

Research Article

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Making Pedagogic Sense of Design Thinking in the Higher Education Context

<https://doi.org/10.1515/edu-2019-0006>

received March 1, 2019; accepted July 12, 2019.

Abstract: This paper explores the educator experience and sense-making of design thinking pedagogy in the higher education context. Design thinking has become a pedagogical phenomenon in higher education due to its widespread relevance across many disciplines. Some studies discuss design thinking as *a pedagogy* in the educational context; however, there is a lack of empirical research to understand the educator perspective on design thinking pedagogy. Three design thinking educators who have had more than fifteen years of teaching experience were interviewed to explore their experiences. The data from these individual in-depth, semi-structured interviews were analysed employing Interpretative Phenomenological Analysis (IPA). One super-ordinate theme; *capability building for everyone*, and four subordinate themes; *developing a participatory approach towards world issues*; *developing an open, explorative attitude*; *developing creative ability*; and *developing an ethical mindset* were identified. From these findings, the paper argues that design thinking educators have the basis for a pedagogical rationale that transcends disciplinary boundaries and provides common ground for collaboration and on-going development of design thinking pedagogy as an emerging field in education.

Keywords: Creative problem-solving, Design Thinking Pedagogy, teaching-learning-assessing, university education.

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1 Introduction

Design thinking is being increasingly applied within non-design professions for dealing with complex problems (Liedtka, Salzman, & Azer, 2017). Growing interest in research and practice regarding creativity, innovation and problem-solving, and its apparent contribution to economic growth and social benefit has contributed to the development of design thinking as a widespread phenomenon in education, comprising the higher education context (Jackson & Buining, 2011; Koh, Chai, Wong, & Hong, 2015; von Thienen, Royalty, & Meinel, 2017; Williams & Rieger, 2015). This interest has led to the development of a plethora of courses in higher education in a variety of disciplines aimed at enhancing creativity and innovative outcomes by graduates in practice (Gilbert, Crow, & Anderson, 2018). In addition to the various design disciplines, design thinking is now being facilitated and taught in disciplines as diverse as business management, engineering, education and information technology. Despite this expanding application, current research reveals concerns and problems highlighting a lack of evidence of how design thinking is being delivered. In the literature, this is attributed to several factors: including minimal consensus around the definition of the term; and, associated with this, the absence of a common language enabling translation across disciplines (Anderson et al., 2014).

Even for the design fields, design and design thinking are elusive terms (Tovey, 2015). Application in non-design areas by non-designers further heightens this. While there have been calls to provide further attention to the content of design thinking courses and to increase their offerings in higher education, there has been negligible critical attention given to underpinning conceptions of design thinking and design thinking pedagogy (Elliott & Lodge, 2017; Lockard & Hargis, 2017; Luka, 2014; Wrigley & Straker, 2017). This is despite the recognition as early as 2009 of the need to address the lack of agreement as to how design thinking should be taught (Costa, 2017; Tschimmel, Loyens, Soares, & Oraviita, 2017).

Responding to the lack of research about the teaching of design thinking from an experiential point of view, and based on taking a problematization approach to research (Sandberg & Alvesson, 2011), this study utilises an Interpretative Phenomenological Analysis (IPA) to explore design thinking in the higher education context as a pedagogic phenomenon. Thus, the guiding research question for this paper is, *how do educators in higher education make sense of design thinking pedagogy?* Hence, the study focusses on personal meaning and sense-making of design thinking educators in the higher education context. In this context, sense-making¹ (see Cerbone, 2015) is the action or process of making sense of or giving meaning to design thinking pedagogy as it is experienced. The use of the term ‘experience’ also recognises the context-bound nature of understanding. In the context of this study, design thinking pedagogy concerns the theory and practice of teaching design thinking, including the strategies, actions and judgements that inform curriculum design and delivery. Although the focus is to understand the phenomenon from the perspective of participants, IPA also recognises that it cannot be done without interpretative involvement (a double hermeneutic approach) by the researcher (Smith & Osborn, 2008a).

Three widely acknowledged design thinking educators with more than fifteen years teaching experience, and who at the time of the study were located at higher education institutions that were well-known for teaching design thinking, were invited to participate in individual semi-structured interviews. With the IPA goal of finding participants who would give the researchers access to a particular perspective on the phenomenon under study (Smith, Flowers, & Larkin, 2009, p. 49), in this case, design thinking pedagogy, the participant recruitment process was ‘purposive’ (Patton, 1990, p. 169) and homogenous. This is a strategy employed in IPA to manage variation and achieve a greater depth of understanding of the phenomenon being studied (Smith & Osborn, 2008a). In this study, the participants were educators based in design or who had started their career as designers and were currently teaching design thinking in both design and non-design domains. While qualitative studies in education justify the use of a small sample size (see Bainger, 2011; Pipere & Micule, 2014), in IPA small sample

sizes acknowledge its ‘idiographic’ approach and its commitment to produce a detailed interpretative account that is grounded in, and does justice to, each participant’s unique sense-making (Smith & Osborn, 2008a).

The outcomes of the study will facilitate communication among researchers, educators and practitioners with the potential to contribute to the development of more effective design thinking curricula, teