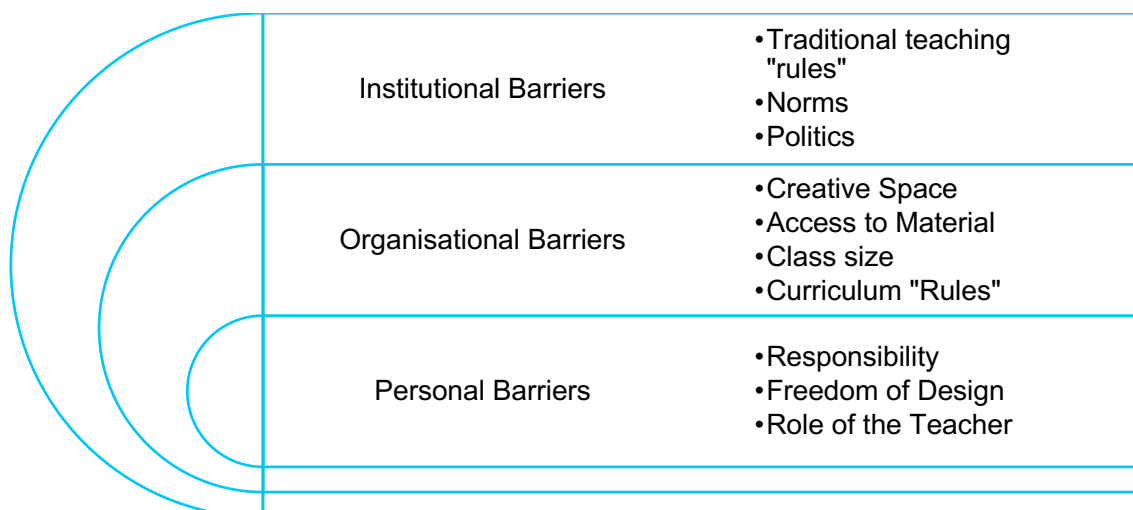


Figure 38: Categories for barriers towards DT integration in EE

Overall, the mentioned barriers center upon restrictive settings on the course level, e.g., by pre-set learning goals, curriculum design or large class-sizes as well as restrictive settings on a wider, organizational level e.g., including the general dependency of authorities as well as different interests and approaches with the university management as well as political stakeholders. Another aspect occurred within this context. It appeared that “Design Thinking” was also mentioned as a way to overcome institutional barriers, as illustrated in the forthcoming quote:

„We're trying to develop what we call an open lab together with the municipalities and regions ... You have all these ideas, but if you can help people to have this safe environment where you, for instance, Design Thinking and all the methodologies that people have agreed upon ... Then you have the mandate of actually being free of this and you have to test until you're ready and it can take maybe one or two years. So we're moving in that direction. It's not easy because the culture around here is not really favoring that.” (2)

Within this interview, the participant emphasized the role of Design Thinking as a concept that is known, heard and understood by others, so they can refer back to Design Thinking in order to create a “mandate” to deliver a more innovative education (within this context explicitly the participant is talking about the opening of a so-called “open lab” on the campus). This aspect of the Value of Design Thinking for Communication with other stakeholders and to overcome institutional barriers to drive innovation within Higher Education is further illustrated in the forthcoming sections (see Section 7.5 on Value of Design Thinking for Entrepreneurship Education).

7.5 Value of Design Thinking Principles in Entrepreneurship Education

Besides the explicit integration of Design Thinking within Entrepreneurship Education Curricula, it became apparent through the interviews that many educators apply certain design principles within their Entrepreneurship Education which shape the nexus of both. Within the following section those themes describing

the value of Design Thinking from the Entrepreneurship Educator's Perspective is discussed in further detail.

7.5.1 Value of facilitating Problem Understanding

As one of the reoccurring themes, the interviewees emphasized the strength of Design Thinking, especially in the phase of "Problem Understanding". This emphasis on the phase of problem understanding has been well evaluated and described within the literature (Christensen, 2009; Dorst, 2011) and has further been identified as one of the core themes of Design Thinking (see Section 3.3.1 on Wicked Problems and Problem Solving). Within the interviews, the participants explicitly discussed the value of Design Thinking in putting a special focus on understanding the problem before focusing on the process of finding a solution. The following quotations illustrate this perspective of the educator in further detail:

"I think a lot of the time as educators, we spend our time trying to help our students come up with the answers. We don't necessarily spend a lot of time getting them to discover the problems and spend time on the problems. We're kind of solution focussed and that is something that I would definitely like to do more of a maybe Design Thinking is the way to help me with that." (24)

Within this quote, the participant criticised the "solution focus" of their work as an entrepreneurship educator. Thus, this quote describes this as a general phenomenon in education as well as a specific step within the Entrepreneurship Education (e.g., in classes when students have to come up with own ideas in order to learn through the experience of entrepreneurial action). The participants describe the value of Design Thinking as a tool for (1) Problem Finding and (2) Problem Understanding.

"So I think I'm, I mean, it's a good approach to really understand the problem that is behind, or that you really want to solve, and that is worth solving because that's the thing. ... therefore, I think I mean, Design Thinking is just the best approach I have seen so far, to really

understand the problem. So that's why I think use design thinking.”
(15)

“People have to understand or have to find ways to recognize opportunities and Design Thinking can help through, to learn need finding, and to see problems and needs as opportunities.” (20)

“(Design Thinking is about.) Finding problems. That do matter.” (2)

“I think one thing that definitely pops up top of mind is sort of the focus on wicked problems. A sort of a process for addressing those problems and recognizing that it's ... You're not ever solving those problems, you're just helping to, you're trying to find ways of addressing those problems ... And then that there's different methodologies that are utilized to help take through how to think about those problems. And that's includes contextualization includes, of course, an ideation aspect includes an analysis and organizing aspect as well.” (4)

Within this context, it is worth to mention that this theme is connected to different perspectives – the educator’s perspective as well as the student perspective. While some make use of this as a tool to use within the “Ideation Phase” other educators reflected on their general role they play in the classroom with their focus on the “output”. (See graphic below).

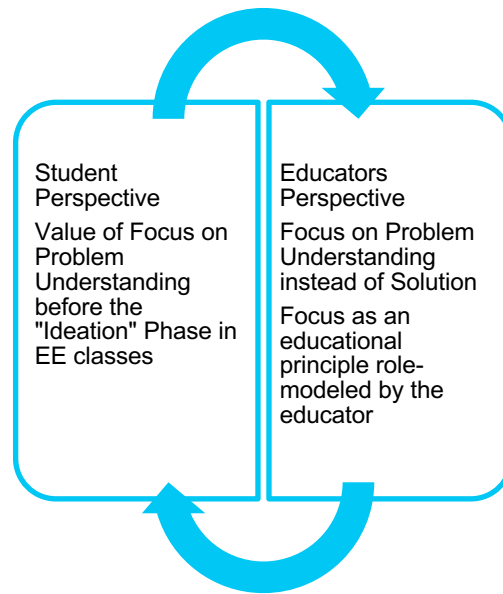


Figure 39: Problem understanding from student’s tool to educational principle

Thus, regarding this theme the perception of the entrepreneurship educators is in alignment with the literature on this focus of problem understanding within Design Thinking. Participants value and apply Design Thinking in order to introduce the students to ill-defined entrepreneurial problems within their Entrepreneurship Education Classes. Furthermore, this aspect is also connected to the process idea of the double diamond and the emphasis on divergent thinking mode (see Section 3.3.1). Further, many educators emphasized the value of Prototyping Principles which they derived from Design Thinking for their Entrepreneurship Education. Thus, this reoccurring theme is introduced below in section 6.5.2.

7.5.2 Value of Prototyping Principles from DT within Entrepreneurship Education

The integration and value of Prototyping has been described repeatedly as one of the important principles from Design Thinking (see Section 3.3.2). Many educators were associating Design Thinking with Prototyping by describing the act of prototyping as an act of creating in a sense to “work with their hands” and “sketching”. Participants even stated that they perceive the Prototyping as the

core of Design Thinking and being so unique about it, that they explicitly mention that they have taken it from Design Thinking:

“Prototypes, is one of the things we’ve definitely taken most directly from Design Thinking and maybe also where we explicitly say to the students that this is something which we take from design thinking.” (10)

“There is also a skill that you can learn through design thinking, and that’s something that in entrepreneurship, education is not dominant at all. also then again relates to this prototype in part where I think that entrepreneurship education has still some steps to take to work steps and how to do that properly. ... Start building. Start working with the material. Something that we need to relearn them because they’ve lost it. And that’s something I think that’s much more at the core of design thinking.” (13)

“I would like to be better with making quick prototypes and test them. And that’s one of my weak points, I think. But it’s definitely a principle of Design Thinking that I would like it more” (7)

While the participants reported a strong connection between their understanding of Design Thinking and the Prototyping as a Principle, the scope of integrating it in their own classroom practice has covered a wide range from integrating “small exercises in class” towards permanent access to maker spaces at their university.

Example for integration of the Prototyping Principle as a short exercise:

“Yeah, I mean, you have newspaper sheets and tape and assessors and then they should make a prototype on. So that is this is something that they can use it as a as an exercise for bringing out ideas. ... And it’s it’s so nice to see how much creativity, how much you can accomplish in just a very short time in in 40 minutes or something like that.” (8)

Example for integration of the Prototyping Principle in form of a Maker Space

“we had like the prototype room, and there was definitely, you know, it was exactly that it was this creative space. It was open, you go in there you have, you know, all these different materials. It's there to help you formulate and start to, you know, formulate concepts into prototypes, into concrete, physical objects that you can then use to understand how is the user going to interact with that one ...”

The majority of educators expressed their interest and perceived value of “Prototyping as a principle” while describing the wish to include more Prototyping within their classes. However, participants explicitly mentioned in this context their dependability from resources at the university, saying they might would include more prototyping but don't have access to it:

“Prototyping, again, really important, but very much based on how much resource your university has. So if you work in for a very, you know, wealthy university, then you can have, you know, ideas labs. You can have resources where students can you know, you can fund them to come up with ideas and then they can use money to test the idea. You know, we don't come from a rich university. We're very limited resource.” (24)

Furthermore, some of the educators were explicitly reflecting about the integration of prototyping as an educational principle that could be applied actively within their own role of educators. The following quotes show examples of educators applying prototyping from an educator's perspective:

	Quote
Prototyping as an Educational Principle applied by the Educator	<i>"I mean, every lecture is a prototype. ... a lecture prototype can only be tested with students. So therefore, every year ... the seminars or the workshops, or the lectures have changed. So every time I go through it and say, like, okay, is it still like the best way to do it? Can I improve it? I mean, it's iteration and, of course, you can also call it prototyping." (15)</i>
	<i>"So I'm almost kind of prototyping in my programmes. If you see why I need to see what works and what doesn't work." (24)</i>
	<i>"You can go into a class with a prototype. ... Out of the discussion, we on the fly in the class redefine the slides and turn it into something that's our shared understanding ... And for me, that's living that prototyping principle: To bring something unfinished, but collaboratively we can turn it into something more." (18)</i>

Table 29: Prototyping as educational principle - key quotes

By this, the educators show a more advanced understanding of Prototyping and Iteration as a principle, that is connected with their role of the educators as the designer of learning (see Section 7.4.5 on the educator as designer). In summary, prototyping as one principle of Design Thinking can be applied on different levels in Entrepreneurship Education:

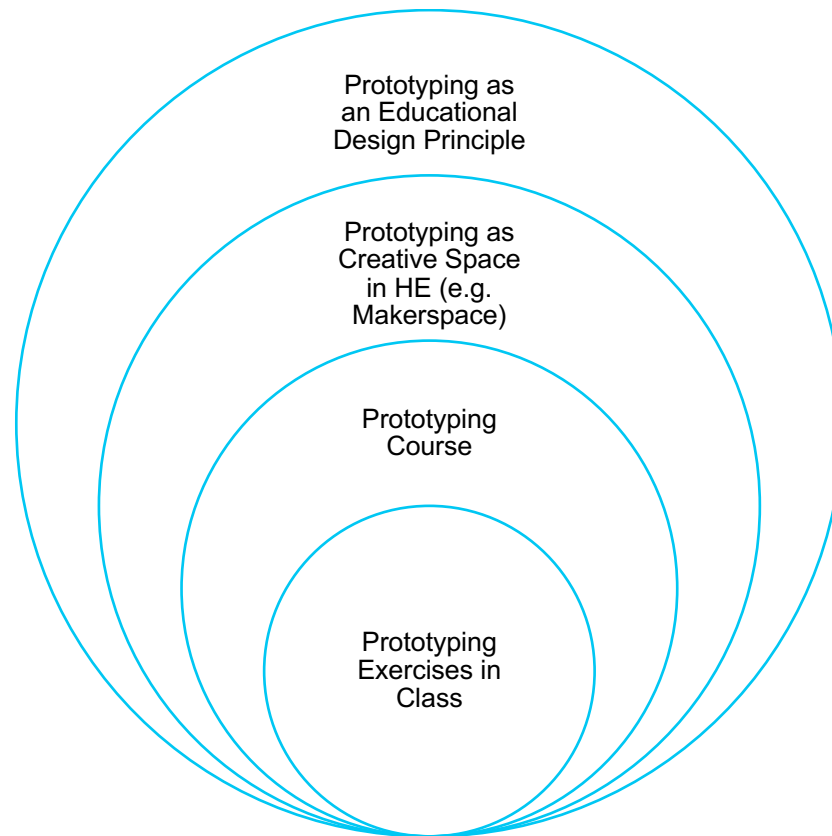


Figure 40: Prototyping application - from exercises to educational principles

The above figure illustrates the application of prototyping as a principle on different levels. On the lowest level, Prototyping can be integrated as small exercises in the classroom, which refers to the Tool Perspective of Design Thinking. On a rather overarching perspective, the prototyping principle can be integrated in the teaching philosophy of Entrepreneurship Education. Thus, not only from the literature review (see Section 3.3.2), but also from the interviews it became apparent that the value of Design Thinking lies in the ability of turning an idea into something real. In order to do so, the integration of multiple perspectives and the value of interdisciplinary are important, and are described in more detail in the forthcoming section.

7.5.3 Value of Interdisciplinary: Integration of Multiple Perspectives

The value of interdisciplinary and multiple perspectives in a team has been an important theme within the design literature (Dunne& Martin, 2006; Johansson-Sköldberg et al., 2013). In line with the literature, the entrepreneurship educators also reflected upon this design principle and its value for their entrepreneurship teaching. It was found that the integration of multiple and interdisciplinary perspectives in delivering the teaching has been an important design principle for some of the participating educators. The educators particularly valued the integration of multiple perspectives into their own teaching by e.g., inviting guest speakers into the classroom – or even working in new teaching structures e.g., by applying concepts like co-teaching. Overall, they valued this approach with or without referring back explicitly on Design Thinking.

Some of the tags that have been integrated within this theme have been e.g., *interdisciplinary teams, multiple perspectives, co-teaching, guest lecturers, diversity, collaborative teaching, collaboration.*

Theme	Quote No.	Exemplary Quote	Source
Integration of multiple perspectives into the teaching	1	<i>“There is always an inspiration or exploration element, so I am inviting a lot of speakers, OK? And the introduction courses, I always try to create a variety of speakers from different industries, from different ages, from different statuses show, but also commercial entrepreneurs to will be older people, all the planners, if you want to kind of always create in the mix so that the students could relate to themselves And possibly connect them to the environment in local ecosystems. This engagement given them, let's say, anchors as well.”</i>	<i>Participant No. 11</i>
	2	<i>“I like to get them, you know, talking to people. So go to networking events. Bring guest lecturers in or take them to go see guest lecturer“</i>	Participant No. 24
	3	<i>“And this workshop, we've invited external stakeholders and depending on the topic, companies, people from the industry into</i>	<i>Participant No 7</i>

		<i>these workshops and they got this concrete experience. And so that would be the creation. And then, of course, there's also cooperation between first semester students and master's and visitors alike, inviting visitors to the class. Not that cooperative, but it's more like the diversity aspect to discuss something“</i>	
	4	<i>„We're very kind of multidisciplinary and I think that is enterprise education“</i>	<i>Participant No 23</i>
	5	<i>„And what I really like is co-teaching that I have another person. And that the other person is different than me, that they understand that we are working as a tandem and expanding the scope. Meaning that we are not speaking in one voice that we...just because we are different personality and different comments in a different direction, we get first a more holistic picture of what important elements are“</i>	<i>Participant No. 20</i>
	6	<i>“when I do teaching, I always get on peoples nerves to tell them well, I have I'm doing this, do it now in this way, or we're doing this and this and that's my idea. And what do you think about it and, and try to, to really get, like the feedback of others, to improve then my own teaching by, by learning on how they would do it, and so on an so on. (..)“</i>	<i>Participant No 15</i>

Table 30: Integration of multiple perspectives - exemplary quotes

From the participants view, the integration of multiple perspectives served different purposes – fulfilling the needs of students as well as educators. For example, the participants reported to a variety of speakers have been invited to the classroom in order to present a variety of relatable role-models for the students (e.g., Quote No.1). Besides, the inclusion of cooperation and multiple perspectives served the purpose to integrate diversity as a design principle within the classroom. Also, the inclusion of multiple perspective served the purpose to deliver a more practical-based education and including the perspective from lecturer “from practice” with a more “relevant experience”. Further, the theme of cooperation and multiple perspectives and diversity has been picked up as being important not only between the lecturer and the students but also between the students –

e.g., between first semesters and masters (see exemplary Quote No. 3). This theme is strongly connected with the aspect of group work and interdisciplinarity and its value for the students, which has been identified as theme on its own and is discussed in section 7.5.3.

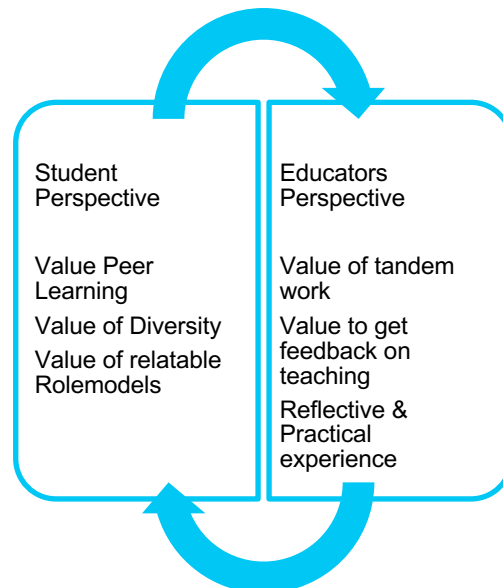


Figure 41: Value of interdisciplinarity from two perspectives

Above those, multiple perspectives have been perceived also – or especially – as useful when being applied within the teaching team (a concept introduced as Co-Teaching). The participants particularly valued the different perspectives in order to approach teaching in a more holistic way, as well as to get feedback on their own teaching (e.g., Participant No. 15 & 20). The Figure 41 illustrates the two perspectives in within interdisciplinarity as a principle have been described as valuable. Thus, from a student perspective, the student experience Peer Learning and Diversity (of perspective) through the use of multiple perspectives. Further, multiple perspectives fostered the value of relatable role models and practical experience. Regarding the teacher perspective, the interdisciplinary working principle has been described as being valuable for feedback and tandem work. Moreover, participants translated the principle of Human-centredness of

Design Thinking into the value of Student-centredness, as explored in the forthcoming section.

7.5.4 Value of Student-Centredness

Within the context of reflecting about the value of Design Thinking from an educator’s perspective, participants mentioned to translate the design principle of a “human-centredness” towards their context of teaching by applying a “student-centredness”. This student-centredness has been put into practice by adapting the course structure on the student’s needs, the application of “student personas” in the course design as well as through the practice of self-directed learning and a servant role of the teacher.

Value	Themes/Keywords	Example Quotes
Value of Student Centeredness/ Structure	Personalized Learning / Focus on the individual	<p><i>“it’s all about personalised learning. It’s all about seeing the individual” (1)</i></p> <p><i>“it is about me trying to help the students develop themselves”</i></p> <p><i>“it’s really more about the development of the person ... it is about the individual” (24)</i></p> <p><i>I’ve got a focus on the individual (27)</i></p>
	Student-Orienta- tion Flexible Course structured on stu- dents’ needs Student-cen- teredness Adaptive Course Design	<p><i>“As I said, people have to be at the centre of what- ever I do. So when it comes to Design Thinking, you’ve got to design your teaching and your assess- ments around people” (26)</i></p> <p><i>“I stay flexible and student-oriented. If it is possible to adapt the structure, I go with them. And this I a design principle, I apply. I have to be always cus- tomer-oriented” (14)</i></p> <p><i>“My teaching does sometimes go off track because ... I’m responsive to what’s in the room ... so it’s op- posed to that kind of very structures teaching pro- cess” (23)</i></p>
	Servant Role of the Teacher Student-Centred- ness in the sense of being responsi- ble Self-Directed Learning	<p><i>“I am not standing in front of them and say what they have to do. No, find your own way. Find your logic” (17)</i></p> <p><i>“I’m not the typical professor staying in front of the class and tell them how the world is circling ... they are in charge and they have to feel responsible. It’s not me who knows all the answers, they have to figure out how they might do it” (20)</i></p>

Table 31: Value of student-centredness – keywords and codes

First of all, one of the reoccurring themes in the interviews has been the focus on the individual and the importance of personalized learning in Entrepreneurship Education. A summary of representative quotes which reflected this perspective can be found in the first column of the Table 31). Moreover, the educators emphasized the central role of the student, and even more compared their student-centeredness' towards being "customer-oriented" – a wording which has been rather retrieved from the Design Thinking Vocabulary. Within the second column of the table, examples are shown of educators who emphasized the central role the students play in their Entrepreneurship Education. They reported to adapt the course structure and content in a very conscious way in order to be responsible to the "people", which are in this case the students in the classroom. By this, the participants reported the explicit value of Principles they retrieved from Design Thinking in order to design their Entrepreneurship Education in a student-centered way. Another very explicit use of a Design Thinking Tools for the educational use has been that e.g., Participant 17 reported to work with "student personas" which have been created based on interviews with students and former students (17). However, the inclusion of student perspectives has also been applied by Participant 6, who stated to not use any Design Thinking in the teaching explicitly: "My Perspective ... it came from our students, because I spent a lot of time doing interviews with my students" (6).

Furthermore, the Participants connected the student-centeredness of their entrepreneurship course with their own role of the teacher and the practice of fostering self-directed learning among the students- as shown in the last column of the table above. Thus, the educators expressed their application of the student-centeredness by fostering an active and responsible role of the students and a servant role of the educator in the classroom in order to foster a self-directed learning. Within the following section, a closer analysis is provided on the emergent theme of the Value of Design Thinking to foster creativity and ideation by putting emphasis on the divergent thinking.

7.5.5 Value of Creativity and Ideation through divergent Thinking

Even though the popular Design Thinking Model of the Double Diamond (see Section 3.3 on Design Thinking Models) includes divergent and convergent thinking modes in an equal manner, many participants expressed their perceived value of Design Thinking for fostering Creativity and Ideation through divergent thinking. As many participants associated Design Thinking with a unique strength in divergent thinking (see section 7.3.1 on Associations on Design Thinking), it has been not surprising that the value of Creativity and Ideation has been a re-occurring theme within the interviews. However, it became apparent from the interviews that some educators remained unclear on the conceptual difference between Design Thinking and creativity (“So, it is more related to creativity for me” 13). However, many educators explicitly expressed the value of Design Thinking Methods for Creativity and Ideation in their Entrepreneurship Classroom. This also relates to the Value of Design Thinking for the Phase of Problem Understanding (see Section 7.5.1) even though it takes a little different focus in a way that is fostering Creative Confidence in general among students as well as educators (“I was able to think more creatively” 26) and not only at a certain (entrepreneurial) process step. Very explicitly, some of the educators reported the value it had for themselves as e.g., Participant 8 who stated:

“But the divergent part, it’s about being opening up and that for me, as an engineer, trained to think critically and to do so ... It was really opening up my mind. And it has been really very valuable for me”
(8)

This quote remarks a notable finding in the context of the various backgrounds and disciplines the entrepreneurship educators come from (as also discussed in the Literature Review on the role of the Entrepreneurship Educators in Section 2.4). As shown, the participant especially emphasized the value of Design Thinking in the context to its contrary background from engineering – and thus, reflects back to the duality between a design and decision attitude, as previously

discussed in the literature (Owen, 2006; Boland & Collopy, 2004). Besides the role of Design Thinking for its own approach towards creativity and ideation as an educator, other participants discussed the role it can play for the students. Hence, educators valued Design Thinking as an approach students can use to creatively “explore, test and refine” ideas in a sense of providing “creativity tools” (Participant 23).

*“It about the creativity to think broadly, but also the visualization part
(.) this is a skill that you can learn through Design Thinking and that
is something that is in entrepreneurship education not dominant”
(13)*

This focus has been echoed by other participants who underlined that Design Thinking has “a lot to offer to entrepreneurial types of education when it comes to ... creativity” (29). Furthermore, from the interviews it became apparent that Design Thinking is used to create a “safe space” in which it is “ok” and acceptable to teach different and overcome structural barriers. Thus, the value of creativity was also connected to the value of interactivity and activity in general, as explored in the following section.

7.5.6 Value of Interactive Workshop Methods and Fun

One of the new themes that emerged from the interviews with the goal to develop further understanding of the purpose and value Design Thinking fulfills for the educators has been the educator’s need for interactivity and “fun” with their students. Thus, within the context of Design Thinking some educators reported that Design Thinking fulfills their own need for entertainment as well as the student’s need. Thus, the role of “fun” elements is considered from both perspectives. For example, participant 17 reported the importance of fun in its own lectures when Design Thinking is applied: “and to have fun in the lecture ... and I have a lot of fun”. Thus, it became apparent that some entrepreneurship educators reported

the value of fun and interactive workshop tools by Design Thinking. This theme has also been picked up by Participant 20, who described their own role in the classroom as “for me the role is really like a coach in a way to motivate, to spark, to bring fun in” and even more to care about the “emotional state of the people”. By referring to the design of the “emotional state of the people” this participant reflected upon a possible educational purpose that the presence of “fun” might take, e.g., in order to create a certain openness for ideation sessions. The need for entertainment was also echoed by e.g., Participant 9 who shared the wish to be perceived as a teacher who is not boring: “There are teachers where you get so bored that you could hardly keep your eyes open. And I didn’t want to be like that. I wanted to make education exciting and experimental” (9). Thus, Participant 9 elaborated on the interactive design of the course as “it is too boring for everybody, myself included just be sitting and listening to lectures” (9). Overall, the need for interactivity has been put into the context of experiential learning in general, a perspective which has been expressed by most of the educators who confirmed the practice of project-based learning within their Entrepreneurship Education. This approach was e.g., exemplary stated by participant 23: “they’ve got their own projects and they go out and do stuff – its outside of the classroom” (23).

Furthermore, this perspective to integrate Design Thinking methods in order to fulfill the educator’s desire to be entertained has been actively criticized by e.g., Participant No. 6 who stated: *“Is that maybe why teachers love this method so much because it kind of emulates their own desire?”* (6). Moreover, this participant raised the question whether educators who use Design Thinking Workshops in their teaching because “they just want something meaningful to do with their students” as “you know, it can make for some fun, creative moments for people, but does that throw them into entrepreneurial processes?” Moreover, Participant 6 judged that Design Thinking provides “simple tools” which make “workshops interesting” and which the “students like and makes teachers happy” without delivering relevant knowledge on entrepreneurial processes: “There is a need for simple tools out there and Design Thinking is answering this need” (6). Thus, this perception can also be seen in connection towards the Tool Perspective on

Design Thinking (see Section 7.3.2) as well as the topic of Simplification (see Section 7.3.7). Further, the Value of Design Thinking for Communication in or about Entrepreneurship Education is introduced in the forthcoming section.

7.5.7 Value of Communication

From the interviews a new theme emerged as Participants described Design Thinking as a new “semantic toolbox” for their own understanding of their practice and a vocabulary to communicate what they do in Entrepreneurship Education towards other stakeholders. The following figure (Figure 42) illustrates the first and second level coding of this theme.

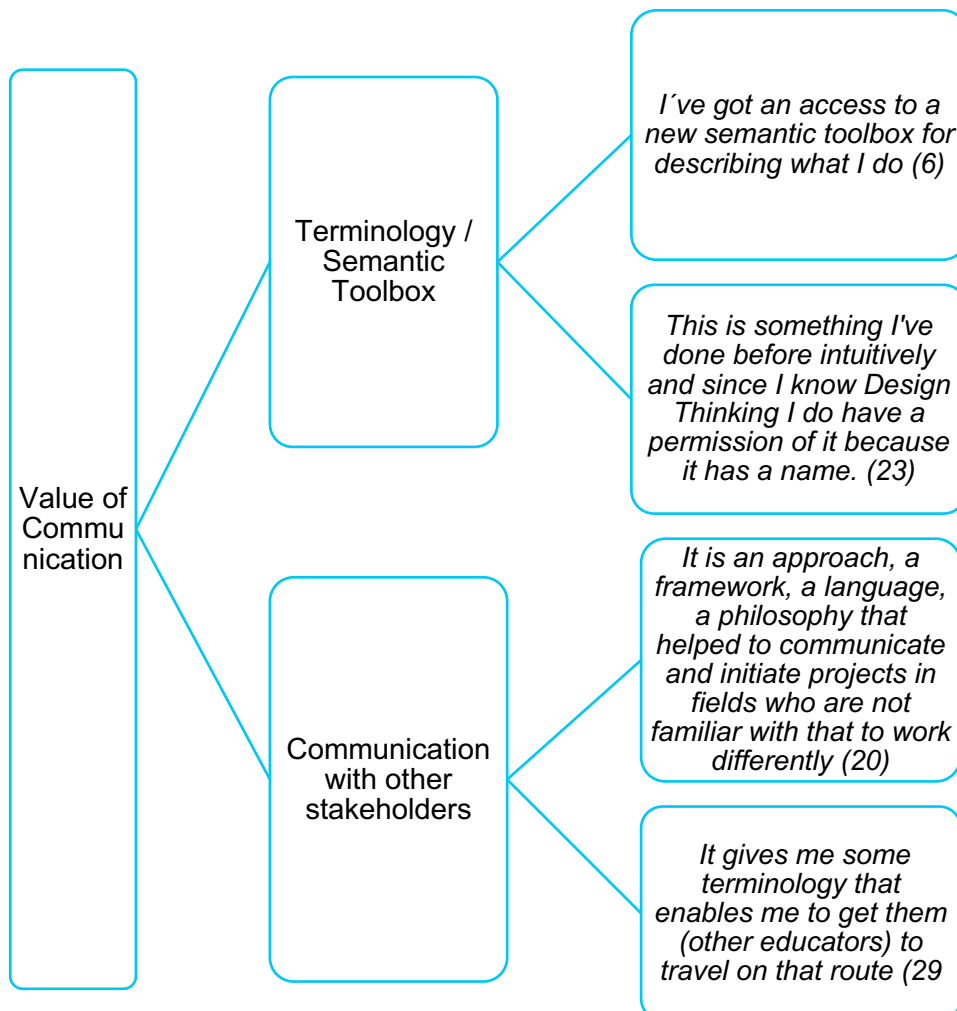


Figure 42: Example for first and second level coding – Value of communication

Participants communicated the perceived value of Design Thinking for communicating their work towards other stakeholders – which can be either students or colleagues as well as e.g., policy makers. The theme of considering Design Thinking as a concept that is providing a new word to existing practice has been further elaborated in previous sections (see Section 7.3.6 on New Words). However, while some educators perceived this as a rather critical conquer, most participants recognized this value of communication.:

Value	Themes / Keywords	Example Quotes
Value of Communication	Terminology Framework Permission Communication Semantic Toolbox Language	<p><i>“It gives me some terminology that enables me to get them (other educators) to travel on that route” (29)</i></p> <p><i>“And suddenly you have a specific literature that frames the whole thing” (7)</i></p> <p><i>“This is something I’ve done before intuitively and since I know Design Thinking I do have a permission of it because it has a name.” (23)</i></p> <p><i>“It’s a new way of thinking, a new set of tools. And it makes sense. It’s really easy to communicate why it makes sense to entrepreneurship and they can see it and they can love it” (7)</i></p> <p><i>“I’ve got an access to a new semantic toolbox for describing what I do” (6)</i></p> <p><i>“It is an approach, a framework, a language, a philosophy that helped to communicate and initiate projects in fields who are not familiar with that to work differently” (20)</i></p>

Table 32: Value of Communication – keywords and quotes

Thus, participants described Design Thinking as providing them a “language” / “terminology” and “semantic toolbox” that is providing a framework and a “permission” to do things and projects in a certain way or to on a certain “route”. While few participants mentioned the value of communication when talking to their students (e.g., Participant 7), most participants emphasized the role Design Thinking could play to external stakeholders. Thus, the value of communication is furthermore connected with the fact that Design Thinking as a concept is well known and familiar as a trend, not only but also in a Non-Business Context. Therefore, participants emphasized the value of communication not in relation to a sort of “internal” communication with other entrepreneurship educators, but in order to communicate the value of Entrepreneurship Education to other fields.

7.5.8 Value of Process and Structure

From the previous sections it became apparent that many entrepreneurship educators not only understand Design Thinking as a process, but they also practice it in their teaching and therefore also value the procedural and structural elements of Design Thinking.

Thus, when being asked about the value of Design Thinking for Entrepreneurship Educations, one of the reoccurring themes has been the value of Design Thinking in providing a Process and a certain structure to different phases of the Entrepreneurship Course. The wide use of Design Thinking Process models has been introduced in the literature chapter (see Section 3.2 on Design Thinking Process Models).

Value	Themes / Keywords	Example Quotes
Value of Process / Structure	Context Structure Contextualizing Knowledge Student Process Structure Phases of Creativity and Ideation Shaping Ideas Steps for Organising Education	<p><i>But of course, it gave me a context, it gave me more materials, more reading, and it contextualised, as I said, my knowledge. To sum up, give me a structure to. (14)</i></p> <p><i>I mean one of the things I do love about is the structure ... Yeah, it just pushes the students through this process rather than just sitting in one space. Because yeah, it's very tempting to just go "I have an idea." And they don't anything else with that. It pushes them through I say, "Well have you done this with it, have you tested it?" ... It gives structure to what is a very messy thing, you know creativity and ideas. It kind of feels so vague. So yeah, ironically, it's the structure that I think is really valuable because it gives shape to those ideas (23)</i></p> <p><i>I have this model, you start with this, etc., and you move with certain steps. And it's a way of organising things. Maybe it works in education because you have to control it within five weeks or something like that for the course. (2)</i></p>

Table 33: Value of Process and Structure - keywords and quotes

As presented in the table above (Table 33) the educators reported on the one hand to value Design Thinking in order to structure “messy things”. When Participant 23 reported the value of the process, the reference on “irony” also reflected the perception of Design Thinking being torn between being truly iterative and non-linear but still following a sequential logic of procedural phases.

The previous sections have displayed the identified areas of value that Entrepreneurship Educators perceived from an integration of Design Thinking within their teaching. In the forthcoming final section, the overall results of this Results and Analysis Chapter are summarized.

7.6 Summary

This chapter has presented the results and insights into the data from 29 qualitative interviews with Entrepreneurship Educators from Higher Education in Northern Europe. First of all, the chapter introduced a holistic perspective on the interviews and gave an overview on the most important subjects and overarching coherence and links between the themes. From this it was found that the central codes centred around the themes of the Design Thinking Definition and specifically lots of data has been generated discussing the role of the teacher in the Entrepreneurship Education Setting. Secondly, this chapter highlighted the results on discussing the role of the entrepreneurship educators in context (Section 7.2 on the Role of the Educator). In line with the interpretive approach of this research, the goal of this section was to dive into the narrative and individual context of the respondents in order to reflect their underlying belief system. This was important to understand in the context of exploring the value Design Thinking has for individual educators. Thus, it was found that the backgrounds and disciplines of the entrepreneurship educators showed a large scale of variety, while the wide majority of the participants expressed their broad perspective on the goal of Entrepreneurship Education.

Furthermore, one of the most predominant themes has been that the participants reflected upon their role as an entrepreneurship educator. Thus, it became apparent that most of the participants shared the self-understanding of a cooperative process facilitator even though few participants mentioned their inner conflict of representing different roles, representing expertise and authority as well as informal trust, inspiration and motivation. It became apparent that some of the educators come from a non-entrepreneurship background academically but rather joined the field from different disciplines, which results in their practice-based view on Entrepreneurship Education.

Next, the data analysis presented the results and insights on how the participants understand Design Thinking and what kind of perspectives they associate with the concept (Section 7.3 on the Perspectives on Design Thinking). The analysis of the definitional attributes showed an educator's understanding which centred

upon the topics of Problem-solving, Innovation and Ideation, Human-Centredness, Hands-on Toolbox and Mindset. Moreover, the participant's knowledge of the term Design Thinking represented the wide application and prevalence of the term while also reflecting the definitional insecurity. Overall, all of the three theoretical perspectives (Process, - Toolset, Mindset) have been represented in the statements of the educators. Most of the educators were attracted towards the process perspective and the data has shown that the toolbox perspective was rather shared by educators with less experience in Design Thinking, while those who strongly integrated Design Thinking in their teaching, mostly shared the perspective of describing it as a mindset. Furthermore, this section explored the critical understanding of the educators, which centred around the perception of Design Thinking as a fad and the lack of theoretical foundation and simplification. Besides, the analysis found that entrepreneurship educators in general mentioned strong overlaps and similarities between Design Thinking and Entrepreneurship Education even though they expressed their view on Design Thinking introducing a new vocabulary for their existing teaching practice.

The Educational Practice of Design Thinking in Entrepreneurship Education was explored in the third Section (see 7.4). Thus, the results provided insights into the actual application of Design Thinking in the Entrepreneurship Educator's classroom. The results indicated the variety of explicit and implicit use of Design Thinking Principles in Entrepreneurship Education. Thus, each participant was unique in his or her educational practice, however, there have been commonalities. The analysis has synthesized different forms of educational practice: First, the integration of Design Thinking at the beginning of the experiential Entrepreneurship Education Course fulfilled the purpose of ideation, problem finding and problem understanding. Others shared their practice to use the structure and process of Design Thinking as the "backbone" of the Entrepreneurship Education Course, while the next use case reported a rather scattered and selective integration of Design Thinking Tools. Moreover, some of the educators communicated the use of Design Thinking principles as overarching educational guidance for their teaching practice. Thus, while some educators reported infusing Design Thinking in almost everything they do as educators, others expressed their doubts on the use

applicability in their context. Thus, it became apparent that the application and practice of Design Thinking in Entrepreneurship Education are dependent on the context and culture of the students, the educators as well as the institutional settings.

Lastly, the section 7.5 discussed the value of Design Thinking expressed by the Entrepreneurship Educators. Overall, it became apparent that there exist two dimensions of value of Design Thinking within Entrepreneurship Education. On the one hand, educators perceived Design Thinking as valuable for their students e.g., to discover problems or learn the importance of prototyping. On the other hand, educators expressed their perceived value Design Thinking has for themselves (e.g., the Value of interactive workshop methods or the Value of Communication). This distinction of the value of Design Thinking for the Entrepreneurship Students as well as for the Entrepreneurship Educators provided new insights and a novel layer for the conceptualisation. The next chapter relates the findings from the analysis to the extant literature along with the research questions. Thus, in the next step the results from the data which have been presented in this chapter are further discussed to synthesize the educational practice with the theoretical foundations.

Chapter 8 Discussion

8.0 Introduction to chapter

This study moves beyond proposing the increased use of Design Thinking in Entrepreneurship Education or assessing its general effectiveness, as other scholars have already addressed these questions (Sarooghi et al., 2019; Glen et al., 2014). This study instead investigates an educator-centred perspective. Thus, the primary aim of this research was to explore the phenomenon of Design Thinking within Entrepreneurship Education within Higher Education in UK & Northern Europe, with a specific focus on the educator’s perspective. The previous chapter analysed the findings of a qualitative interview study with 29 European Entrepreneurship Educators. This analysis provided novel insights into how and why Entrepreneurship Educators are integrating Design Thinking within their entrepreneurship teaching and what motivates or hinders them in doing so. The purpose of this chapter is to relate the findings from the qualitative interviews to the extant literature and the conceptualisation of Design Thinking and Entrepreneurship Education along the defined dimensions. This will be done by answering the research question of this study approached from three different perspectives, as detailed below:

Overarching Research Question	What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?
Conceptual Perspective – Guiding Questions	What is the educators’ working understanding of Design Thinking? What is their understanding of the DT/EE nexus?
Educational Practice: Guiding Questions	How do educators apply Design Thinking in Entrepreneurship Education (as a method, course and/or general pedagogical approach)? How is Design Thinking integrated into Entrepreneurship Education Practice? On what level is Design Thinking integrated into Entrepreneurship Education? Design Thinking as a course

	model or pedagogic approach? Explicit or implicit integration?
Perceived Value: Guiding Questions	What are the educator's pedagogical beliefs about the value of integrating Design Thinking in Entrepreneurship Education? Why do educators apply Design Thinking in Entrepreneurship Education?

Table 34: Overarching Research Questions and guiding questions

This chapter synthesizes and connects the empirical findings of educational practice and the application of Design Thinking by educators with the conceptualization derived from the theoretical foundations of the literature.

8.1 Conceptual Perspectives on Design Thinking by Entrepreneurship Educators

One of the aims of this study was to depict the different conceptual perspectives of Design Thinking from the Entrepreneurship Educator's perspective. First, all of the participating Entrepreneurship Educators had heard the term "Design Thinking" before, which underlines the wide application and prevalence of the term in entrepreneurship pedagogy (Sarooghi et al., 2019). Within this work Design Thinking has been broadly defined along the different dimensions of a toolset, process, and mindset (Brenner et al., 2016). This perspective is aligned with the view that Design Thinking (mindset) is enacted through Design Thinking practices (tools) within a systematic process (process) that fosters innovative problem-solving (Carlgren et al., 2016; Dell`Era et al., 2020; Elsbach & Stigliani, 2018; Micheli et al., 2019; Klenner et al., 2020).

The literature review provided a variety of Design Thinking definitions and discourses both in academic and practitioner-oriented literature (Johansson-Sköldberg et al., 2013; Kimbell, 2011, 2012; Razzouk & Shute, 2012). Early literature referred to the academic construction of the term "Designerly Thinking" as the creation of artefacts (Simon, 1969) as a problem-solving activity (Buchanan,

1992; Rittel & Webber, 1973) or a way of reasoning (Lawson 2006; Cross, 2006). The popularization of the term “Design Thinking” evolved from this, describing the concept as a way of working in innovation (Brown, 2008; Brown, 2009) and centring around the themes of wicked problems (Rittel & Weber, 1973) and problem-solving (Dorst 2011) with a focus on Prototyping and Iteration (Brown, 2008; Kelley, 2005, Christensen, 2009) by embracing an interdisciplinary (Brown, 2009; Dunne & Martin, 2006) and human-centred approach (Kimbell, 2011; Brown, 2009).

From this, Design Thinking was established as an umbrella construct (Dunne & Martin, 2006; Micheli et al., 2019) which unites diverse phenomena and attributes. Most recently, Dell’Era et al. (2021) identified four different interpretations of the paradigm characterized by different practices: creative problem solving, sprint execution, creative confidence, and innovation of meaning. In contemporary conceptualisations, Design Thinking has been constructed as a comprehensive design philosophy grounded in theory and leading to entrepreneurship and innovation (Auerhammer & Roth, 2021).

The full range of the above conceptualisations were reflected in the Entrepreneurship Educators’ responses during the interviews. They associated Design Thinking with the themes of Problem Solving, Innovation, Ideation, Human-Centredness, Toolbox, Mindset, and a Hands-On Approach (see Section 7.3.1 on Definitional Attribute of Design Thinking). The definitional attributes used by the Entrepreneurship Educators thus were congruent with the existing literature which also defined Design Thinking along with the attributes of Problem-Solving (Dorst, 2011), Innovation and Ideation, Human-Centredness (Brown, 2008, Dell’Era, 2018), and Prototyping and Experimentation (Boland & Collopy, 2004; Brown, 2008). As shown, there are obvious conceptual commonalities and common themes between Design Thinking and Entrepreneurship Education present not only within the literature but also in the conceptual understanding of the educators. This congruent perspective from the Entrepreneurship Educators implies a satisfying understanding of the concept, which some of the educators demonstrated. However, as further discussed in the following, most of the Entrepreneurship Educators showed a rather limited view on the Design Thinking construct.

Thus, the Entrepreneurship Educators' understanding of Design Thinking along the defined dimensions will be further discussed in the light of the literature. Prior studies structured the Design Thinking construct along a variety of dimensions (Micheli et al., 2019; Johansson et al., 2013; Brenner et al., 2016), as displayed in Section 3.4. Regarding the Entrepreneurship Education context, Sarooghi et al. (2019) structured Design Thinking into three different categories based on Brenner et al. (2016), namely "Mindset, Process and Tools". This structure has been adapted and further developed within this work (see figure 42 below).

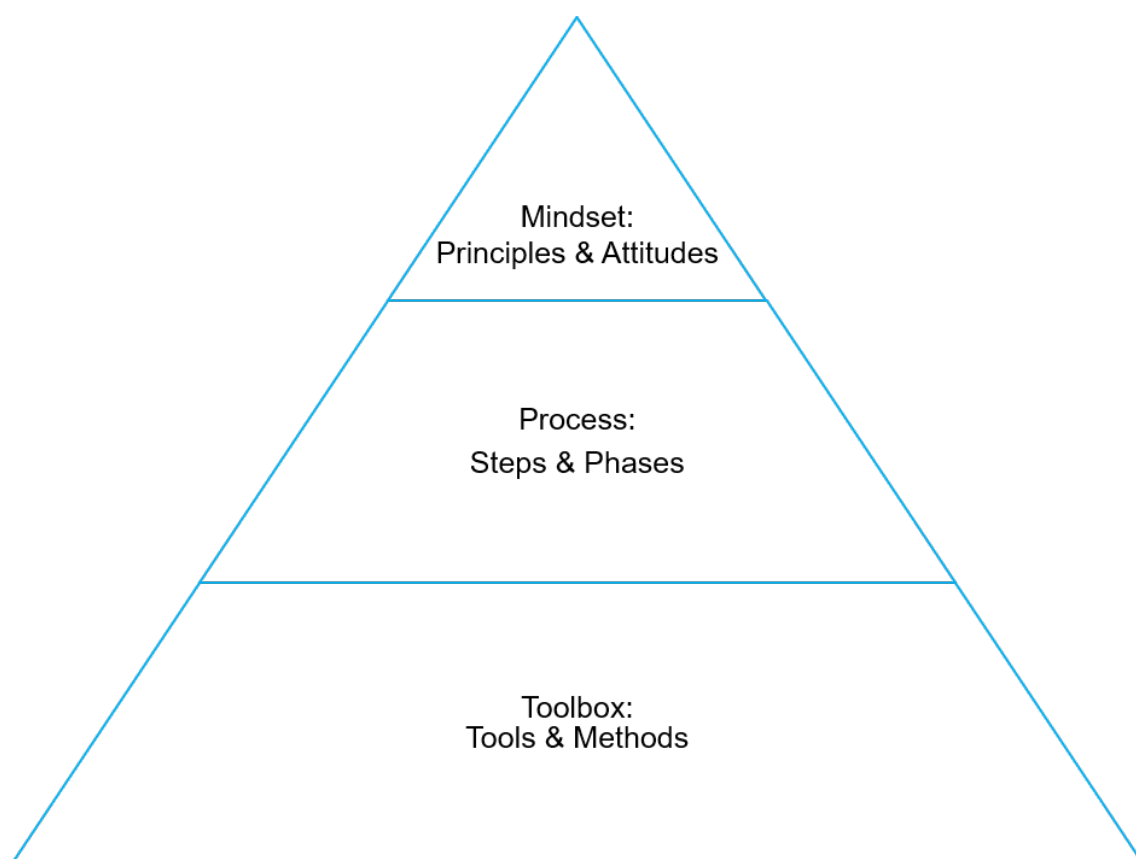


Figure 43: Dimensions of DT (Huber et al., 2016; Sarooghi et al., 2019; Brenner et al., 2016)

All three perspectives were described by the participants, with the majority of the Entrepreneurship Educators sharing an understanding of Design Thinking as a process. During analysis it became apparent that most of the Entrepreneurship Educators shared a limited view on the Design Thinking construct with a strong

emphasis on the Process Perspective. Even though procedural elements are key to the Design Thinking construct and Design Thinking has been previously portrayed as a human-centred problem-solving process (Brown, 2009; Liedtka & Ogilivie, 2011), the reductionist approach of only focussing on the process misses the potential of understanding Design Thinking principles over processes (Auernhammer & Roth, 2021). This predominant understanding of Design Thinking as a process was further reflected in their educational practice, which will be discussed in Section 8.2.

Regarding the understanding of Design Thinking as a Toolbox, only few Entrepreneurship Educators perceived Design Thinking as a Toolbox even though the selective integration of Design Thinking methods was common educational practice (see Sections 7.3.2 and 7.4.4) among the respondents. There seemed to be a mismatch between conceptual understanding and practice in the classroom. In addition, the Entrepreneurship Educators expressed their viewpoint on Design Thinking as being a toolbox both for students (e.g., in order to support self-directed learning activities) as well as a toolbox for educators. The adaptability of Design Thinking Tools into the Entrepreneurship Education Context is a conceptual aspect that has been stretched by both the participants of this study and those in previous studies (Klenner et al., 2021). From the interviews it appeared that quite a few educators shared this perspective that a holistic mindset approach might evolve from the enactment of Design Thinking Tools and Methods. This supports previous studies that noted that facilitating a Design Thinking mindset among students requires practice and repetition (Sarooghi et al., 2019).

Further, it was particularly notable that those Entrepreneurship Educators who claimed to intensively enact Design Thinking within their teaching mostly expressed their understanding of Design Thinking as the construct of a mindset. Those educators also shared the self-conceptualisation of being a “Design Thinker” and reported that the “Design Thinking Mindset” actively shaped their teaching approach towards entrepreneurship. In general, the term mindset describes an established set of attitudes, and therefore the mindset perspective on Design Thinking has been defined by principles that serve as guidance of thought and action (Brenner et al., 2016). The literature has described those principles as

centering around user focus, problem-framing, visualization, experimentation, and diversity (Carlgren et al., 2016) alongside further defined dimensions and themes (Micheli et al., 2019; Dell’Era, 2021). In the educational context Design Thinking can not only describe guiding principles for the students, but also the guiding principles of the teacher as the creator of learning experiences (Welsh & Dehler, 2012). Few participants shared this holistic perspective on Design Thinking as being a construct that can be neither only one for another but being all of the mentioned above– toolset, a process, a set of principles or a mindset. This perspective reflects a more recent description within the literature which illustrates Design Thinking as a “multifaceted set of interrelated thinking modes, attitudes & values, attributes and abilities that can be learned and supported through various activities and practices” (Auerhammer & Roth, 2021 p.638).

On an overall perspective, it can be said that the hierarchical order of the three different Design Thinking Dimensions displayed in the pyramid figure above reflect the experience and adaption of Design Thinking among the Entrepreneurship Educators. The less experience and use, the lower the educators place their Design Thinking understanding on the pyramid, while the more they assign towards Design Thinking the broader – or higher – their understanding is.

Overall, this study suggests that Design Thinking is well understood among some of the Entrepreneurship Educators, but there is still ambiguity in the definition of the concept. This definitional insecurity prevents progress in understanding the phenomena of Design Thinking in Entrepreneurship Education. While some of the educators were familiar with defining Design Thinking and exhibited an advanced understanding of the concept (“*it’s a philosophy human-centered approach for problem solving. It’s a process with two stages, the problem and solution phase, its tool set and it’s a craft.*” (20)) others expressed their lack of knowledge on what Design Thinking de facto is (“*I have to admit (...) the whole idea is for me rather abstract*” (16)). The Entrepreneurship Educator’s understanding therefore reflects the lack of a general accepted definition, as the term is a subject of controversy (Liedtka, 2015). This finding supports prior literature where scholars reported Design Thinking’s urgent need for validity and clarity in order to avoid a “construct collapse” due to polysemy (Micheli et al., 2018). Even

though conflicting views of concepts are common, the divergent definitions of Design Thinking also hinder not only the comparability of research but “inhibit progress in the understanding of phenomena” (Micheli et al., 2018, p.125). Only recently have scholars tried to elucidate on the theoretical development and definitional understanding of the Design Thinking construct (Auerhammer & Roth, 2021; Micheli et al., 2018).

The participating Entrepreneurship Educators’ most critical views on Design Thinking shared their perspective on Design Thinking as lacking theoretical foundation, embracing simplification, and in general being a popularized buzzword with a focus on being too practitioner-oriented. Several participants expressed their understanding of Design Thinking being a fad, which represents the notion of Design Thinking as being fuzzy and undertheorized (Abrahamson, 1996). This perspective on Design Thinking shows negative associations with the omnipresence of the construct, an aspect that has been previously mentioned as a ‘crisis point’ (Dorst, 2011, p.531). It was found that the perception of Design Thinking being used as a “buzzword” is widely spread not only among Design Thinking critics but also among Design Thinking advocates. This perception of Design Thinking as a “fad” appears to be connected to Design Thinking being rather popular for a short period of time and related to the understanding of the concept as lacking profound theoretical foundation. The lack of theoretical grounding and construct clarity has been identified as the most significant criticism of Design Thinking (Auerhammer & Roth, 2021), an idea which was reinforced by the Entrepreneurship Educators who participated in this study. Further, Design Thinking has been criticized for “overselling the methods” (Seidel & Fixon, 2013, p.31) and has been questioned upon the evidence over its effects (Micheli et al, 2019). This lack of theory has been described as a problematic result (Auerhammer & Roth, 2021) of the popular Design Thinking agency (IDEO) having such an influential practitioners’ orientation (Brown, 2009). The findings from the educators’ interviews further reinforce the importance of illustrating and communicating the theoretical foundations and construct clarity (Auerhammer & Roth, 2021).

Further conceptual critique was reported in relation to the definition of Design Thinking being a mindset. Some educators reported observing colleagues

adopting Design Thinking as their “religion”, which referred to the notion to choose Design Thinking as the only answer to any question. There also seemed to be a “clash of culture” expressed by the participants by referring back to a “fight between the churches”. While some Entrepreneurship Educators perceived strong synergies, others tried to draw strict lines. Participants justified their avoidance of Design Thinking with the fear that Entrepreneurship Education would become a fad if it was too closely connected with the concept of Design Thinking. These doubts are not totally unfounded, as Design Thinking has been declared as being in danger of the fate of other management concepts (Micheli et al., 2019).

In summary, this work has shown that Entrepreneurship Educators show a profound understanding of the Design Thinking concept, as their associations with the term are mostly congruent with the core themes from the literature. However, this research has also shown the fundamental insecurities regarding the theoretical grounding of the construct. Overall, this study supports the practical relevance of Design Thinking (Micheli et al., 2019). Thus, the next section will elaborate on the educational practice of Design Thinking in Entrepreneurship Education and discuss the different forms and practices of Design Thinking Integration in the Entrepreneurship Classroom.

8.2 Educational Practice of Design Thinking in Entrepreneurship Education

The forthcoming section will discuss the findings from the qualitative interview study on the educational practice of Design Thinking integration within Entrepreneurship Education and relate it to the literature. The interviews revealed how the Entrepreneurship Educators apply and integrate Design Thinking in their own teaching. Scholars have labelled Design Thinking the “reverse problem” of most other academic concepts, as Design Thinking lacks conceptual clarity and theoretical rigor even though it has practical relevance and interest (Micheli et al.,

2019, p.143). Previous scholars and practitioners have highlighted the need for more Design Thinking within Business Schools in general (Glen, 2014; Dunne & Martin, 2006; Welsh & Dehler, 2013) and Entrepreneurship Education specifically (Nielsen & Stovang, 2015; Sarooghi et al., 2019; McLuskie et al., 2019; Linton & Klinton, 2019).

This research reveals insights into some of the assumptions taken for granted (Campbell, 2020) by some scholars on how Design Thinking is taught by Entrepreneurship Educators. There exists a difference between the scholarly proposed integration of Design Thinking and the behavioural practice within the classroom. Further, the educator's understanding of the concept and their educational practice differ. Regarding Design Thinking integration within Entrepreneurship Education, many educators preferred to discuss when and how they would integrate Design Thinking within their courses. This appeared to provide insights into the actual Design Thinking Practice within Entrepreneurship Education. From the interviews with 29 Entrepreneurship Educators, it became apparent that there are four different forms of a Design Thinking integration predominant in Entrepreneurship Education (Table 35). In the graph below, Design Thinking is displayed as the blue element and their level of integration within the Entrepreneurship Course is displayed in grey.


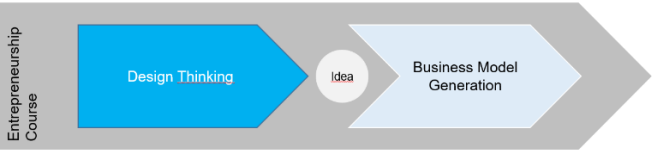
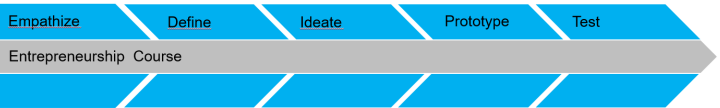
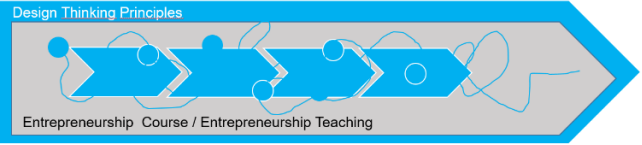
Form of DT integration	Description	Visualization* (see also Appendix)
Selective	Design Thinking is integrated in a selective and opportunistic way, often through use of single Tools/ Methods	
Idea-Centric	Design Thinking is integrated in the (often project-based) Entrepreneurship Course to guide the process of idea generation in the beginning	
Procedural	Design Thinking Process is used to structure the Entrepreneurship Course based on the DT process	
Holistic	Design Thinking is used as overarching guiding principles for the teaching approach and intuitive use of tools or process elements on a principal basis	

Table 35: Four forms of Design Thinking integration in Entrepreneurship Education

The four different forms will be further illustrated in the following;

Selective: Within the first scenario, Entrepreneurship Educators reported making use of Design Thinking Tools and Practices in a scattered and selective way. They reported having adapted the tools to fit their own purposes and integrated them in an occasional and opportunistic way into their Entrepreneurship Teaching. This educational practice mostly occurred in the context of a “Tool Perspective” on Design Thinking. This underlines the fact that Design Thinking has manifested in the practice of facilitating the process of innovation from a tool perspective (Brown, 2008; Liedtka, 2015).

Idea-Centric: The second scenario of Design Thinking integration within Entrepreneurship Educations is centered around the reported practice of the Entrepreneurship Educators integrating Design Thinking in the beginning of their (often project-based) courses. The participants reported using Design Thinking for the first phase of facilitating the student’s process of framing a problem and ideating a solution. This is further represented in the literature’s view on envisioning Design Thinking as especially useful in the beginning of a practice-based innovation process (Klenner et al., 2021). Design Thinking has been described as a “useful front end to the new approaches to entrepreneurship in giving students a more useful guidance on how to carry out a productive and user-centred ideation process” (Glen et al., 2014; p. 662).

Procedural: For quite a few of the Entrepreneurship Educators, the structure of the Design Thinking Process seemed to form a valuable framework for their Entrepreneurship Course. Within this scenario, the educators made use of the Design Thinking Process to structure their course e.g., by putting focus on one of the process steps (empathy, define, prototype etc.) each week. Design Thinking was used as a “backbone” or “skeleton”, though some reported making slight adaptations. This application can be understood as underestimating the principles of iteration as well as the

demand to teach entrepreneurship as a method instead of as a process (Neck & Greene, 2011).

Holistic: Some Entrepreneurship Educators reported applying Design Thinking as their overarching principles guiding their approach to teaching entrepreneurship. They reported being less strict in following a systematic process of Design Thinking and adopting it as their “way” of doing things, integrating Design Thinking Tools and Processes throughout their educational practice in an intuitive manner. Following the conceptualisation of Klenner et al. (2021) this form of Design Thinking integration within Entrepreneurship Education is defined as a “Designerly Way of Teaching Entrepreneurship”. This form of a Design Thinking integration has been previously reflected within the literature as the application of Design Thinking as a teaching approach to teach an entrepreneurial mindset for students (Neck & Green, 2011; Nielsen & Stovang, 2015). Previous case studies have described Design Thinking as a “teaching approach” for Entrepreneurship Education (Lynch et al., 2021).

Outside of the four different forms of educational practice, this study also highlighted the “Cookbook Integration vs. Intuitive Integration” of Design Thinking within Entrepreneurship Education. Prior studies have questioned whether Design Thinking could be “implemented” through a step-by-step process in a linear cookbook pattern (Auerhammer & Roth, 2021). This study has revealed the obvious: educators who have less experience with Design Thinking appear to follow notional “rules” and “processes” of Design Thinking more strictly than Design Thinking’s attributes of fluency and flexibility might require. On the contrary, (Design Thinking-) experienced Entrepreneurship Educators reported a flexible, natural and intuitive integration of Design Thinking within their Entrepreneurship Teaching. These educators reported enacting Design Thinking as their approach to education in general and thus applying Design Principles they derived from Design Thinking and internalizing those principles guiding their own

understanding of being an Entrepreneurship Educator. They made use of the “Prototyping Principle” within the classroom by seeing every Lecture as a Prototype itself. They further reported enacting the Design principle of “Human-centredness” in their educational practice by empathizing with students in the phase of course design, taking a servant role and in general embracing “student-centredness”.

One of the goals of this research was to explore not only the explicit use of Design Thinking integration by making use of Design Thinking Content but also by further understanding the implicit use of Design Thinking within Entrepreneurship Education. A new insight emerged from the interviews as some educators reported having applied Design Thinking when looking for general educational guidance. From a practical point of view, Design Thinking is bridging a vacuum for educational guidance in Entrepreneurship Education. Design Thinking is used as a “bridge” for educators in search for a framework to follow that could give them guidance on educational practice in Entrepreneurship Education.

Design Thinking fulfills a need for providing a sophisticated but still simple combination of a process/toolbox/philosophy that gave the interviewees security in their teaching. It appeared that this need was especially highlighted when the teachers reported feeling “unexperienced” and “being thrown into teaching”. Some of the educators explicitly shared their experiences and reflections on how their Design Thinking shaped their Role of being an Entrepreneurship Educator. It appeared that those Design Thinking advocates illustrated less attention – or knowledge— towards the Entrepreneurship Education Theory. This further reinforces the role Design Thinking plays as a bridging construct for some educators who were in search for practical and theoretical guidance on how to design their Entrepreneurship Courses. These insights endorse the circumstance that Entrepreneurship Educators have often been left alone in finding their way into pedagogic practice (Lackéus et al., 2016; Neck & Corbett, 2018). This value of Design Thinking for some of the Educator’s teaching philosophies is further discussed in the next section (Perceived Value of Design Thinking for Entrepreneurship Education in Section 8.3).

The following section discusses barriers in the education practice of Design Thinking within Entrepreneurship Education. A new theme emerged from the interviews, as the Entrepreneurship Educators reported that they perceive institutional restrictions as one of the main barriers for a purposeful integration of Design Thinking within their Entrepreneurship Curricula (see Section 7.4.8). Even though Entrepreneurship Educators play a central role in the design and delivery of Entrepreneurship Courses to the students, they often felt bound to existing institutional systems. It was apparent that Entrepreneurship Educators face personal, organisational, and institutional barriers when integrating Design Thinking. From an institutional perspective, the educators faced structural and cultural issues both in delivering entrepreneurial education in general and Design Thinking specifically.

The integration of Design Thinking into Entrepreneurship Teaching needs more than an educator trained in Design Thinking. It is important to provide an infrastructure including the access to suitable spaces which allow for studio-based learning environments. This aspect was reported by Entrepreneurship Educators, who explicitly complained about restriction in terms of material and space which prevented them from delivering adequate learning experiences. The room set-up has been reported as a crucial part of a valuable Design Thinking integration and should represent the principles of Design Thinking, such as collaboration and creation (Thoring et al., 2014). Regarding the physical environment, a fruitful Design Thinking integration requires similar settings as experiential learning in general (Huber et al., 2016; Welsh & Dehler, 2013). This further reinforces the critical need for an alignment of institutional support (Sarooghi et al., 2019).

In general, both the literature and the findings from this study suggest that the educator's mindset— or rather, the perspective of the educator— is critical to increasing the educator's capability to advocate the facilitation of future skills among their students through Design Thinking (Kickbusch et al., 2020). On a tool and process level it might be possible to enact Design Thinking despite of personal barriers. However, when it comes to the transfer of principles, the theme of authenticity becomes more important. Regarding personal barriers, a strong connection can be seen towards the general self-conceptualisation of the educators.

Some participants reflected upon their inner conflict regarding the representation of authority in the field of entrepreneurship. However, most of the educators emphasized their “hands-on”, “experiential” and “informal” way of teaching entrepreneurship. Entrepreneurship Educators who identified themselves as being in a facilitating role often felt a natural attraction towards the ideas of the Design Thinking Education. Further, as previously presented on the Results section (see Section 7.2.1 on Perspectives on Entrepreneurship Education) it became apparent that Educators who moved into this field from other familiar disciplines such as Business Administration, Business Communication and Electronic Business tended to adopt more Design Thinking as this related to their practice-based view on entrepreneurship. This further supports the role of subjective choices within the field of Entrepreneurship Education (Vanevenhoeven, 2013) often made by individuals coming from different fields (Fayolle & Gailly, 2008).

From the interviews with the Entrepreneurship Educators, it became apparent that the curricular integration of Design Thinking in Entrepreneurship Education is dependent on the individual rather than the institution. Previous literature has demanded a broader role of Design Thinking in the business school curriculum in general (Glen et al., 2014; Glen, 2015) and Entrepreneurship Education specifically (Sarooghi et al., 2019; Klenner et al., 2021). However, none of the Entrepreneurship Educators reported a wide and overarching curricular integration of Design Thinking principles within their Entrepreneurship studies. Further, the method and extent of Design Thinking within Entrepreneurship Education appeared to be dependent on the educator’s individual perspective rather than being driven at an institutional level. This implies that the Design Thinking integration within Entrepreneurship Education has not yet reached the diffusion on Higher Education Institution and instead underlines the central role of the Educator’s individual decision (Henry, 2020; Kyrö, 2015). Overall, a new question emerged from this study surrounding whether Entrepreneurship Educators teach Design Thinking for entrepreneurship or whether they teach entrepreneurship through Design Thinking (see Section 9.4 on Future Work).

The previous sections illustrated the core themes regarding Design Thinking Practice within Entrepreneurship Education, making a contribution to the

research question on how (when and for whom) Entrepreneurship Educators integrate Design Thinking in their courses. From the analysis it became apparent that Entrepreneurship Educators integrate Design Thinking as a method for their students (to support Student's Learning— e.g. by applying Design Thinking as a toolbox for Ideation) as well as applying Design Thinking in order to develop or structure for their own Teaching (e.g., by applying Design Thinking Principles as a conceptual foundation for their approach). This further implies the use of Design Thinking for both Entrepreneurship Students as well as for Entrepreneurship Educators. The perceived value of Design Thinking from an Educator's perspective on both groups is discussed in the forthcoming section.

8.3 Perceived Value of Design Thinking for Entrepreneurship Educators

The overarching research questions this study explored has been the perceived value of Design Thinking for Entrepreneurship Educators within Higher Education. The previous section discussed the educator's conceptual perception and educational practice on Design Thinking within Entrepreneurship Education. This provided answers for the question of what defines their understanding and how they apply the construct within the classroom. This section will discuss why they do what they do and therefore summarize the perceived value Design Thinking has from their viewpoint.

The benefits and perceived value of Design Thinking in Entrepreneurship Education mirror those benefits presented in prior studies, in particular the value of prototyping, interdisciplinary or student-centeredness (Huber et al., 2016; Linton & Klinton, 2019). However, further new themes emerged which highlighted new roles of Design Thinking adopted by the Entrepreneurship Educators, namely fulfilling the need for simple and interactive workshop experiences or the value of Design Thinking in providing a semantic toolbox for communication with other stakeholders. It is important to mention that the discussed values have been synthesized from explicit, as well as implicit, connections and mentions of Design Thinking. For example, while some educators explicitly mentioned the contribution of Design Thinking to the development of their own teaching philosophy,

others might have expressed this value in a more implicit way. The following section examines these findings and discusses them in relation to prior theory.

The perceived value of Design Thinking for facilitating Problem-Understanding was a theme not only predominant in the literature but also in the interviews. In both an explicit and implicit way, the Entrepreneurship Educators perceived the emphasis of Design Thinking in the phase of problem understanding within the innovation process as a valuable complement for their Entrepreneurship Education practice. This value appears to be valid in the context of the Design Thinking literature, which highlights the unique importance of framing and defining the (wicked) problem as a starting point before searching for a solution (Dorst & Cross, 2001). Further, this exploration of the problem phase has been described as a problem-solving approach that creates new opportunities for inventing new solutions (Boland & Collopy, 2004; Dunne & Martin, 2006). Based on the ideas of Rittel & Webber (1973) and Buchanan (1992), the design process has distinct phases differing between problem definition and problem solution, an idea which has been widely translated in the Double Diamond Model (Design Council, 2000). Even though some of the Entrepreneurship Educators criticized those models for their simplification, many Educators reported applying and integrating Design Thinking during the problem phase, especially with the goal to foster the problem understanding among the students. This was often reported in the context of an overall idea-centric practice of Design Thinking within Entrepreneurship Education (see Section 7.4.2). The qualitative results from this study therefore support and add further detail to the conclusions of the previous survey-based approaches in which collaborative problem-solving has been highly accentuated across different Entrepreneurship Education programs (Sarooghi et al., 2019).

The notion of prototyping as a principle was widely perceived as a valuable Design Thinking element. Prototyping is not only an important step in most Design Thinking processes (Boland & Collopy, 2004; Brown, 2009), but Design Thinking embraces the attitude of experimentation (Brown, 2009) and characterizes Prototyping as a thinking mode. Design Thinking has claimed to innovate educational practice by introducing prototyping as a mindset, connecting the thinking about and doing of things (Henriksen et al., 2017). Described as a “methodology of

enablement” (Welsh & Dehler, 2012 p. 773), Design Thinking supports students in developing possibilities and envisioning the possible.

This emphasis on tangibility and prototyping as a principle was perceived by many Entrepreneurship Educators in this study as one of the most predominant valuable aspects of Design Thinking. As this study has shown, some of the educators understood, or at least perceived, Prototyping as being the core of the Design Thinking construct. Entrepreneurship Educators reported explicitly integrating Design Thinking within their teaching when it came to Prototyping: “Prototyping is one of the things we’ve definitely taken most directly from Design Thinking” (10). However, the scope of integrating Prototyping into their Entrepreneurship Courses was wide, ranging from covering Prototyping as a short classroom exercise to permanent access to maker spaces at the university. Even though this study has outlined that Design Thinking is often associated with and referred to as Prototyping, previous research has shown that prototyping is a less prevalent element, possibly due to the lack of physical infrastructure (Sarooghi et al., 2019). This argument was echoed in this study as some educators mentioned their dependability on the university’s resources as a barrier, e.g., the use of maker spaces or prototyping labs. This further reinforces the statement that the exposure to Design Thinking for students requires a suitable infrastructure and institutional support (Sarooghi et al., 2019). This is also connected with the need for creative spaces (see also barriers in section 7.2), which should represent the principles of Design Thinking (Thoring et al., 2014). The creation of the physical learning environment is essential not only for fostering prototyping, but also as a highly collaborative environment that supports the so-called studio-spaced learning (Wrigley & Straker, 2017). In general, the consideration of space is a theme that could be a valuable addition to the Entrepreneurship Education discipline.

This aspect of fostering collaborative learning in an innovative learning atmosphere is further connected to the perceived value of Design Thinking for the emphasis on interdisciplinarity and the integration of multiple perspectives (Section 7.5.3); the Value of Student-Centredness (Section 7.5.4), the Value of Creativity and Ideation (Section 7.5.5) and the identified Value of Interactive Workshop Methods (Section 7.5.6). Instead of formal lecture practice, the Design Thinking

pedagogy emphasized a student-centred approach often based on project-based learning in multidisciplinary student-teams (Beckman & Barry, 2007; Glen et al., 2014). Insights from this study confirmed the value of Design Thinking in shifting from teacher towards student-centred learning (Daniel, 2016; Linton & Klinton, 2019). In connection with the creation of an innovative learning atmosphere, educators explicitly expressed the value of Design Thinking for fulfilling their need for interactivity and entertaining methods within the classroom. Entrepreneurship Educators have been previously criticized for applying Design Thinking Tools in a rather superficial manner (Sarooghi et al., 2019). However, not every interactive workshop tool necessarily comes from Design Thinking. Previous research has fuelled the confusion on Design Thinking Tools by e.g., describing the Business Model Canvas as a Design Thinking Tool (Sarooghi et al., 2019), even though this argumentation remains unclear.

Besides the value of specific phases in the process, such as Problem-Understanding and Prototyping, the educators further expressed the value of the overall process and structure of Design Thinking. Design Thinking process elements have been widely spread among theory and practice (Buchanan, 1992; Brown, 2008; Razzouk & Shute, 2012) and even though models differ regarding their number of steps and stages (see Section 3.2 on Design Thinking Process Models) the Design Thinking Process is characterized by being iterative, recursive, non-linear and human-centred. The analysis of the interviews suggested that Entrepreneurship Educators do not only understand and practice Design Thinking as a process. Several participants further mentioned the value of the procedural structure of Design Thinking within their Entrepreneurship Education. As reported previously, Entrepreneurship Educators did not only understand Design Thinking as being mainly a process construct: they also often applied it in that way and explicitly referred to the value of the process and structure of the concept. The Design Thinking process was described as playing a central role in the student's development, especially as they often experience uncertainty when facing ambiguous and unstructured "wicked" problems in the entrepreneurial context (Glen et al., 2014). This study has further shown that the Design Thinking Process steps are not only valuable for the student's orientation, but are also perceived as being

valuable for the educators when structuring their project-based courses to learn in an entrepreneurial context. Design Thinking process models were used by the Entrepreneurship Educators to guide the student's learning process and as an overall "backbone" of the project-based Entrepreneurship Courses. The weaknesses of relying too much on the process perspective and understanding the process as a clear or linear step-by-step approach are obvious due to the nature of wicked problems (Buchanan, 1992; Rittel & Weber, 1988).

Another new theme that emerged from the interviews was the attributed value of Design Thinking for communicating the value of Entrepreneurship Education to other stakeholders. It appeared that Entrepreneurship Educators emphasized the role of Design Thinking in providing a "common language" with other disciplines. Participants mentioned referring to applying Design Thinking as a way to communicate the value of Entrepreneurship Education. This supports the role of Design Thinking in bridging and embracing interdisciplinarity as a key theme (Brown, 2009; Kelley, 2005; Welsh & Dehler, 2013) but with a new outlook. This perspective of Design Thinking being used as a semantic toolbox or translator/mediator between disciplines has not been previously identified in the literature. The Value of Design Thinking for Communication reveals another important function of mainstream approaches, as they provide a new and common vocabulary to interact and communicate with various disciplines in the business context.

The general perceived value of Design Thinking within Entrepreneurship Education is very context specific. This feeds into recent discussions on the need for a more comprehensive understanding of context as an important parameter of educational design in Entrepreneurship Education (Thomasson et al., 2020). This study has shown (see Section 7.4.6) that the value of Design Thinking is dependent on the context and culture in which the Entrepreneurship Education takes place. From the interviews it appeared that the context and culture of the students and the teachers as well as the discipline and field of study is important when evaluating the value of Design Thinking for Entrepreneurship Education. For example, the emphasis on human-centredness was perceived differently. Some expressed the value of the human-centered perspective for the students, which supports the position of Design Thinking being valuable by creating

(entrepreneurial) opportunities through understanding the needs of the people (Dunne & Martin, 2006; Neck et al., 2014). Others reported that the principle of starting with the user perspective into the innovation process does not apply in the context of e.g., a focus on technology entrepreneurship (medicine, drug development, technology transfer, etc.).

The educators reported that there are certain types of students who find it easier or harder to relate to the notions of the Design Thinking construct (see Section 7.4.6). They reported that the value of the Design Thinking concept may be especially high for those groups who feel rather novel to this kind of approach, as recent research is presenting Design Thinking as a pedagogy that is particularly suitable to teach entrepreneurship to engineering students (Lynch et al., 2021). Previous studies have reported that Design Thinking provides a valuable opening and a novel change of perspective towards the user focus, especially within fields of study which are traditionally product-focused (Lynch et al., 2021).

When discussing the perceived value of Design Thinking (Principles) of Entrepreneurship Educators it is important to consider the wider context. These considerations place the discussion on Design Thinking in Entrepreneurship Education in the context of some key fundamental questions going back to the question of the sense and meaning of Entrepreneurship Education (Hannon, 2006) and the missing link towards educational philosophy and pedagogy in higher education (Bell, 2021). From the interviews it became apparent that quite a few Entrepreneurship Educators had teaching principles they adapted from Design Thinking which could be related back to some of the basic ideas of e.g., experiential learning theory (Hägg & Gabrielsson, 2019). Previous research has discussed linking Design Thinking and the constructivist learning approach (Pande & Bharathi, 2020) or Design Thinking and experiential learning theory (Rauth et al., 2010). There is also a long-accepted view that Entrepreneurship Education should be action-oriented, experiential (Rae, 2000; Cope and Watts, 2000; Gibb, 1997) and collaborative (Pittaway & Cope, 2007) among other characteristics. Most Entrepreneurship Education programs involve experiential and “active” forms of learning (Pittaway & Cope, 2007). The synthesis of the educational interface of Design Thinking and Entrepreneurship Education (see Section 4.3) has

been previously revealed to show high similarities regarding their underlying educational theories and building upon the influences of constructivism among experiential learning, critical pedagogy, and active learning (Dewey, 1963; Hägg & Gabrielson, 2019; Welsh & Dehler, 2013). Although this was the primary question of this research, this interview study has underlined the reality that some Educators are not aware of the underpinning educational philosophies which drive and direct their educator's practice (Hannon, 2006; Bell, 2021) – see Section 7.2.1.

This study has shown that some Entrepreneurship Educators turn towards concepts and constructs from other fields, such as “Design Thinking”, in order to bridge a vacuum and fulfill their need for educational guidance (see Section 7.4.5) and a framework for their Entrepreneurship Educator's toolkit. As stated by Hannon, it is crucial for Entrepreneurship Educators to depict a personal philosophy to “*understand the need for underpinning philosophical frameworks that enable a greater understanding of why they do what they do in the way they do it*” (Hannon, 2006, p.299). However, many educators do not articulate or explicitly choose a philosophy or theory of learning (Bell, 2021) even though the awareness of this choice contributes to professionalism (Merriam, 1982).

This describes the reality of Entrepreneurship Educators developing and operating in the field without understanding their educational philosophy and being experienced in any kind of pedagogical training (Bechard & Gregoire, 2005; Hannon, 2006; Bell, 2021). This study has shown that some Entrepreneurship Educators have— consciously or subconsciously – adopted Design Thinking as their underlying principle, representing an inner compass guiding their teaching decisions in Entrepreneurship Education. Within this interview study, Entrepreneurship Educators stated that Design Thinking has changed their role as an educator and has provided them with a framework and context they could relate to. Along with this comes the self-conceptualisation of some educators as being a “Design Thinker”. Thus, Entrepreneurship Educators make use of Design Thinking in the construction of its Entrepreneurship Education pedagogy.

One of the key findings from this study has been the conceptualization of the Design Thinking principles, which can be applied from two different perspectives contributing towards two dimensions of value as illustrated in Table 36. On the

one hand, Design Thinking can be applied to fulfill a certain purpose for the educator (value for the educator), while on the reverse outlook, provide value for the student.






Transfer to “Student focus”	Principles derived from Design Thinking	Transfer to “Educator focus”
Peer Learning/ Diversity in Class and learning in interdisciplinary teams	Interdisciplinarity 	Experts/External Speakers in Class in order to provide multiple perspectives
Tool/Principle before “Ideation”	Focus on Problem Understanding 	General focus of Education on understanding problem instead of output-orientation
Co-Learning	Teamwork 	Co-Teaching
Learning Prototyping in Class as a “Tool”	Prototyping as a Principle 	Prototyping the Classroom situation/Lectures
Course structure for the student’s orientation	Process Steps (e.g., Describe, Define, Develop, Deliver) 	Process Steps and Structure for Educator’s guidance on the Course Set-Up

Table 36: Principles of Design Thinking and their value from two perspectives

The figure above illustrates how principles derived from Design Thinking (e.g., interdisciplinarity, prototyping, process steps) can be either applied with a focus on the student or the educator. From the interviews it became apparent that educators with strong Design Thinking experience were capable of transferring the principles towards their educator’s perspective. As an example, while most of the educators communicated the value of Design Thinking by providing suitable exercises to let the students practice prototyping (e.g., in order to foster creativity) as described in the section 7.5.2, others demonstrated the ability to transfer the

principle of prototyping towards their own educator's practice as an "educational principle" by describing their lectures as prototypes and applying the prototyping principle in their course design.

8.4 Summary

The previous sections have discussed the findings of this research in the context of the extant literature to explore the phenomenon of Design Thinking within Entrepreneurship Education within Higher Education in Europe with a special focus on the educator's perspective. As illustrated in the summarizing graphic (Figure 44), the first important element has been the conceptualization of the nexus. The literature review illustrated that Design Thinking and Entrepreneurship (Education) share substantial and elementary common themes and core principles. The conceptualization of the nexus summarizes those along conceptual and educational dimensions. Based on this, the topic has been processed from an educator's viewpoint as the central perspective, as visualized in the illustration. The results of this work discuss how Entrepreneurship Educators understand Design Thinking (conceptual understanding), how and on what level they apply it in their entrepreneurship teaching (educational practice) and why and for what perceived value they choose to do so (perceived value). Therefore, this study synthesises existing perspectives on the pyramid model of Design Thinking (toolset, process, and mindset) and discusses them in the context of Entrepreneurship Education, thus moving towards the convergence of a common understanding.

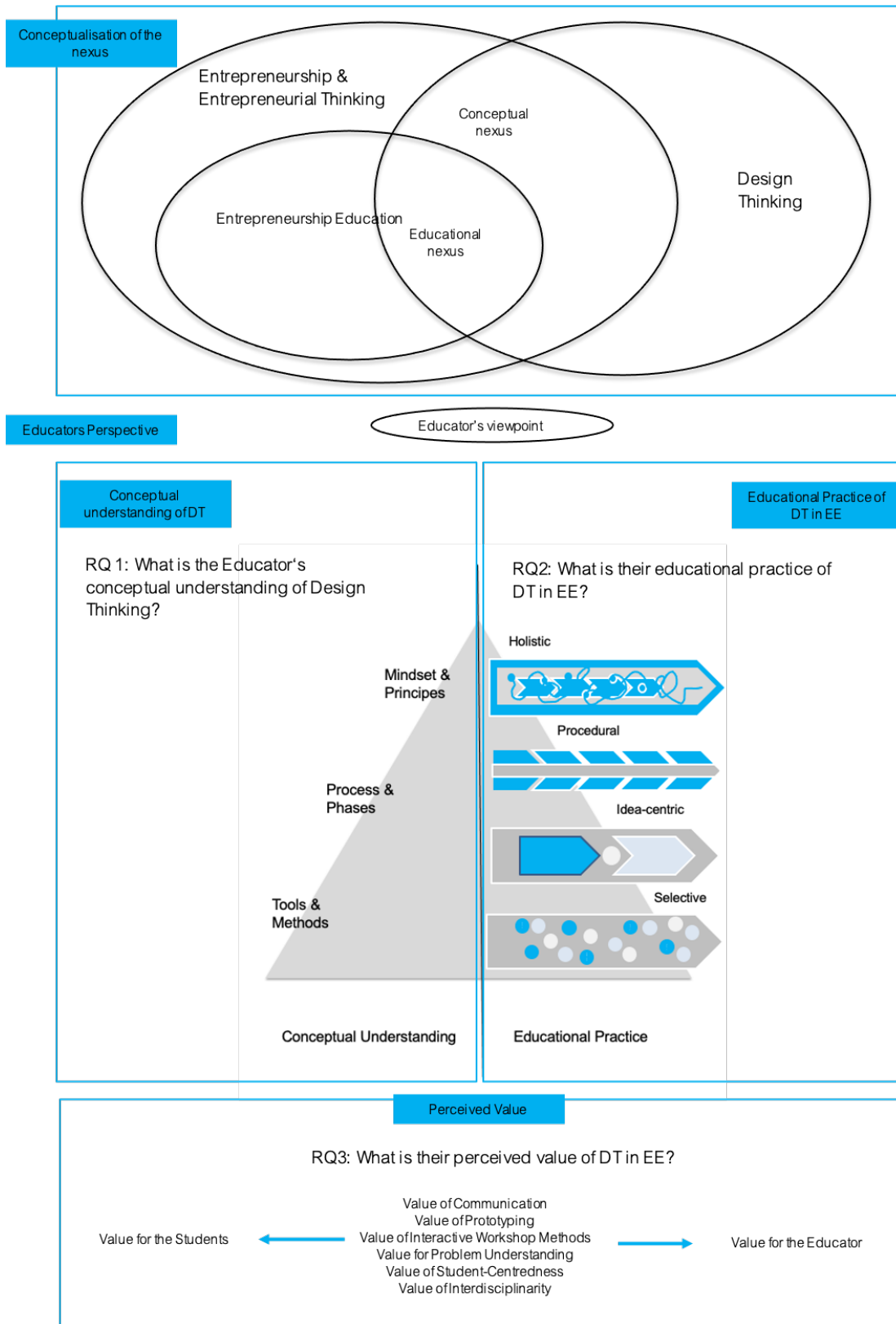


Figure 44: Illustrative overview of this work's contribution (see also Appendix)

From a practical perspective, this study has identified four different predominant ways in which Entrepreneurship Educators integrate Design Thinking in their classroom, namely selective, idea-centric, procedural and holistic. The qualitative interview study has revealed deep insights into the Educators' understanding of the concept as well as their practical integration of Design Thinking within the classroom. The interviews provided insight into the Educator's perspective and their motives as well as the values they perceive when integrating Design Thinking into their teaching. These findings offer insights into the perceived value of Design Thinking for Entrepreneurship Educators and reflect that the value of Design Thinking in Entrepreneurship Education can be applied from two different perspectives to fulfil a certain purpose for the educator (value for the educator) while, on the reverse perspective, provide value for the student. This section provided a short summary of the discussion chapter. The forthcoming chapter will summarize the major findings and conclusions in further detail.

Chapter 9 Conclusions

9.0 Introduction to chapter

The previous chapter discussed the empirical findings of this study in relation to the literature and provided answers to the question of the value of Design Thinking (DT) for Entrepreneurship Education (EE). This chapter draws conclusions on the major findings of this study. First, it summarises the contribution of the study to an enhanced understanding of Design Thinking within Entrepreneurship Education in European higher education. To do this, the chapter further reflects on the answers to the research questions in relation to the research aims and discusses the value and contribution thereof. Second, it outlines the implications of this study for both policy and practice. These implications are written with the intention of shaping the development of guidelines for educational policymakers and entrepreneurship educators. Although the contribution and implications of this study are bound to the context within which the findings were gathered, some implications are likely to have broader applicability. Further, this chapter presents a critical reflection on the limitations of this study based on a critical examination of its methodology and approach. Finally, it identifies potential research areas and opportunities for future work.

9.1 Contribution and Implications for Theory

This study has contributed to the existing debate on the value of integrating Design Thinking into Entrepreneurship Education (Daniel et al., 2016; Huq & Gilbert, 2017; Linton & Klinton, 2019; Sarooghi et al., 2019; Val et al., 2019). Over the last twenty years, Design Thinking has emerged in a variety of educational contexts of entrepreneurship, including in the context of the EntreComp framework (Bacigalupo et al. 2020; Campbell, 2019). Previous research has demonstrated and quantified the wide use of Design Thinking within entrepreneurship curricula (Kremel & Edman, 2019; Sarooghi et al., 2019); however, there is a lack of clear conceptualisation of the Design Thinking and entrepreneurship nexus and a lack of clear understanding of the conceptual interface of Entrepreneurship Education and Design Thinking.

In order to contribute to a more profound perspective on this research gap (as outlined in Section 4.5), this study puts focus on the quality of the Design Thinking integration in Entrepreneurship Education; from an educator’s perspective. More specifically, the study evaluates the current educator-centred perspective on the value of Design Thinking in Entrepreneurship Education in the context of Europe’s higher education. In order to answer the question “What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?” , this study employed a qualitative approach to analyse the following areas:

Overarching Research Question	What is the conceptual understanding, educational practice and perceived value of Design Thinking for entrepreneurship educators in Higher Education in UK & Northern Europe?
Conceptual Perspective – Guiding Questions	What is the educators’ working understanding of Design Thinking? What is their understanding of the DT/EE nexus?
Educational Practice: Guiding Questions	How do educators apply Design Thinking in Entrepreneurship Education (as a method, course and/or general pedagogical approach)? How is Design Thinking integrated into Entrepreneurship Education Practice? On what level is Design Thinking integrated into Entrepreneurship Education? Design Thinking as a course model or pedagogic approach? Explicit or implicit integration?
Perceived Value: Guiding Questions	What are the educator’s pedagogical beliefs about the value of integrating Design Thinking in Entrepreneurship Education? Why do educators apply Design Thinking in Entrepreneurship Education?

Table 37: Overarching Research Questions and guiding questions

Results of this qualitative analysis demonstrated how entrepreneurship educators understand Design Thinking (conceptual understanding), how and on what level they apply it in their entrepreneurship teaching (educational practice) and why and for what perceived value they choose to do so (perceived value). In this section, the results of the three areas are highlighted and their key findings and contribution as well as the implications for theory are summarised.

The findings of this study provided insights into how entrepreneurship educators understand the term “design thinking” and what kind of perspective they associate with the concept. In this study, entrepreneurship educators defined Design Thinking based on attributes and conceptualisations that are congruent with the literature. In particular, they associated Design Thinking with the themes of problem solving (Boland & Collopy, 2004; Christensen, 2009; Dorst, 2011), innovation and ideation (Dell’Era, 2020; Micheli et al., 2019), human-centredness (Brown, 2009; Kimbell, 2011), prototyping and experimentation (Boland & Collopy, 2004; Brown, 2008) and a hands-on, toolbox approach (Micheli et al., 2019).

An additional implication for theory is, that these findings demonstrated conceptual commonalities between Design Thinking and Entrepreneurship Education which have been identified in the literature and confirmed by the conceptual understanding of the educator (see Section 4.4). Scholars and entrepreneurship educators often utilise the term “design thinking” and referred back to the use of “Design Thinking methods” although often leaving them undefined. While recent literature has contributed to defining the key notion of Design Thinking (Micheli et al., 2020), the findings of this study (see Section 7.3) determined that the current entrepreneurship educator’s understanding has shown different meanings in differing contexts. This is a new contribution to knowledge, as it had not been empirically explored previously. Thus, this study supports a wide application and prevalence of the term while also reflecting the definitional ambiguity. The findings therefore contributed to the debate on the missing coherence in Design Thinking definitions (Rauth et al., 2010), which prohibits progress in understanding the Design Thinking phenomena (Micheli et al., 2018) and thus have implications on the theory around Design Thinking. This lack of understanding of Design

Thinking and the differences in argumentation have been supported by research on the toolbox integration of Design Thinking (Huber et al., 2016; Mansoori & Lackéurs, 2019) and the application of Design Thinking as a suitable pedagogic approach when teaching entrepreneurship (Daniel et al., 2016; Lynch et al., 2021; Nielsen & Stovang; Val et al., 2017).

This study has also synthesised existing perspectives on the pyramid model of Design Thinking (toolset, process, and mindset) and discussed them in the context of Entrepreneurship Education, thus moving towards convergence of a common understanding. This novel contribution to theory demonstrated that most entrepreneurship educators shared the perspective of Design Thinking being a process. Educators with less Design Thinking experience mostly associated Design Thinking with a toolbox and so-called Design Thinking advocates. They have shown a strong Design Thinking integration in their Entrepreneurship Education and described Design Thinking as a mindset or a set of principles guiding their action. They identified a strong emphasis on the process perspective, which contributed to the debate on the missed potential of Design Thinking driven by a reductive and limited view of the concept (Dell'Era et al., 2020; Auernhammer & Roth, 2021). These findings also bring to light predominant doubts and criticisms (Abrahamson, 1996) among entrepreneurship educators regarding Design Thinking. In particular, the criticism regarding a lack of theoretical foundation, simplification and being a fad or buzzword and too practitioner oriented. They also reflected and contributed to recent discussions on the lack of construct clarity and criticism of Design Thinking (Auerhammer & Roth, 2021). This study, therefore, contributed to theoretical understanding by unfolding the Design Thinking concept and revisiting its understanding among entrepreneurship educators.

As well as the educator's conceptualisation, this study also addressed a certain lack of coherence between how Design Thinking is understood in the educational practice and how it is portrayed in academic terms (Carlgren et al., 2016) and thus provided insights into bridging what Design Thinking is in theory and how it is applied in practice. The study sought to determine how entrepreneurship educators apply and integrate Design Thinking in their entrepreneurship teaching. In recent years, the Design Thinking construct has been pushed forward into the

practice of Entrepreneurship Education in Europe; in particular in the context of the Entrecomp framework (Bacigalupo et al. 2020; Campbell, 2020) and the practical relevance and interest in Design Thinking (Micheli et al., 2019). Previous studies have confirmed the wide use of Design Thinking within entrepreneurship curricula (Kremel & Edman, 2019; Sarooghi et al., 2019). This study enhanced the understanding of the quality of this integration from an educator's perspective. The use of the qualitative perspective uncovered assumptions taken for granted by scholars (e.g., Campbell, 2020) that differed from educators' classroom reality and how they integrated Design Thinking into entrepreneurship teaching. The findings demonstrated that although integrating Design Thinking in a linear cookbook pattern (Auernhammer & Roth, 2021) appeared to be common practice, educators exhibited a lot of variation in the level of Design Thinking integration.

For instance, some educators mentioned that they applied Design Thinking when integrating a short exercise of prototyping, while others reconstructed the principles of Design Thinking into their overarching teaching philosophy. It has been shown that some Educators make use of Design Thinking in the construction of their Entrepreneurship Education pedagogy. Perhaps the greatest novel contribution of this empirical study has been that in order to provide structure to this practice, this study identified and synthesised four previously undescribed forms of Design Thinking integration in Entrepreneurship Education: Selective, Idea-centric, Procedural, and Holistic, as shown diagrammatically in Figure 44. Entrepreneurship educators were seen to integrate Design Thinking by applying single Design Thinking Tools (Selective) or guiding the process of idea generation (Idea-centric). They also described utilising the Design Thinking process steps as a backbone for their entrepreneurship course (Procedural) or lastly enact Design Thinking as the overarching principle guiding their approach to teaching entrepreneurship (Holistic). Developing a framework for the four forms of Design Thinking integration within Entrepreneurship Education will help future researchers to better understand the interface between Design Thinking and Entrepreneurship Education. The new conceptualisation both adds new perspectives to the extant literature and theory and aids practitioners to consider the extent of their own practice.

Further, this study identified structural and cultural barriers (e.g., restrictive role of the educator, limited access to material & space) faced by educators in the delivery of entrepreneurial education in general, and Design Thinking specifically. Thus, the level of integration of Design Thinking is also dependent on the ability to overcome the barriers on an institutional, organisational and personal level. The level of Design Thinking integration was further found to be influenced by the context and culture of the institutions as well as the educator's individual perspective. The findings suggested that the initial curricular integration of Design Thinking in Entrepreneurship Education is not driven on an institutional level, but rather relied on the educator's choice, which underlines the central role of the educator's individual decision (Henry, 2020; Kyrö, 2015). Thus, this study addressed the need of advocating the understanding of the current implementation of Design Thinking within Entrepreneurship Education to educators (Sarooghi et al., 2019). It also deepened the understanding of developing meaningful offerings of Design Thinking for the Entrepreneurship Education context specifically, as well as provided initial answers towards the question of the individual and organizational barriers to adopt Design Thinking practices (Micheli et al., 2019).

Addressing the third area of the research question, the findings offered insights into the perceived value of Design Thinking for entrepreneurship educators. At the practical level, the findings suggested that entrepreneurship educators integrate Design Thinking into their practice for two main reasons: providing value for their students' learning, and; serving the purpose to guide and develop the educators' own teaching. While previous research has focused on quantitative or single-case studies (Huber et al., 2016; Kremel & Edman, 2019; Linton & Klinton, 2019; Nielsen & Stovang, 2015; Sarooghi et al., 2019), this study presented a new viewpoint on the narratives of the entrepreneurship educators and the perceived value Design Thinking has for them. By doing so, it applied a unique approach including the reflective discourse on the personal experiences of the contextualised participants and their classroom practice (Gerber et al., 1995). Notably, this study not only sought to verify existing concepts but also identified new and unexpected patterns based on this open-ended approach and therefore adds to the extant literature and theory.

The findings suggested that perceived values of Design Thinking could be explicit and implicit for both students and teachers. While some perceived values confirmed previous research such as the value of prototyping, problem-understanding and human-centredness (Huber et al., 2016; Linton & Klinton, 2019), new themes also emerged. For instance, it was found that entrepreneurship educators valued Design Thinking for its semantic toolbox in order to communicate to Entrepreneurship Education stakeholders from non-business disciplines. Further, entrepreneurship educators tended to integrate Design Thinking for its value to embrace interactivity, ideation and interdisciplinarity in the classroom.

One of the key findings from this study was the conceptualisation of the Design Thinking principles (see Section 3.3). This conceptualisation can be applied from two different perspectives contributing toward two dimensions of value. From one perspective, Design Thinking can be described as fulfilling a certain purpose for the educator (value for the educator) while the reverse perspective describes the value for the student. To master Design Thinking in the classroom, the findings suggested that educators need to reflect and transfer the principles into their personal perspectives. Previous research has explored Design Thinking as a suitable teaching method based on the students' perspective on the learning process (Lynch et al., 2021). Thus, it is an elementary contribution of this work to focus on the educator's needs and highlight the discussion on Design Thinking within Entrepreneurship Education while focussing on what kind of value Design Thinking provides for the educator and not for the student. This study showed that entrepreneurship educators make important decisions in the design of their education. They do not only focus on what kind of value a certain method or course structure would have for the students, but sometimes choose a certain way that has value for themselves. For example, some described it as a way to demonstrate their innovativeness and contemporary practice while others chose simple interactive workshop tools for creating a comfortable and entertaining atmosphere in the classroom.

Previous discussion in the field of Entrepreneurship Education Research has mainly focused on teaching content and the learning process of the student (Fayolle, 2008; Robinson et al., 2016). Thus, there have been scarce insights in

the field on who the educators are and what perceptions shape their teaching, besides exceptions (Toding & Venesaar, 2018). In a wider context, this study provided further insights into Fayolle's (2013) question of who the entrepreneurship educators are and what and why they do what they do in their classrooms. Further, these findings answered the call to put more focus on the role of the individual educator (Hägg & Gabrielson, 2019) and how their decisions shaped entrepreneurial learning (Henry, 2020; Kyrö, 2015)

Besides the abovementioned key contributions of the study, further insights were retrieved through the synthesis of the literature and its novel explorative approach (see Section 6.3.1). Due to its novelty, the literature on Design Thinking in business education (Boland & Collopy, 2004; Brown, 2009; Dunne & Martin, 2006) in general and Entrepreneurship Education specifically, is still in its infancy (Lynch et al., 2021). Thus, the synthesis of common themes and unifying logic as well as the investigation of common theoretical groundings (as outlined in Section 4.4) helped to stimulate theoretical sensitivity toward the concept of Design Thinking (Johnson & Christensen, 2014) in the Entrepreneurship Education context. The literature review revealed a variety of Design Thinking definitions in academic and practitioner-oriented studies (Johansson-Sköldberg et al., 2013; Kimbell, 2011, 2012; Razzouk & Shute, 2012). These different perspectives called for a comprehensive examination of the Design Thinking Integration in Entrepreneurship Education. This study, therefore, sought complexity and a pluralistic approach to the construction of meaning. The explorative literature review allowed a synthesis of a detailed outline of the reasoning of a conceptual nexus of Design Thinking and Entrepreneurship Education (see Section 4.2). This narrative and explorative literature review contributed to the understanding of the field itself by synthesising different perspectives into one overview. Further, this explorative approach provided the required flexibility in this dynamically evolving field of knowledge. Within this context, it needs to be acknowledged that new relevant studies on this area have been published during the time frame of this study, which started in 2018 (e.g., Auernhammer & Roth, 2021; Dell'Era et al., 2020; Kremel & Edman, 2019; Lynch et al., 2021; Mansoori & Lackéus, 2019; Micheli et al., 2019; Sarooghi et al., 2019). In summary, this study provided novel insights

into the topic by focussing on the educator's perspective, further synthesising relevant literature, identifying common themes and unifying logic.

Following an interpretive approach in this research, contributions to the knowledge on Entrepreneurship Education were made based on narratives, stories and perceptions and thus were not created in isolation. The value of Design Thinking for entrepreneurship educators can only be described by diving into multiple realities and different perspectives. Thus, this study critically explored the complexity and embraced the richness of differences by exploring and analysing the perspectives of 29 entrepreneurship educators. Through the analysis of their individual understanding of the Design Thinking concept and their narratives on educational practice, new knowledge was created. This new knowledge reflects the truly interpretative approach of this research and is based on the claim that the value of Design Thinking can only be understood through understanding the meaning for the entrepreneurship educators involved. This explorative approach has been previously described as an open promising opportunity for entrepreneurship research (Kyrö et al., 2013).

This study focused on the geographical cluster of the UK and Northern Europe (namely Denmark, Germany, Netherlands, and Sweden). This geographical viewpoint provided novel insights into the topic of Design Thinking in Entrepreneurship Education. Previous studies have often focused on Design Thinking integration in the United States (e.g., Sarooghi et al., 2019). However, the context of an old duality of the European and American Approaches to Entrepreneurship Education (Guzmán & Liñán, 2005) and the increased policy drive to include Design Thinking (Bacigalupo et al., 2016) justified the need for a European perspective on the topic.

Exploring the thoughts of the entrepreneurship educators in this study also provided novel perspectives contributing to the field of Entrepreneurship Education in a wider context. In particular, the identified fear of entrepreneurship educators with respect to being replaced by Design Thinking, and Entrepreneurship Education becoming a fad itself, contributed to the debate on the self-conceptualisation and the *raison d'être* of Entrepreneurship Education (Blenker et al., 2011). This

fear increased the risk of entrepreneurship falling into a category error by trying to classify it as a sub-discipline (Sarasvathy & Venkataraman, 2011).

This study confirmed the wide application of Design Thinking within Entrepreneurship Education (Sarooghi et al., 2019; Mansoori & Lackéus, 2019) while adopting a more critical and differentiated view on this integration than previously reported. By exploring what entrepreneurship educators understand about Design Thinking and how and why they integrate it into their teaching, this study provided answers to the question of the conceptual understanding, educational practice and perceived value of Design Thinking for Entrepreneurship Education in Higher Education – from an educator’s perspective. There is not only one way of looking at Design Thinking from an entrepreneurship educator’s perspective; entrepreneurship educators were shown to integrate Design Thinking in many different ways and for many reasons. The study has, however, revealed a common ground among educators’ sense-making of a Design Thinking integration in Entrepreneurship Education. In addition, the key principles of Design Thinking were comprehensively defined and further commonalities defining the DT/EE nexus were identified. In conclusion, this study reaffirmed the wide application of Design Thinking within Entrepreneurship Education but presented the new centrality of the educator’s perspective at the core of the discussion on its utility. Further recommendations and implications for policy and practice are elaborated in the following section.

9.2 Implications for Policy and Practice

Higher education in general and Entrepreneurship Education, in particular, play a key role in developing skills and competencies for the next generation; therefore, the improvement and iteration of Entrepreneurship Education practices are important. Although this study focused on entrepreneurship educators’ practice of Design Thinking use, the findings of this study offer several implications for policy and practice. This qualitative interview study has generated “portable” principles relevant to other domains and settings (Goia et al., 2012). Overall, this study presented implications for higher education institutions and entrepreneurship educators in how they conceived and introduced Design Thinking within

Entrepreneurship Education. The formulation of these implications can inform future practice and enrich a valuable integration of Design Thinking within Entrepreneurship Education. It also provided practical recommendations for reflection and points higher education entrepreneurship educators in the right direction regarding the various ways to integrate Design Thinking in teaching.

The deep-dive insights into the educator's perspective suggested further training is required, focussing on educational philosophy for entrepreneurship educators (section 7.2). Entrepreneurship educators need to reflect on their philosophical role and educational practice in a more frequent manner. Most entrepreneurship educators in this study were able to place their view on Entrepreneurship Education into a theoretical context. Although common themes (e.g., facilitation style, individualised learning, and hands-on experiences) emerged among participants' perspectives of their role in the classroom, only a few seemed to be aware of the underlying educational philosophy guiding their actions. These findings further reinforced previous suggestions that entrepreneurship educators' lack knowledge and awareness of their guiding educational philosophy as well as lack pedagogical training (Bechard & Gregoire, 2005; Hannon, 2006; Bell, 2021).

Thus, this study further emphasised the potential benefits of professional training in entrepreneurship pedagogy, a call that has been made widely (Bécharde & Grégoire, 2005; Hannon, 2018). These findings also reinforced the diverse nature of educators in the field who come from different fields and disciplines (Fayolle & Gailly, 2008; Vanevenhoeven, 2013, Henry, 2020). Some participant educators rather relied upon practice-based methods and lacked knowledge of Entrepreneurship Theory (section 7.2.1). Moreover, entrepreneurship educators shared their inner conflicts in relation to their role in the classroom, which underlined the increasing importance of reflective practice in developing their individual perspectives on Entrepreneurship Education (Kyrö, 2015; Henry, 2020).

The simplification of Design Thinking principles represented a strength and weakness at the same time. One of the most notable findings from this study was the exploration of motives and reasons why entrepreneurship educators integrate Design Thinking into their teaching and what kind of value it served from their own perspective: a semantic toolbox for communication, a procedural structure

for the course, and simple and interactive workshop methods. With the student perspective outside the scope, this study highlighted some educators' urgent need for simple tools and a structure to follow. For some educators, Design Thinking seemed to be better at answering that need than Entrepreneurship Education. Furthermore, Design Thinking can also be used as an answer to the Entrepreneurship Education's Dilemma. Although the standardisation and simplification of Entrepreneurship Education have been criticised as the "McDonaldization of Entrepreneurship Education" (Brentnall et al., 2021), the narratives of the participants showed that (early-career) educators needed further guidance. These findings reflect that Entrepreneurship Education as a field can learn from Design Thinking to simplify its message in order to make the value of Entrepreneurship Education accessible and easier to communicate.

In addition, this study further reinforced the need within Entrepreneurship Education to provide "Train-the-Trainer" courses, as it remained unclear and undefined yet, what an "entrepreneurship educator" is and what kind of skills they have to be equipped with. In the context of Design Thinking, it became apparent that understanding the principles is more important than just applying the tools. This study identified a need for further research covering the fundamental question of what constitutes a "design thinker" and what kind of training and practice is required to become a "design thinker" in the educational context (Micheli et al., 2019). If entrepreneurship educators are demanded to deliver Design Thinking-based educational experiences for their students (Sarooghi et al., 2019), it is yet to be defined how entrepreneurship educators should be trained in Design Thinking. In particular, this study has identified a need for appropriate training of the educators to extend their awareness of the principles of Design Thinking.

From this study, it also became apparent that the focus on the procedural view of Design Thinking as a process is predominant in the educational practice of entrepreneurship educators. As demonstrated, this is just one piece of the puzzle, and if Design Thinking aims to teach attitudes over just tools in a process it might be questioned whether trainings that teach Design Thinking in one hour (Schumacher & Mayer, 2018) are helpful in getting the message across. Most educators interviewed showed a rather limited view of Design Thinking when classifying

it as either a toolbox or a process or a mindset, without acknowledging the view that all of the three perspectives have to be understood as a holistic concept. As introduced by Huber et al. (2016), this work contributed to reframing the pedagogical pyramid of Design Thinking for Entrepreneurship Education (as introduced in section 3.6). Thus, it was confirmed that educators should understand Design Thinking principles if they work with, or apply, its tools in the classroom. In order to seize the potential of a Design Thinking integration in Entrepreneurship Education, a suitable training programme could be mandatory. This Design Thinking training might explicitly de-focus on “just” the process of creative problem solving but try to convey Design Thinking and its principles to an audience of educators.

While it might be suitable for practitioners to learn some applicable Design Thinking methods in a 2 day-workshop, this approach falls short of the needs identified in this study for an educator’s effective training. Entrepreneurship educators should gain a comprehensive and contemporary understanding of Design Thinking including its theoretical underpinnings and reflect on how the Design Thinking principles can enhance and align their didactic and pedagogical choices. Therefore, it is suggested to apply the pyramid model of Design Thinking, which has been conceptualised within this work (see Section 3.6) building upon the initial thoughts of Huber et al., 2016 and Rauth et al., 2010. This will foster a more holistic perspective on the possibilities of Design Thinking in Entrepreneurship Education going beyond the process view. Further, the four different forms of Design Thinking integration in Entrepreneurship Education (section 8.2) provide a framework in order to increase the entrepreneurship educator’s understanding of the concept, especially as it is applied in the entrepreneurial process (Sarooghi et al., 2019).

This study further demonstrated that a valuable integration of Design Thinking in Entrepreneurship Education required access to innovative infrastructure (Sarooghi et al., 2019) as well as a certain openness towards new educational cultures in higher education. The study, however, identified institutional, organisational and personal barriers which must be overcome to provide fruitful settings for a Design Thinking integration. Therefore, it is further suggested to extend

initiatives in a suitable infrastructure for entrepreneurial and Design Thinking-based learning and teaching, both embracing the importance of experience. Design Thinking integration requires, for example, access to prototyping labs and a studio-like environment fostering collaboration and innovation in an educational setting. However, the set-up of new learning spaces alone is not sufficient, as a valuable Design Thinking integration is dependent on an open teaching culture at the institutions. Indeed, Design Thinking principles can be applied to re-envision the future of education within the twenty-first century (Jobst et al., 2012; Johansson-Sköldberg et al., 2013; Kickbusch et al., 2020; Razzouk & Shute, 2012). The findings of this study suggested that, in order for entrepreneurship educators to engage in Design Thinking principles, they need a certain “freedom to design” if they should be trusted with becoming active learning designers, not just transferring knowledge. Thus, higher education institutions could incorporate a greater extent of flexibility in the creation and adaptation of entrepreneurship course programmes and curricula, as flexibility and freedom are required to deliver courses that are based on the principle of iteration. This, in turn, demands further opportunities for ongoing pedagogical trials and the possibility to infuse design principles such as prototyping in the creation of Entrepreneurship Education formats. From this, an imperative question is posed: how do educational systems embrace, create and sustain a design culture fostering entrepreneurship? The recommendation to do so finds support in several previous (case-)studies where critical assets for a valuable Design Thinking integration in practice are defined (Sarooghi et al., 2019).

In summary, Design Thinking has been confirmed as a valuable complement, not a replacement, for Entrepreneurship Education. The findings of this research advocated a more profound and reflective integration of Design Thinking within Entrepreneurship Education. These findings are expected to be transferable as the sample covered a rich diversity of perspectives, regarding the distribution of gender, Design Thinking experience and levels of expertise from 29 entrepreneurship educators coming from the UK and Northern Europe (Denmark, Germany, Netherlands, and Sweden). This expected transferability underlies the universality of the implications which could potentially be relevant in the Western higher

education context, including Australia, Canada, Europe and the United States. However, this research is not without limitations and thus, within the next section, a reflective commentary on the research limitations and the research process is shared.

9.3 Research Limitations and Reflection

Although the research aim was addressed, and the research questions were answered, further refinement of this study could have expanded its potential. General limitations and thoughts regarding the reliability and validity of this qualitative inquiry are presented in the early sections when reflecting on the research methodology (see Section 6.6). Within this section, a retrospective, critical reflection upon the methodology, the methods employed, and further limitations of this study are discussed, including limitations regarding its time, scope and limited access to resources.

One limitation was the adaption and reduction of chosen methods due to the COVID-19 pandemic. Initially, teaching observations had been planned as a complementary method to observe and reflect on the actual behaviour of the entrepreneurship educators in the classroom. Unfortunately, the phase of data collection was conducted between May and September 2020 in which all of the higher education institutions across Europe were in lockdown and no face-to-face teaching took place. Although the qualitative interviews provided excellent data points and the return of requests exceeded expectations, complementary teaching observations would have enhanced the potential by identifying the implicit application of Design Thinking principles in Entrepreneurship Education and enriched the data.

In addition to the missed opportunity to undertake teaching observations, the pandemic led to further limitations to the study. All of the 29 interviews took place during a time of contact and travel restrictions and thus were conducted online via video call. These Zoom interviews resulted in a rich data set that covered five different countries without additional travel costs. However, conducting qualitative interviews online also restricted the implicit, personal and contextual insights which would have been gained in a face-to-face setting, often in the natural

environment; the higher education institutions where the entrepreneurship educators are employed.

A further limitation of this research is the missing wider review and analysis of the topic, for example, through a curricular analysis. Initially, this research aimed to examine curricula documents in order to gain insights into the curricular value of Design Thinking in Entrepreneurship Education. This would have been a valuable addition as curricula and course descriptions are the most important administrative documents that determine the quality and content of training and education (Carl, 2009). Furthermore, the examination of qualitative documents is a basic type of preparatory data collection in qualitative research (Creswell, 2014). However, there was limited access to relevant resources during the data collection process. First, there was restricted access to the course syllabus from publicly available sources such as higher education websites. Second, the course description of several courses was not up-to-date and did not reflect the current status of their teaching. This limited the results of this research regarding the level of Design Thinking integration from the educator's perspective and excluded potential valuable insights into the integration from an institutional, curricular perspective.

Another limitation of this study relates to the interview guidelines. The initial intention was to include questions on how the participants understand the DT/EE nexus. However, during the interview process, most participants felt overwhelmed in providing a credible answer to this question. It became apparent that it is not up to the academic community of Entrepreneurship Education to define what Design Thinking is, as this should be left to the Design Thinking scholars. Thus, this study focused on how entrepreneurship educators understand and apply Design Thinking within the Entrepreneurship Education context of higher education. This approach is in line with the interpretative approach which aims to understand human behaviour and the creation of the meaning of those involved. However, it is uncertain whether participants were knowledgeable on the Design Thinking concept, so their answers only reflect their understanding, which might be different from the reality of Design Thinking experts. Still, this underlines that

this study emphasized the interpretative understanding of the value of Design Thinking for Entrepreneurship Education.

Regarding the timeline of this study, the results of this study were restricted as they reflected the value of Design Thinking for Entrepreneurship Educators at this particular time. Even though a longitudinal representation of, for example, the perceived change of value of Design Thinking in Entrepreneurship Education context might be worthwhile research, this was not possible within the constraints of the study (as outlined in Section 6.2.3). Further, there was also a limitation concerning the data analysis. It would have been commendable to integrate a second reviewer in the coding or include a second round of respondent validation in order to confirm and potentially improve validation of codes and themes. This was not possible due to the limitations of time, resource and lockdowns. However, this study mitigated this by integrating reflective practice to actively reflect on the possible impact of the researcher's own bias. Reflecting upon this interpretive view was not aimed to create a superior truth (Kettley, 2010) but rather to present multiple perspectives in order to construct meaning and portable principles (Goia et al., 2012; Breakwell, 2000; Miles & Hubermann, 1994).

Moreover, a reflection upon the limitations of this study also included a reflection on the overall PhD research process, which served the goal to build and develop research skills. Thus, periods of reflective practice were embedded during the process in order to contemplate the researcher's experiences and perceptions, further shaping the interpretive philosophy guiding this research. This regular engagement in reflective periods was important and valuable, especially with the researcher's role being that of an entrepreneurship educator applying Design Thinking. In retrospect, a change in perception emerged and preconceived ideas on the value of Design Thinking for Entrepreneurship Education and related questions have been overcome. It is hoped that the findings and insights of this study will contribute to inspiring further entrepreneurship educators in this process of reflection. This section presented the limitations of this research and further reflection upon the research process including a justification of the given constraints. In general, these limitations should be recognised concerning the achieved contributions and the value of this research. Further, these limitations

can be regarded as offering opportunities for further work, which will be introduced in the following section.

9.4 Opportunities for future research

The findings and proposed frameworks from this study suggested several new and related questions. This study covered the most prominent connection between Design Thinking in Entrepreneurship Education along the two defined dimensions covering the conceptual and educational perspectives. The interface is illustrative and based on the data; however, the conceptualised interface is not necessarily exhaustive. Thus, further linkages seem plausible, and further studies have the potential to expand the findings and provide broader insights. This study explored the topic solely from an entrepreneurship educator's perspective. Although some of those entrepreneurship educators had quite some practical experience with Design Thinking, it would be further valuable to invite the thoughts of Design Thinking scholars to discuss the results.

Since Design Thinking has been more frequently applied in Entrepreneurship Education settings, researchers are recommended to assess how Design Thinking affects the entrepreneurship educators' practice. Future work on the student's perspective would enhance this study and provide promising opportunities for further insights. This future work could provide answers to open questions such as how the different Design Thinking integrations that have been identified within this work (Selective, Idea-centric, Procedural, and Holistic) contribute to the development of entrepreneurial competencies among the students. Potentially, a study comparing the student and educator's views on the topic through focus groups and interviews could be of interest.

Previous work has acknowledged that the selective integration of Design Thinking Tools has been too often used in a superficial manner (Sarooghi et al., 2019) - a practice that has been confirmed by this research. Thus, it will be crucial to examine the output of this kind of teaching and develop criteria for assessment. A suggested area for future research, therefore, could be a design-science research approach toward the creation of an entrepreneurial curriculum, including Design Thinking. This would further add to the rigour-relevance gap (Berglund et

al., 2018; Finch et al., 2018) and requires educators to pay further attention to the limitation of theoretical rigour, especially in practically oriented courses (Mansoori & Lackéus, 2019).

Further, this investigation could also explore in greater depth the influencing contextual factors on the successful application of Design Thinking. As previously discussed, (see Section 7.4.6 on the Importance of Context), participants reflected upon the differing readiness of students to pick up on Design Thinking depending on the disciplines they come from and the non-value of the human-centred Design Thinking perspective in the educational context of, for example, deep-tech entrepreneurship. By contrast, Design Thinking claims to be relevant for everything and anyone (Dell’Era, 2020; Razouk & Shute, 2012) but in the context of Entrepreneurship Education, the question could be raised whether it has specific value for target groups in specific phases of the entrepreneurial process. In this context, this study has made some initial steps in emphasising the strength and value of Design Thinking in problem-understanding and conceptualising this practical application as an idea-centric integration. These initial findings could potentially be further evaluated.

This study can be regarded as a promising basis for future extension of this field of study from a quantitative perspective. Previous research has performed a survey-based approach to demonstrate the wide implementation of Design Thinking among university departments and entrepreneurship centres in the United States (Sarooghi et al., 2019). In line with the philosophical viewpoint of this research, it has been essential to gain insights into the topic from a qualitative perspective. However, quantitatively evaluating the current state of practice of Design Thinking within Entrepreneurship Education in Europe would be a valuable and promising complementary path for future research. This path would increase the comparability of the European perspective to the status quo in the American context. The findings of this qualitative study went beyond answering the research aims of this study and can be regarded as a potential source for future research recommendations. In this study, many entrepreneurship educators followed the invitation to reflect on their self-conceptualisation and role in the classroom. These data points revealed notable ambivalences which might provide future avenues

for understanding the educator's perspective on Entrepreneurship Education. These future avenues include the conflict of switching roles, the need for train-the-trainer offerings and educational guidance or the challenge to overcome personal barriers in the adaption of a new teaching philosophy. Overall, a new question has emerged from this study questioning whether entrepreneurship educators teach Design Thinking for entrepreneurship or whether they teach entrepreneurship through Design Thinking. Prior research has conceptualised the relationship of Design Thinking within the entrepreneurship (with a focus on the effectuation principles) context as "entrepreneurial ways of designing and design-erly ways of entrepreneuring" (Klenner et al., 2021, p. 66); a viewpoint that includes potential for fruitful research. Further, recent research from the scholarly field of Design Thinking discussed the designer's need to emphasize reclaiming Design Thinking as a designer's domain "(Micheli et al., 2019). However, one of the main contributions of Design Thinking has been the integration of diverse disciplines within the practice and research (Auerhammer & Roth, 2021) and thus Design Thinking provides researchers with an opportunity to incorporate knowledge from diverse disciplinary perspectives in order to innovate higher education in an entrepreneurial way. In this line of enquiry, there are various potential avenues for future work, such as the potential of design-based learning activities in Entrepreneurship Education.

Recent studies that make connections between Design Thinking and Entrepreneurship Research in general (Hyytinen, 2021) foster Entrepreneurship Education by design (Lahn et al., 2016) or formulate design principles for the design of Entrepreneurship Education programmes (Baggen et al., 2021; Zhang & Van Burg, 2020). Those intents provide another novel perspective on Design Thinking being relevant, not only to the educational context of entrepreneurship, but rather suggesting a design mode for research in a design-science manner (Dimov, 2016). This study has provided insights into the reality that some entrepreneurship educators apply Design Thinking principles as their overarching guideline for teaching entrepreneurship. By contrast, this reflected the need for inexperienced educators who made use of Design Thinking to bridge a vacuum of educational

guidance and thus contributing to the existing debate on educating entrepreneurship educators (Lackéus et al., 2016; Neck and Corbett, 2018).

Perhaps most important have been the insights into the practice of those who adopted Design Thinking as their approach to education and enacted intuitively design principles in their design of any classroom activities. This suggests a promising connection of this study with recent discussion in the wider field of entrepreneurship research proposing design (Romme & Reymen, 2018) and the use of design principles as a solution to bridge theoretical rigour and practical relevance (Berglund et al., 2018; Berglund & Wenner, 2016). This provides further opportunities for research, especially in the field of Entrepreneurship Education and how research on Entrepreneurship Education is conducted in a more design-based manner. Future work might extend the idea of the educators 'role as the learning designer' (Kickbusch et al., 2020; Paniagua & Istance, 2018) and provide future avenues for researching the impact of Entrepreneurship Education from a design-science perspective. Therefore, this research would encourage future studies emphasising a design-based research approach in Entrepreneurship Education. This would be a meaningful extension of this work and could aim to improve the identified educational practices of Design Thinking in the real Entrepreneurship Education classroom setting.

9.5 Conclusions

In conclusion, it is no coincidence that Entrepreneurship Education is one of the pioneering fields in the implementation of Design Thinking. This chapter has outlined the contributions and implications of the study as well as reflected upon its potential limitations and opportunities for future work. As shown, the findings of this study illustrate the need for further reflection and conceptual clarity upon the endurance of Design Thinking as a possible permanent addition to Entrepreneurship Education. The findings bring convergence on a common understanding of the different perspectives (toolset, process, and principles) and defined forms of educational practice (selective, idea-centric, procedural, and holistic) as well as illustrate the value of Design Thinking for Entrepreneurship Education.

This has been done through the insights from 29 Entrepreneurship Educators coming from the UK and Northern Europe (Denmark, Germany, Netherlands, and Sweden). As such, this study has contributed to a more profound perspective on Design Thinking within Entrepreneurship Education. It became apparent in this study that Design Thinking is predominantly integrated as a process in the educational practice of entrepreneurship educators. Thus, in order to foster a more comprehensive understanding of the concept, this study suggests more profound training for Entrepreneurship Educators. The pyramid model of Design Thinking, which has been conceptualised within this work (see Section 3.6) building upon the initial thoughts of Huber et al., (2016) and Rauth et al., (2010), as well as the four different forms of DT integration in EE (section 7.2), provide a framework in order to increase the entrepreneurship educator's reflection on how to Design Thinking within their teaching and, most importantly, learn to transfer the principles of Design Thinking into their educational choices. In order to support this, Higher Education Institutions need to help Entrepreneurship Educators to overcome the defined existing barriers and incorporate a greater extent of flexibility and freedom of design in the course creation. With a more reflective integration, Design Thinking can be a valuable complement, not a replacement, for Entrepreneurship Education. Further studies might hold value in investigating the influencing factors on the successful application and quantitatively evaluating the current state of practice of Design Thinking within Entrepreneurship Education in Europe.

Overall, this study presents the new centrality of the educator's perspective at the core of the review of Design Thinking as it pertains to Entrepreneurship Education. This provides potential for future work such as expanding the insights by inviting the thoughts of Design Thinking scholars in order to incorporate diverse disciplinary perspectives in the entrepreneurial innovation of Higher Education Institutions and drive future studies with a design-based research approach in Entrepreneurship Education.

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Appendix 1: Interview Guideline Semi-Structured Interviews

Warming-Up

- Short Introduction of myself
- Explanation of the Research Topic and Background of this research without referring to the concept of Design Thinking in order to avoid bias: "Within this research we analyse Entrepreneurship Education Curricula and current practice in teaching Entrepreneurship Education in Higher Education"
- Remark of Ethical Consent / Interview will be stored and transcribed etc

Exploration of Personal Background

- If you may shortly introduce yourself – and explain to me your personal background – discipline, and what brought you to teach Entrepreneurship Education?
- Only if not answered via previous Email:
 - Curriculum Vitae
 - What courses/modules do you teach? For whom? For how long?
 - Could you send the Course Syllabus?

Exploration of Perspective on Entrepreneurship Education

- What is your definition/perspective of Entrepreneurship Education? How have you come to that definition/perspective?
- How would you define the goal of Entrepreneurship Education?
- If you think about about one of the courses you're teaching, how would you describe the goal of your course?

Exploration of Pedagogical Perspective on Entrepreneurship Education

- How would you describe your approach to teach entrepreneurship education (e.g. if they are not sure what I mean: interactive, experience-based, practical-oriented, personalized – e.g. teaching/learning through listening, teaching/learning through interaction / or empowerment)
- How would you define yourself as an educator? How would you describe your teaching style? (e.g. if they are not sure what I mean: do you see yourself as someone delivering knowledge or rather facilitating a process? Is your teaching style rather authoritative or personal, how is the interaction rate with your students high/low – teaching styles: directing, discussing, delegating)

Exploration of Perspective on Design Thinking

- Have you heard of Design Thinking?
- How do you know Design Thinking? Where have you learned about it?
- How would you assess your experience with Design Thinking? In which category would you put yourself? Beginner/Mediate/Expert?
- What do you associate with Design Thinking? What do you think of when you think of Design Thinking? In your own words, what is Design Thinking about? -> **RATHER PROCESS; TOOLS OR MINDSET?**

Rather less experience

Exploration of "unconscious" use of Design Thinking in Entrepreneurship Education

- > How do you teach your Entrepreneurship Course? Can you tell me a little bit more about the structure and content of the course?
- > If you think about an Design Thinking Coach/ Design Thinking Workshop – how would you describe the pedagogical approach/setting in design thinking? (e.g. if they are not sure what I mean: interactive, experience-based, practical-oriented, personalized – e.g. teaching/learning through listening,

Rather more experience

Exploration of Pedagogical Perspective on Design Thinking

- Do you teach Design Thinking? (if yes: Please tell me a bit more about what and how you teach Design Thinking as part of your Entrepreneurship Education Course (e.g. programme, module, lesson, course)
- Regarding the teaching strategy – how would you describe the pedagogical principles in Design Thinking in general?
- Do you use Design Thinking Principles in your approach to your teaching? E.g. Has the Design Thinking Experienced shaped you as an educator?

Appendix 1: Interview Guideline Semi-Structured Interviews

<p>teaching/learning through interaction / or empowerment)</p>	<ul style="list-style-type: none"> • Would you say that you embrace a Design Thinking Mindset as an Entrepreneurship Educator?
<p><u>Tools and Models</u></p> <ul style="list-style-type: none"> • Do you recognize any of the tools and models? Have you ever used one in your teaching? > Show Table/Slide with Tools 	<p><u>Tools and Models</u></p> <ul style="list-style-type: none"> • Do you use Models and Theories from Design Thinking in your teaching of other subjects? If so, how? ➔ Show Table/Slides with Tools
<p><u>Exploration of Conceptual Interface of EE/DT</u></p> <ul style="list-style-type: none"> • From your perspective: Are there any similarities in the concept of Entrepreneurship Education and design thinking? How would you describe these similarities? • From your perspective: Are there any differences in the concepts of Entrepreneurship Education and Design Thinking? How would you describe these differences? 	<p><u>Exploration of Conceptual Interface of EE/DT</u></p> <ul style="list-style-type: none"> • From your perspective: Are there any similarities in the concept of Entrepreneurship Education and design thinking? How would you describe these similarities? • From your perspective: Are there any differences in the concepts of Entrepreneurship Education and Design Thinking? How would you describe these differences?
<p><u>Exploration of Pedagogical Interface of EE/DT</u></p> <ul style="list-style-type: none"> • If you think about a Design Thinking Coach and an Entrepreneurship Educator - In what way would you say that the pedagogical principles of DT/EE are different or similar? 	<p><u>Exploration of Pedagogical Interface of EE/DT</u></p> <ul style="list-style-type: none"> • Regarding the pedagogical principles in general: In what way would you say that the pedagogical principles of DT/EE are similar? • In what way would you say that the pedagogical principles of DT/EE are different? (Are they?)
<p><u>Exploration of Value of DT for EE</u></p> <ul style="list-style-type: none"> > Why have you not yet integrated Design Thinking in EE? Why might you integrate Design Thinking in Entrepreneurship Education? Why/Why not? 	<p><u>Exploration of Value of DT for EE</u></p> <ul style="list-style-type: none"> • From your personal perspective: Do you see any value of integrating Design Thinking in EE? • (If yes) What kind of value? (If not): Why might you integrate Design Thinking in Entrepreneurship Education? Why/Why not? • Do you see any value of DT for yourself as an Entrepreneurship Educator? Does it influence your approach/ understanding as educator? In which way?
<p><u>Exploration of Context</u></p> <ul style="list-style-type: none"> • How would you describe your institution's perspective on entrepreneurship education? • How is entrepreneurship Education integrated in your university on a meta-perspective? 	
<p><u>Finish</u></p> <ul style="list-style-type: none"> • Thank you • If not yet: Question for Sending Curricula Documents • Possible Contact / Recommendation for further interviews 	

Appendix 2: Research Information Sheet



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Swansea University
Bay Campus
Fabian Way
Swansea,
SA1 8EN
Tel: +44 (0)1792 295601

SCHOOL OF MANAGEMENT

STUDY INFORMATION SHEET

Title of Project:	Pedagogical Design and Teaching Practice in Entrepreneurship Education	SOM-REC Reference Number:	
Researcher(s):	Hannah Laura Schneider, Stuttgart Media University, Dr. Louisa Huxtable-Thomas, Swansea University Prof. Paul Jones, Swansea University Dr. Robert Bowen, Swansea University Prof. Dr. Nils Högsdal, Stuttgart Media University	Researcher's Email(s):	

Purpose of this research:

It will be the aim of this study to explore the pedagogical design of Entrepreneurship Education. This research study follows a qualitative approach, divided in an investigation of the current curricula integration and its application in practice. The participants involved in the study, especially in the focus of the pedagogical investigation, will be Entrepreneurship educators from Higher Education Institutions in Europe with more than 3 years of experience teaching in the field. Entrepreneurship Educators include e.g. Professors in Entrepreneurship, Lecturers in the field of Entrepreneurship and Entrepreneurship Education, Teaching Staff.

Participant Involvement

Participating in this study will include a voluntary interview of which will be 60-90 minutes of duration. Questions will be open-ended and relate to your perspective on Entrepreneurship Education as well as on your role as an educator and your experiences teaching in the field.

Collected Material

The interviews will be audio-recorded and transcribed. The interviews will be anonymously represented in the research, the dissertation and future publications. No legal names will be used. If statements from the interview will be quoted, pseudo names (e.g. "Participant A") will be used. Furthermore, the Participant Information will be published in the following format: *Participant A: Job Description, Field, University/Polytechnic in the UK.*

Participant Opt-Out

An informed consent form will be sent to the participants previously to the interview. If a participant would like to opt-out, participants can withdraw at any time or refuse to answer any question without any consequences of any kind.

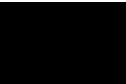
Appendix 3: Ethical Consent Form



School of Management,
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I volunteer to participate in a research project conducted by Hannah Laura Schneider from Swansea University/Stuttgart Media University. I understand that the project is designed to gather information about teaching practice in entrepreneurship education in higher education.

- My participation in this project is voluntary. I understand that I will not be paid for my participation. I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
- I understand that the Participation involves being interviewed by researcher from Swansea University. The interview will last approximately 60-90 minutes. Notes will be written during the interview. An audio tape of the interview and subsequent dialogue will be made. If I don't want to be audio-taped, I will not be able to participate in the study.
- I agree to my interview being audio-recorded. I understand that disguised extracts from my interview may be quoted in dissertation, conference presentation and published papers. I understand that I can withdraw permission to use data from my interview within six weeks after the interview, in which case the material will be deleted.
- I understand that all information I provide for this study will be treated confidentially. Subsequent uses of records and data will be subject to standard data policies which protect the anonymity of individuals and institutions. I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
- I have had the purpose and nature of the study explained to me in writing, I have received the information sheet in advance and I have had the opportunity to ask questions about the study. I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

_____	_____	_____
Name of participant (block capitals)	Date	Signature
Hannah Laura Schneider		
_____	_____	_____
Researcher (block capitals)	Date	Signature

Remember that participation in this research study is completely voluntary. Even after you agree to participate and begin the study, you are still free to withdraw at any time and for any reason.

If you have any complaints or concerns about this research, you can contact the School of Management Research Office by emailing Helen Snaith at h.snaith@swansea.ac.uk.

Appendix 4: Interview Invitation Email Example

Dear XYZ,

I am writing to you today as your perspective would be of high value for my research into the practices of entrepreneurship educators. I hope to convince you to contribute to my research project as I am currently enrolled as an external Ph.D. student at Swansea University under the supervision of Dr. Louisa Huxtable-Thomas and Prof. Paul Jones where I am researching the **pedagogical design of Entrepreneurship Education**.

For this, I am taking a qualitative approach including **semi-structured interviews** with Educators as well as Content Analysis of Curricula among Higher Education Institutions in Europe. Therefore I am seeking for Entrepreneurship Educators with more than 3 years of experience teaching in the field - such as you. Participating in this study will include a voluntary interview (around 60 minutes of duration), taking place in May, June, or July 2020.

I have already conducted some of my first interviews with e.g. **XYZ** who also **mentioned you as a valuable participant in the research**. With our research, we hope to make a contribution to the current state of teaching in Entrepreneurship Education - and therefore **your perspective and participation will be of great value**. Attached you find the Research Information Sheet with some further information.

So what do you think?

It would be more than great to have you on board! If you like, you can already book a time slot using following this link, it makes calendar coordination very easy: <https://calendly.com/schneider-hannahlaura/interview-entrepreneurship-education>
If you have any further questions needed to be clarified, please let me know!

So what do you think? If you have any further questions, please come back to me!

With the very best wishes from Germany,

Hannah Laura Schneider

Dear XYZ,

thank you very much for participating in our interview study! I am very happy about your interest and looking forward to our interview as agreed on for **the 23rd of June (Tuesday) at 9am!** This is great - it feels like a great honour to have you on board!

For prior information please consider the **Research Information Sheet including the Ethical Consent form attached**. In preparation for the interview I would like to ask you to sign the document on page 2 and send it back to me. The interview will take place via Zoom - you do not need to download software for this, just join the meeting with the Password "1234" - I will also send you a calendar invite with the information.

Here is the link for the Video Call: <https://zoom.us/j/4191653785?pwd=ZnAzMkdEd3pia3FzVjAwUDZpc0E0QT09>
Meeting-ID: 419 165 3785
Password: 1234

I am very much looking forward to speaking to you and hear your perspective! If you have any further questions, please come back to me at any time.

Many thanks in advance and with best wishes from Germany,

Hannah Laura Schneider

Appendix 5: First Stage Ethics Review Swansea University

SCHOOL OF MANAGEMENT, SWANSEA UNIVERSITY

FIRST STAGE ETHICAL REVIEW FORM

To be completed for all research involving human subjects OR datasets of any kind OR the environment

Name of PI or PGR Student	Hannah Laura Schneider
Staff Number or Student ID	
Supervisors*	Dr. Huxtable-Thomas, Prof. Jones, Dr. Bowen
Date Submitted	
Title of Project	An entrepreneurship education pedagogy drawing upon design thinking: a European Higher Education perspective
Name of Funder / Sponsor*	
Finance Code / Reference*	
Duration of Project	October 2018 – October 2021 (3 years Full-Time PhD)

Aim of research project (250 words):

It will be the aim of this study to bridge the gap between the disciplines of design thinking and entrepreneurship education exploring the DT/EE nexus, with a special focus on pedagogical design. Therefore it is the purpose of this study to illuminate the value of Design Thinking for Entrepreneurship Education in the Higher Education Context in general as well as investigating the value of Design Thinking for Entrepreneurship Education Pedagogy. The overall research aim of this study is to answer the following two Research Questions which serve as an umbrella over the whole study: 1. Curricular Focus: What is the value of Design Thinking for Entrepreneurship Education Curricula in Higher Education? 2. Pedagogical Focus: What is the value of Design Thinking for Entrepreneurship Educators in Higher Education?

In order to answer the questions above, the research study follows a qualitative approach, which is divided in an investigation of the current curricula integration and its application in practice.

* Complete if appropriate

Risk evaluation: Does the proposed research involve any of the following?

Tick those boxes for which the answer is **YES**

X Cross those boxes for which the answer is **NO**

Participants

- Will the study involve recruitment of patients or staff through the NHS or the use of NHS data or premises and/or equipment? If this is the case, the project **must** be reviewed by the NHS. Please see the following NHS online tools for help with this <http://www.hra-decisiontools.org.uk/research/> and <http://www.hra-decisiontools.org.uk/ethics/>
- Does the study involve participants aged 16 or over who are unable to give informed consent? (e.g. people with learning disabilities: see Mental Capacity Act 2005. All research that falls under the auspices of the Act **must** be reviewed by the NHS)
- Does the research involve other vulnerable groups: children, those with cognitive impairment or in unequal relationships? (e.g. your students). This

Research Design

- Will the study discuss sensitive topics or require the collection of sensitive information? (e.g. terrorism and extremism; sexual activity, drug use or criminal activity; collection of security sensitive documents or information)
- Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?
- Is pain or more than mild discomfort likely to result from the study?
- Will the study involve prolonged or repetitive testing?
- Are drugs, placebos or other substances (e.g. foods or vitamins) to be administered to study participants, or will the study involve invasive, intrusive or potentially harmful procedures of any kind? (If any substance is to be administered, this **may** fall under the auspices of the Medicines for Human Use (Clinical Trials) Regulations 2004, and require review by the NHS)
- Will tissue samples (including blood) be obtained from participants? (This would fall under the terms of the Human Tissue Act 2004. All research that falls under the auspices of the Act **must** be reviewed by the NHS)

Please summarise your methodology in detail and provide reflective comments with regards to the design of your research: *max 250 words*.

Overall, an instrumental case study design is applied, as the primary interest of this research is understanding the value of Design Thinking in Entrepreneurship Education than just understanding the particular cases itself. Based on the two focus strands (curricular + pedagogical value) a research design has been developed according to the Research Onion by Saunders et al (2015). The methodology includes mainly three different streams of data collection and analysis:

- 1.) Curricula Analysis: No participants involved, content analysis of curricula data from university websites
- 2.) Pedagogical Analysis I: Semi-Structured In-Depth Interviews with Educators: 60 to 90 minute interviews will take place in personal or via Skype. Interview guide questions will be created as a result of the curricula analysis and will focus on the educator's use of designing thinking, entrepreneurship education and use of pedagogy.
- 3.) Pedagogical Analysis II: Teaching Observations: In order to gain deeper insights in the value of Design Thinking and its application in Entrepreneurship Education pedagogy, teaching observations will be conducted with selected participants in a classical classroom observation manner. **There will be no video recording.** The classroom observation will be a discreet observation, wherein the researcher will have no interaction with the educator and students. The Researchers will gain fully informed and freely given consent to collect data from all of the adults involved in the study and freely given assent from students under the age of 18 (as well as consent from their parents or legal guardians). The educators (including professors, educational assistants, teachings staff) and students' thoughts and interactions that are observed become data and will be kept private/confidential, along with the identities of these study participants.

Data Storage and anonymity

- Will the research involve administrative or secure data that requires permission from the appropriate data controllers and/or individuals before use?
- Will the research involve the sharing of data or confidential information beyond the initial consent given?

Appendix 5: First Stage Ethics Review Swansea University

may require NHS review, and will typically require the researcher to get **Disclosure & Barring Service (DBS) clearance** (formerly CRB checks)

- Will the research harm or pose any risk to the environment? (e.g. research in environmentally sensitive areas (e.g. SSSIs); permission needed to access field sites; transport of samples between countries (e.g. soil); sampling of rare or hazardous material (e.g. invasive species) that could deplete or endanger)

Please describe the participants involved in your research (if no participants, state 'none'): *max 250 words.*

- 1.) **Curricula Focus:** Content Analysis of Curricula, no participants involved
- 2.) **Pedagogical Focus I:** Semi-Structured In-Depth Interviews: The participants involved in the study, especially in the focus of the pedagogical investigation, will be n= 20 entrepreneurship educators from Higher Education Institutions in Europe. Entrepreneurship Educators include e.g. Professors in Entrepreneurship, Lecturers in the field of Entrepreneurship and Entrepreneurship Education, Teaching Staff. Participants will be identified as a result of 1) Curricula Analysis.
- 3.) **Pedagogical Focus II:** Classroom observations will be conducted with selected educators. The selection will be based on purposive sampling and derived from the curricula analysis. The observations focus on the educators, but may involve observing the interactions between educator and students. The teaching observation is not at the core of this research but rather complementary, therefore this research aims for n=3-5 classroom observations.

Recruitment

- Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? (e.g. students at school, members of self-help group or residents of nursing home?)
- Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g. covert observation of people or use of social media content)
- Will the research involve any form of deception? (e.g. misinformation or partial information about the purpose or nature of the research)
- Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?
- Does the research involve members of the public in a research capacity? (e.g. participant research; participants as co-producers or data collectors)

Please explain the recruitment of participants involved in your research (if no participants, state 'none'): *max 250 words.*

The recruitment of the participants will take place by direct recruitment based on purposive sampling: All participants will be asked and invited (via E-Mail) to contribute to the study by being interviewed in semi-structured qualitative interviews. Potential participants and participants will be reassured that their participation is entirely voluntary, that they can withdraw at any time without providing reason and that their data can be destroyed if they wish.) The participants will receive an information sheet, which explicitly explains the research, one week in advance. Moreover, the participants will receive a written consent form, interviews will only take place if the completed consent form will be returned. The interviews with the participants will be audio recorded, and the audio will be transcribed with their consent. The participants confidentiality will be protected.

Appendix 5: First Stage Ethics Review Swansea University

- Will the research involve respondents to the Internet or other visual/vocal methods where respondents may be identified?

Please describe how you will store your research data and for how long, and, if appropriate, how you will ensure anonymity of your data subjects: *max 250 words*.

Potential participants and participants will be reassured that their participation is entirely voluntary, that they can withdraw at any time without providing reason and that their data can be destroyed if they wish. Confirmation of confidentiality was issued in all communications with the participants. Data will be stored in a number of formats including word documents, excel files, outlook messages and NVIVO files. All data will be retained on a secure server at HdM Stuttgart and backed up on the secure server at Swansea University. Data from research subjects will be kept in a separate file to their identifying information.

Safety and Risk

- Has a risk assessment been completed?
- Is there a possibility that the safety of the researcher may be in question? (e.g. in international research: locally employed researchers)
- Will the research take place outside the UK where there may be issues of local practice and political or other sensitivities?
- Could the research impact negatively upon the reputation of the University, researcher(s), research participants, other stakeholders or any other party?
- Do any of the research team have an actual or potential conflict of interest?
- Are you aware of any other significant ethical risks or concerns associated with the research proposal? (If yes, please outline them in the space below)

Please describe the health and safety considerations in relation to both participants and researchers (*250 words max*): *If there are significant concerns an appropriate risk assessment and management plan must be attached.*

The research project will be conducted in compliance with the Swansea University's Research Integrity Framework. This Research integrity framework includes the security of participants consent, a minimum of potential of harm as well as compliance with legal and safety and data protection obligations. Furthermore the ethical considerations taken have been followed by the structure of the six principles for ethical research defined by the Economic & Social Research Council (*ESRC Framework for Research Ethics, 2015*). In Summary:

- The participants are handed out a written consent form and are reassured that their participation is entirely voluntary.
- The participants of the interview study are only adults in an appropriate position of responsibility.
- The participants receive an information sheet on the purpose, method and intended use of this research one week in advance
- The anonymity of the data subjects is ensured meeting the requirements for data safety of the Swansea University. All data will be retained on a secure server.
- A robust process of designing this research has been conducted in order to meet the standards regarding integrity, quality and transparency.

All research work will be undertaken in either an office or classroom environment, which are familiar environments to the researcher and participants. No health and safety concerns have been identified for participants and researchers as a result of this study.

Appendix 6: Dovetail Screenshots – Interview Coding

Participant [00:06:00] OK. Well, I guess the first thing is for me to say, well, I think enterprise education isn't to say what I think is fair. And so I don't think enterprise education is about just graduate starts of numbers. And that's something that I find kind of frustrating, is that when people first hear about enterprise education, they're like, oh, well, you can only measure it by the number of start-ups that results from a particular degree or particular intervention or whatever it may. And I feel like that is a, you know, a very narrow definition of what enterprise education is about. For me, it's a much more about mindsets and a much more holistic perspective on the development of things like skills and competencies and attributes. So somebody may engage in enterprise education and not necessarily see an output, as it were, for five, ten years later. You know, it's really more about the development of the person. Because I see in that way, I see it as quite a tailored intervention. I don't think it's a one size fits all approach to enterprise education. I think it's very much about the individual. Some people will be very responsive to enterprise education. Some people, you know, it's not for them. I don't think we can try and enforce it on everybody. You know, the government all very favourable towards enterprise education, but I almost feel like they think, oh, it will work for everybody or we

entrepreneurial mi... 18

EE Definition 24

Wide definition 6

personal development 2

individual 5

student-centredne... 26

individual 5

Student Journey 3

hundred first semester students who have to use two full days from this. So I really also try to help them to make good quality. So it pushes them a lot. So this is not good enough. You have to reorganise. You have to do this differently and so on. And then, OK, building bridges between the theoretical work and this very, very hands on practical. Now we go to the toy store and buy some glitter. So like try to make it very seriously and theoretical background and at the same time, you know, support them in being creative and try things out and disrupt the prairies there. I always tell them that, like, the fairies are

role of the teacher 61

Fun 4

Participant [00:31:22] My personal experiences. So am I. You have been in academia. It's probably going to sound a bit controversial, but academia can be a little bit stuffy, like a little bit restrictive. And everybody's in their suits. They're very serious. You know, I'm not a very serious person. And I found that to be quite restrictive. And I thought, you know, that must be the same for students, because if I feel like I find sat in a conference room and I'm listening to someone give a presentation and the room is enclosed and the seats are fixed on the walls of plane, I'm not really being my most creative self. You know, I'm not really coming up with ideas because I'm boxed in. I think the students probably feel like that, too. So it came from personal experience. It also came from conversations with APHC students. So when I was at Plymouth University, the larger university, I was friends

Institutional restri... 20

creativity 10

Space 12 barrier 13

flexible space 8

Empathy for the stu... 6

Educators Need 28

Appendix 6: Dovetail Screenshots – Interview Coding

Participant [00:36:27] Yeah. I don't know where. I guess I've got that's the stereotype, I guess sort of comes from the fact that the people that I've heard talk about say I've been from the creative industries and creative sector. So I've got a bit of a stereotype from that design. The actual word design. If you think about it, it just makes you think of arts, crafts, media. So the actual terminology of it automatically makes me think of art and design. For example. I do say that by way of my understanding of design thinking is that it is all around kind of the problem and going back to the problem and then finding the solutions to that problem. And so it's very responsive. It's very agile. I mean, it's all about flexibility. That's that's kind of where my simple my ideas of design think,.

Interviewer [00:37:23] You know, you have any any thoughts on whether you rather forded it for you and form your understanding - it's a process, a toolset or a mindset?

- DT Definition 50
- iterative problem so... 5
- problem solving 13
- agile 1
- #creative 4
- #crafts 1
- #design 3 #art 1
- #problemsolving 9
- #iteration 4
- #responsive 1
- #agile 1
- #flexible 2

And if you think about a little bit now it's how do you say it, would you then s...

New Words 29 Value of Communication 11

H 7 Nov 2021

...hat that entails, working with already existing cases. But also to get them to a common understanding of how to get to a prototype. What are the mechanisms behind it in relation to entrepreneurship? So it's about finding that common language and understanding of the core principles of entrepreneurial thinking and design thinking to get them to this stage where they are able to just dive in deep and get some workshops on how to use the tools, but already have the kind of knowledge of how to kind of do it. Interviewer [00:41:13] So you do you use the design thinking process, any kind of process model also as an overall logic for the course or? Participant [00:41:24] Yeah. We're now starting up thi...

Value of Communication 11 entrepreneurial thinking 3

H 28 Oct 2021

...I start paying interest to this type of method? And that was in 2012 and I started as a teacher in 2010. So yeah, so I mean, pretty early on, I wanted to understand more method based on what I mean. I had been doing this in practice for many years as an entrepreneur and then there were these methods that describe this thing, and pretty, you know, pretty interesting way. So I started looking at them, but I didn't dig deeper into it at that point. Interviewer 22:14 And have you ever done like something like a training and design thinking or workshop, or it was just...

Value of Communication 11 Unconscious Use of DT 3

H 21 Oct 2021

...Interviewer [00:33:07] Oh, right. OK. OK. Why did I say yes (laughing)? Participant [00:33:14] So I. I was lucky because the people I knew on the network and the Enterprise Education Network and it was still early days then really introduced me to a lot of people that it's now moved into design thinking. I'd say at the time we weren't talking. We weren't using that language. This is when he the language he used to define the education techniques we use. It often changes over the years, but the actual styles don't change. People have been doing it for many years, but we now have a particular name for it. A way of categorising it. I think. But a lot of the people I was talking to in the early days have now become leaders in terms of how enterprise education happens and successful methods of education....

New Words 29 Value of Communication 11

H 25 Oct 2021

...what the hell I'm doing. Interviewer 14:44 Yeah. I mean, it's interesting because you said you've not always seen yourself as a designer, right? How you see yourself. Participant 14:56 I mean, I have got I've got an access to a new semantic toolbox for describing what I do and I've been working like this for longer than I've been able to say something to label what I'm doing. And I mean, what, we started working with tasks back in 2015 with Lookme. I've used it with my students since 2016. So I've been doing this for a number of years, I just haven't been able to underst...

Value of Communication 11

H 21 Oct 2021

Appendix 7: Dovetail Screenshots – Tagging & Code Structures

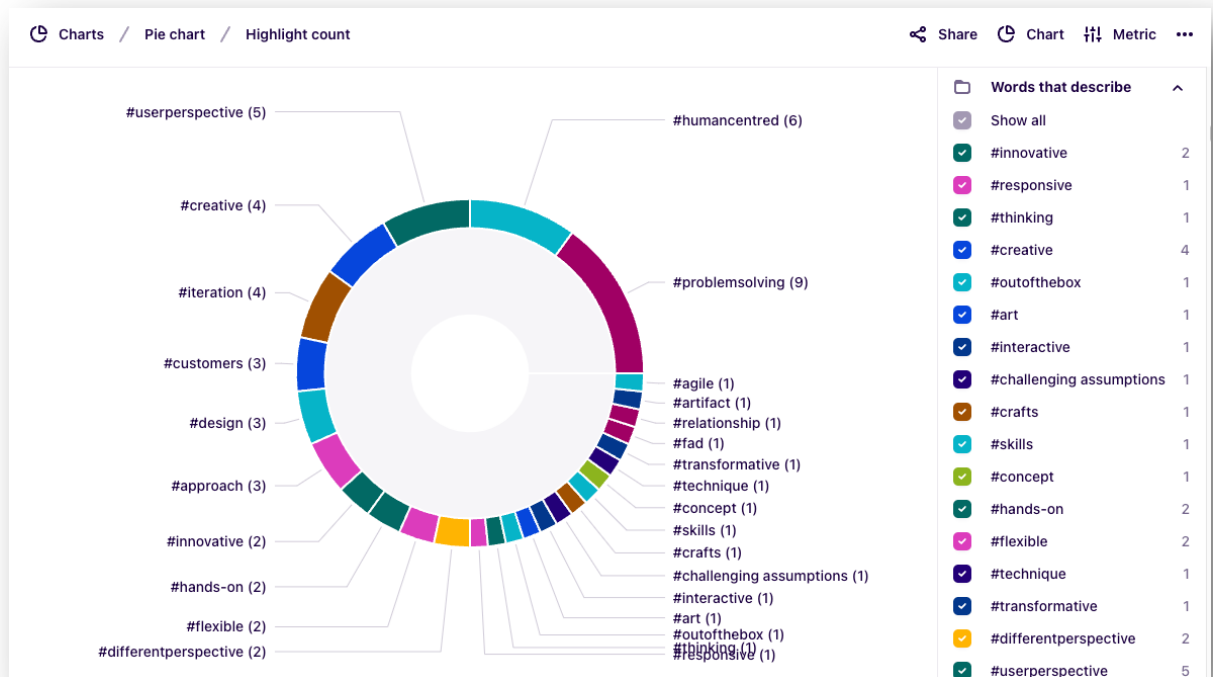
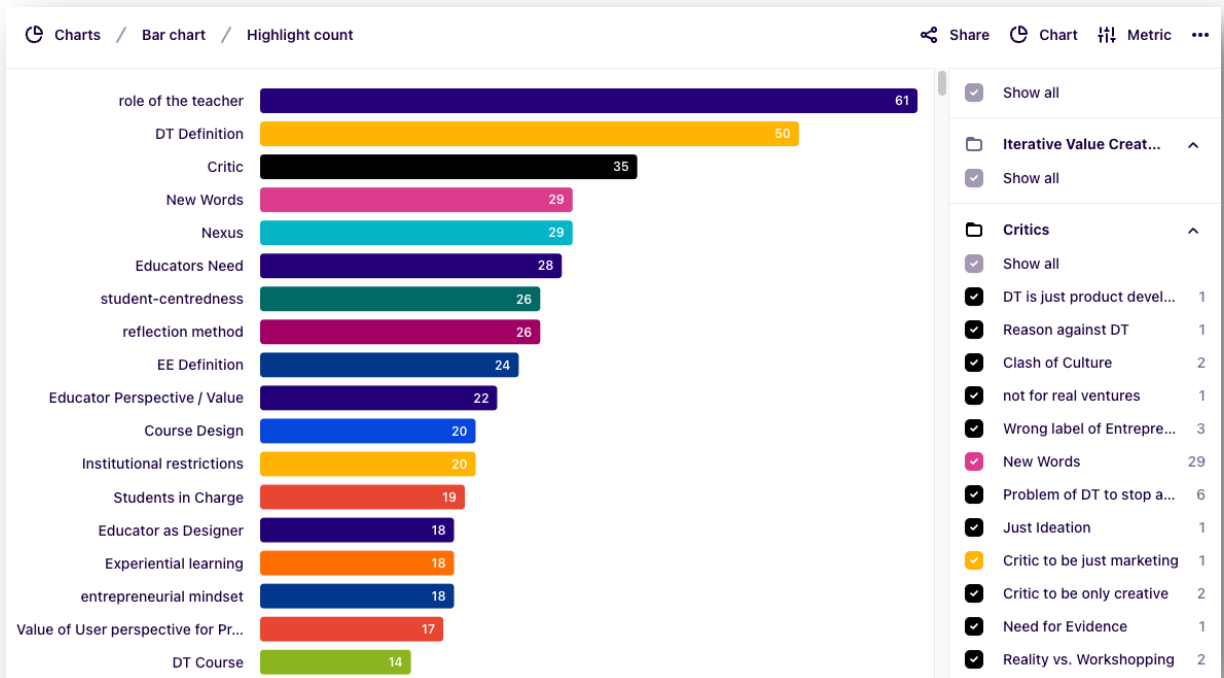
Content	Tags
<p>going beyond the class and has impact beyond</p> <p>So, a lot about... what I think is important when it comes to Open entrepreneurial mindset and entrepreneurial skillset, is that the action part. That they are in charge and they have to feel responsible. And this is and it's not me who knows all the answer, they have to figure out how might we do that?</p>	<ul style="list-style-type: none"> Action Learning 6 Find solution by themselves 2 Practice based 7 Responsibility 2 Students in Charge 19
<p>And this is and it's not me who knows all the answer, they have to figure out how might we do that? And I'm not the traditional lecturer. So, I think when it comes to what is important, that the role of the professor is changing. I'm not the mastermind to say, I said, no this is it. And this would be the answer. I'm more a kind of a coach who will introduce the series and the approaches and the methods and tools. Yeah. But that we're collaboratively thinking about how might we apply them in their field of application. To become expert, they have to become dominant.</p>	<ul style="list-style-type: none"> coach 7 collaborative learning 1 finding answers 1 role of the teacher 61
<p>when it comes to entrepreneurial mindset and entrepreneurial skillset, is that the action part. That they are in charge and they have to feel responsible. And this is and it's not me who knows all the answer, they have to figure out how might we do that?</p>	<ul style="list-style-type: none"> problem solving 13 student-centredness 26

Conceptual Themes

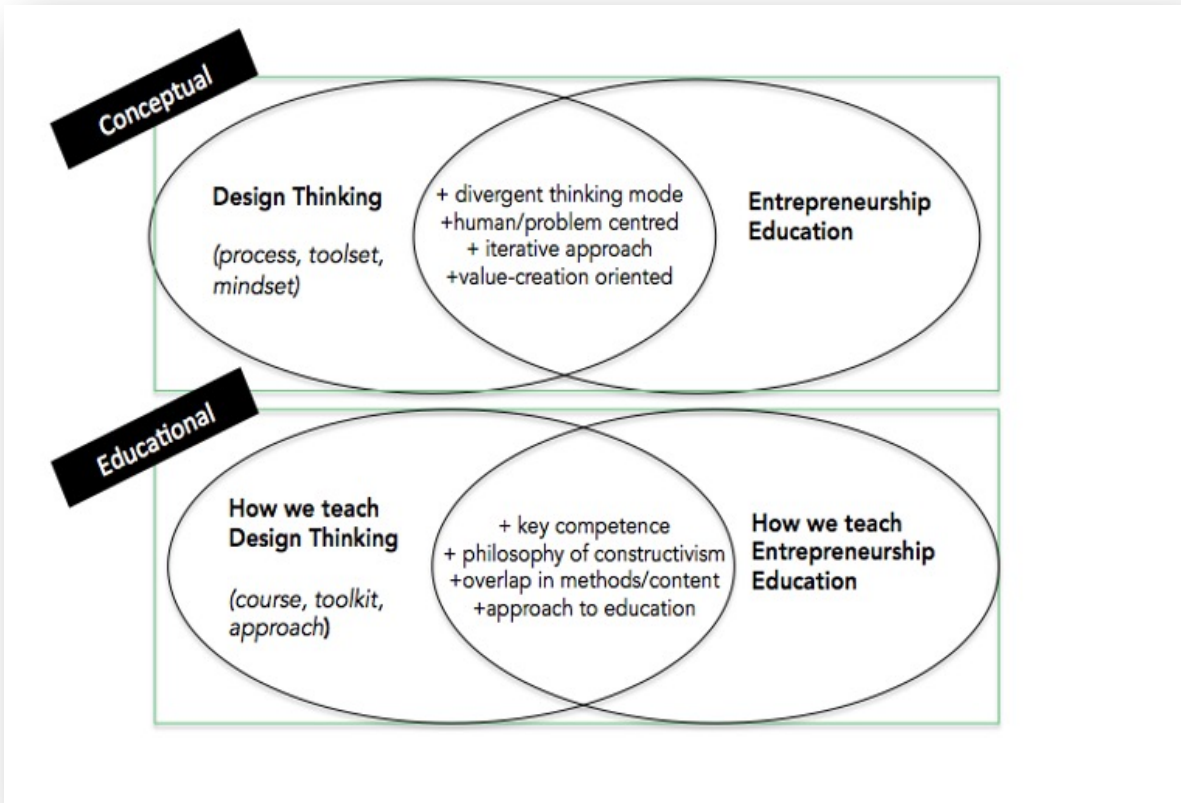
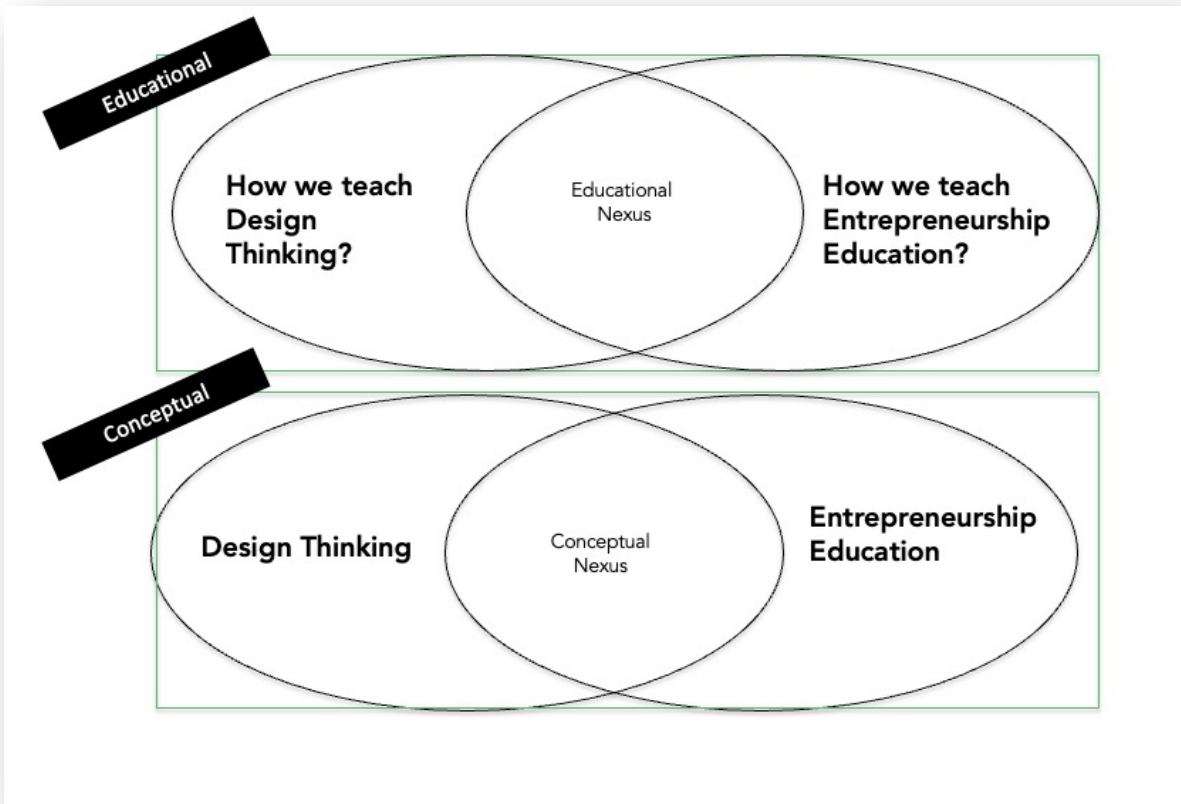
Share Import

Prototyping/Hands-On + ...	Key Competence/ Missi... + ...	iterative, Experiential P... + ...	student-centredness + ...
<ul style="list-style-type: none"> Make it Happen 3 Hands-On 2 Cycle 1 Working with Hands Working with Hands 1 tangible 1 Experimentation 3 prototyping 10 + New tag 	<ul style="list-style-type: none"> self-efficacy 1 valuable for life 1 key competence 2 mission to innovate education 3 self efficacy 1 + New tag 	<ul style="list-style-type: none"> Learning by doing 5 learning thorigh doing 2 iterative, experiential, project... 4 Practice based 7 Action Learning 6 Experiential learning 18 Iterative learning process 2 project-based course 7 + New tag 	<ul style="list-style-type: none"> Empathy for the students 6 student-centredness 26 Designing Courses to Integrat... 5 Find solution by themselves 2 + New tag

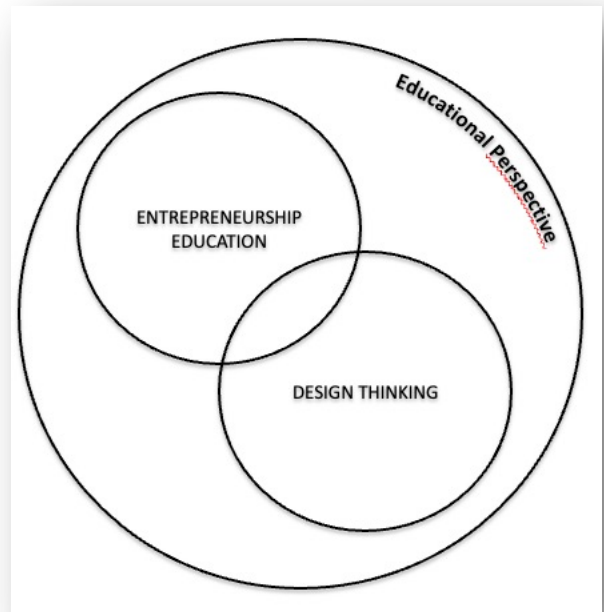
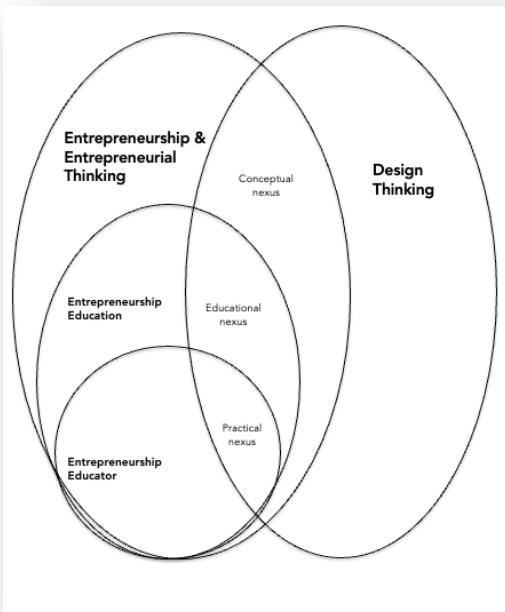
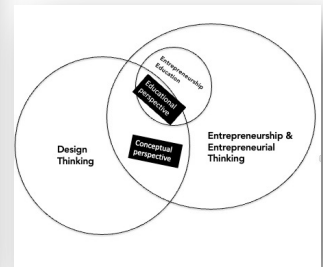
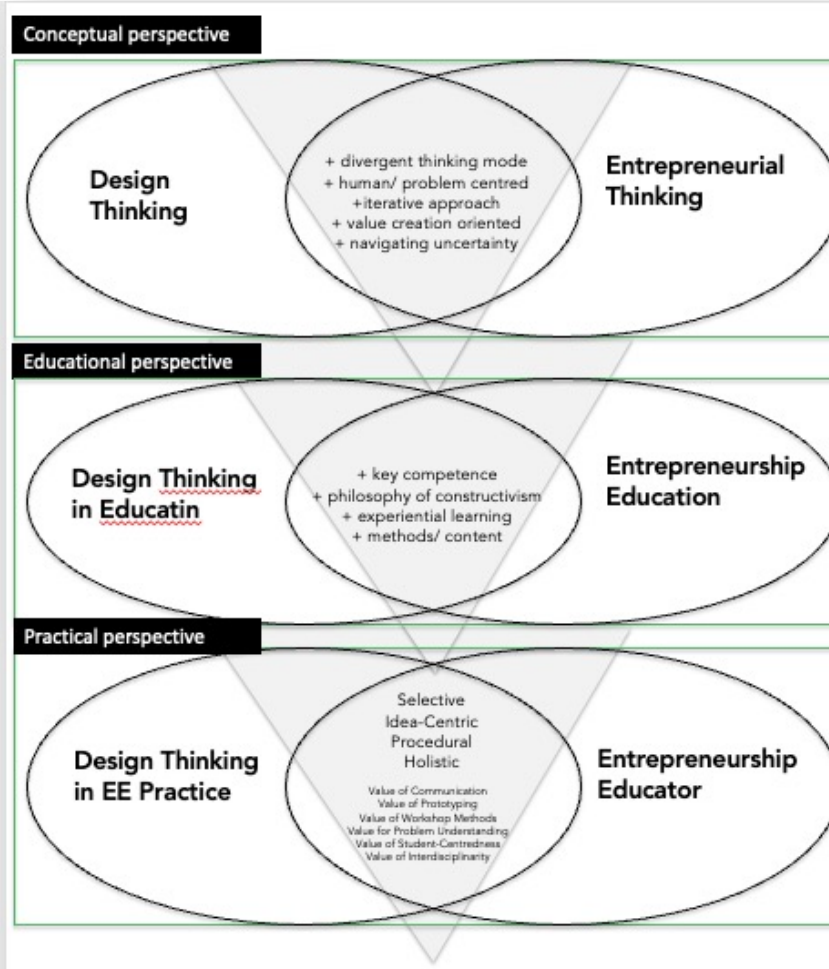
Appendix 7: Dovetail Screenshots – Tagging & Code Structures



Appendix 8: Evolution & Drafts of the DT/EE nexus

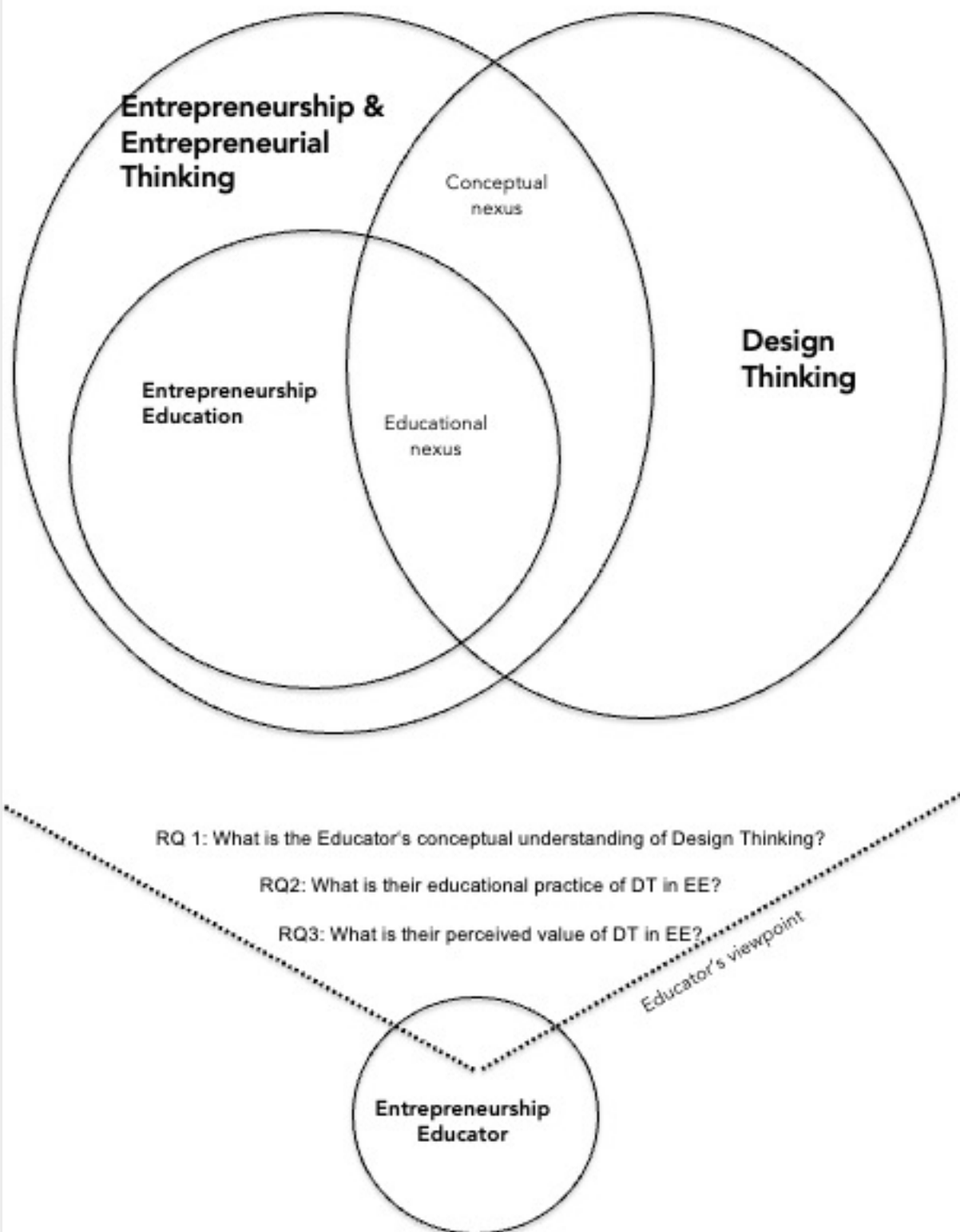


Appendix 8: Evolution & Drafts of the DT/EE nexus

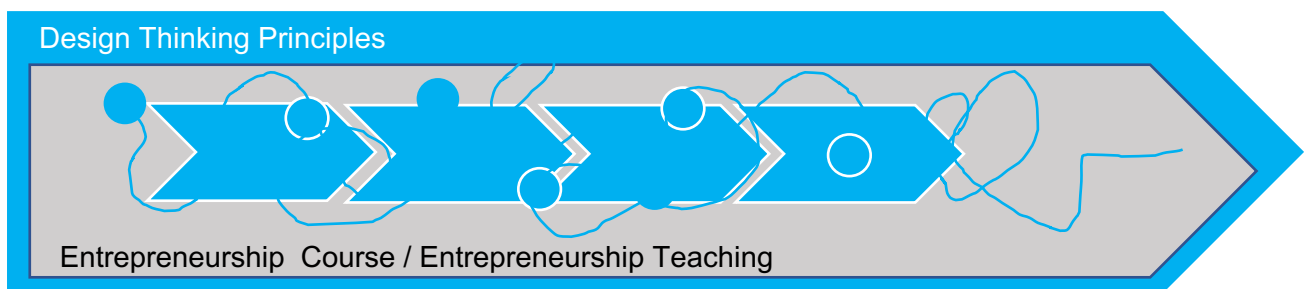
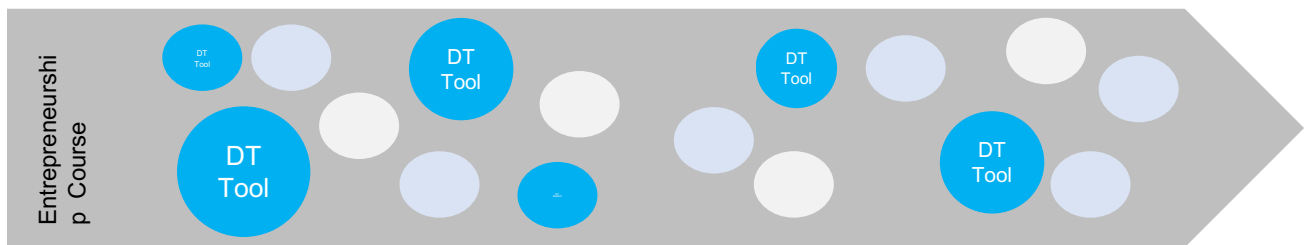
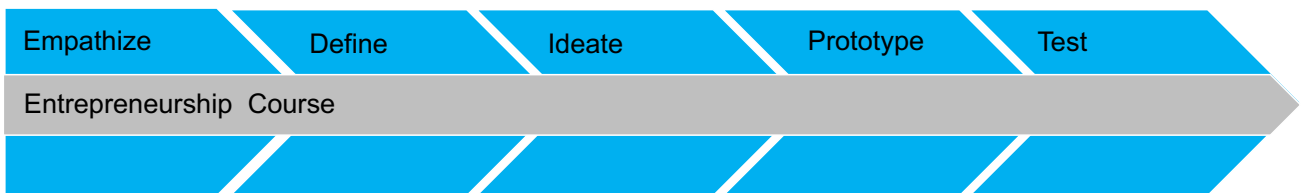
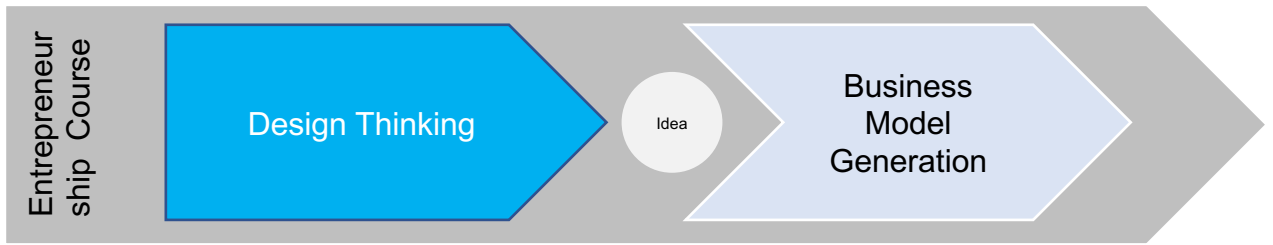


Appendix 8: Evolution & Drafts of the DT/EE nexus

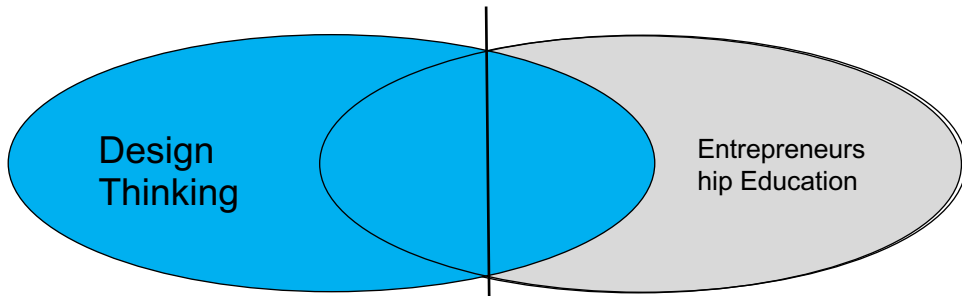
Entrepreneurship Education as Contextual Framework



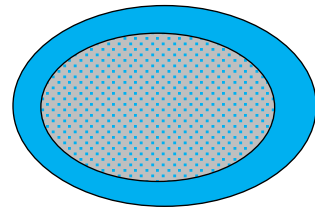
Appendix 9: Four forms of DT integration – Details of Illustration



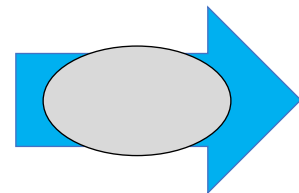
Appendix 9: Four forms of DT integration – Details of Illustration



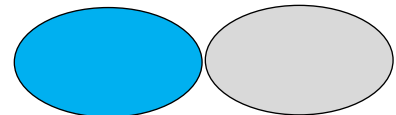
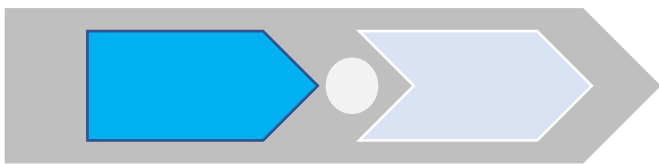
Holistic



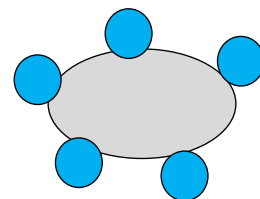
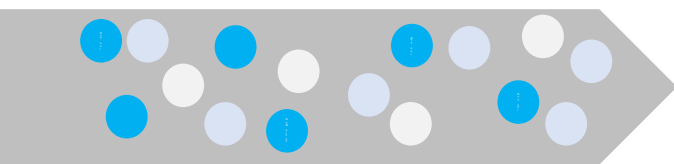
Procedural



Idea-centric

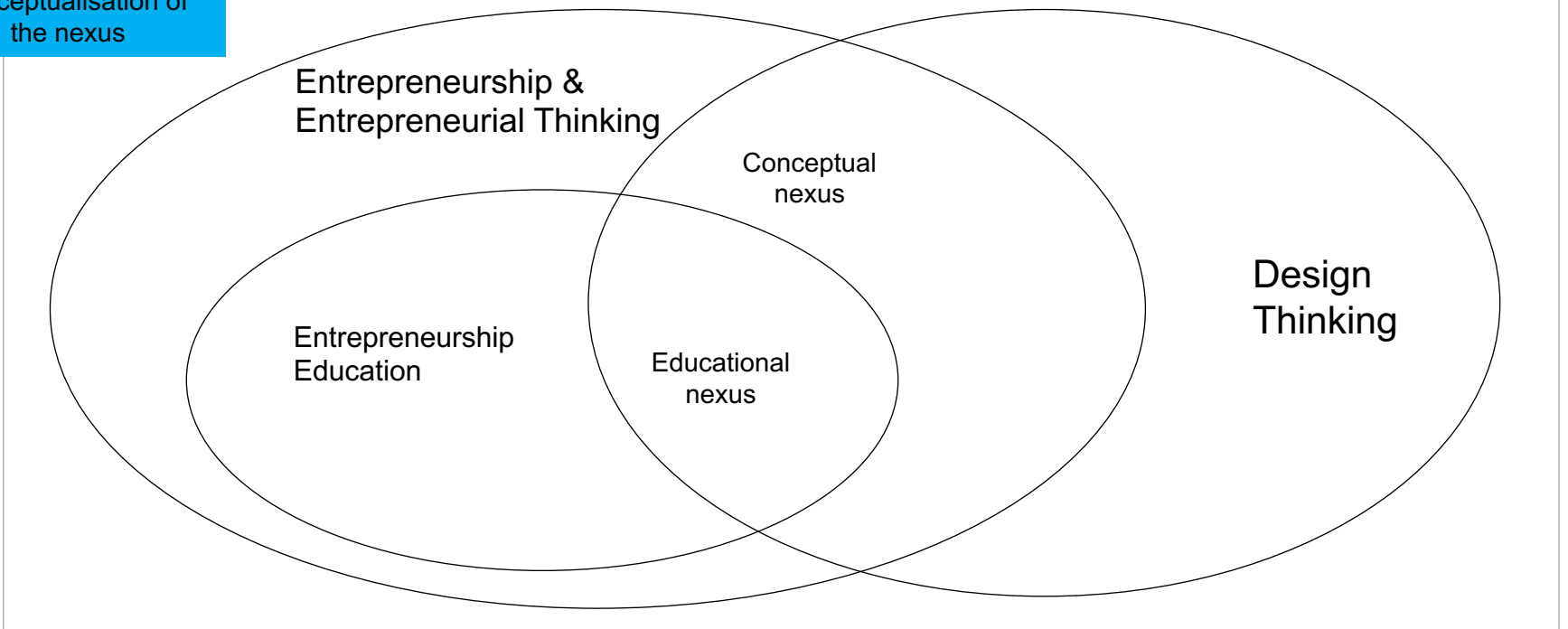


Selective



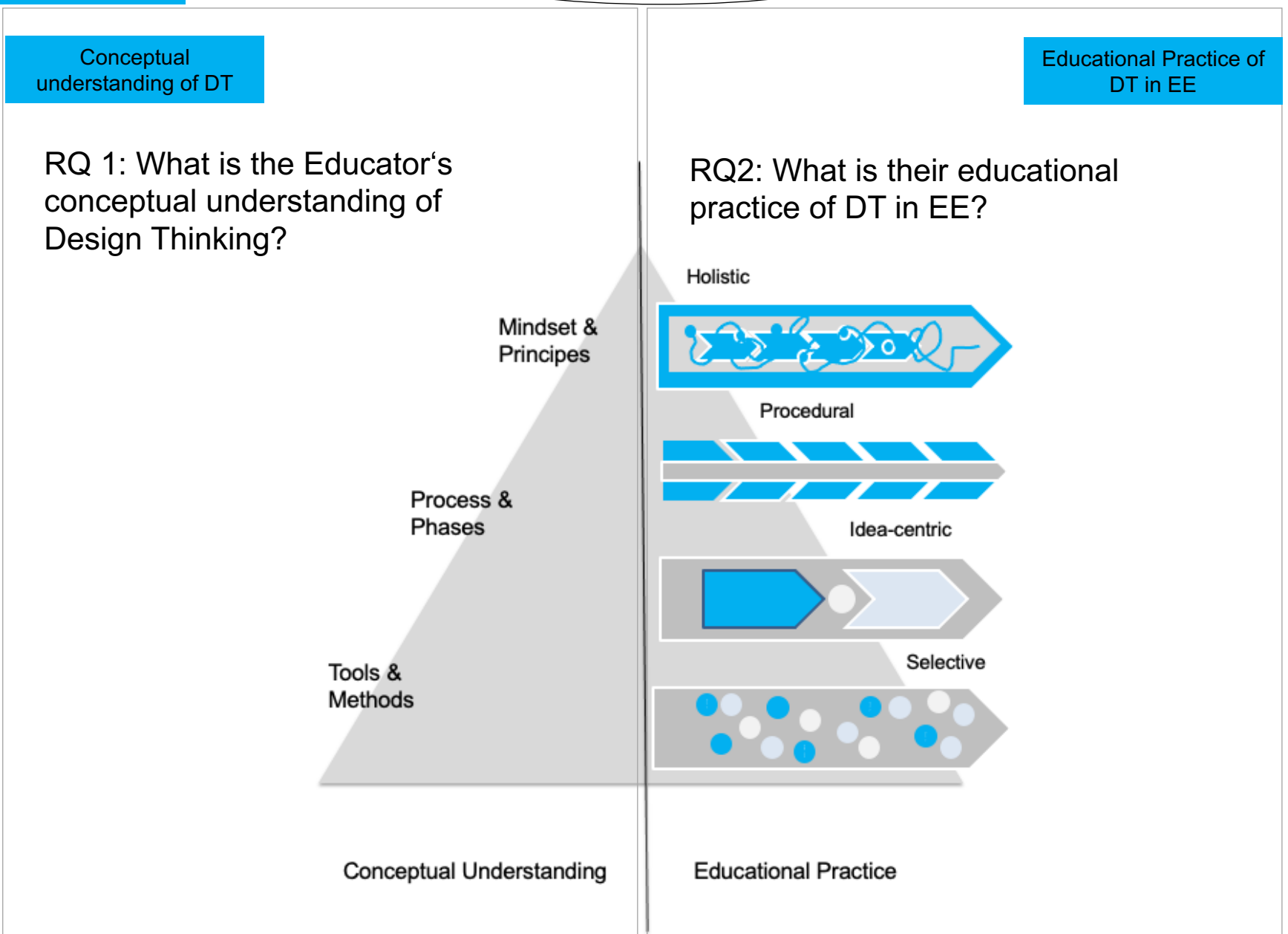
Appendix 10: Contribution in A3

Conceptualisation of the nexus



Educators Perspective

Educator's viewpoint



Perceived Value

RQ3: What is their perceived value of DT in EE?

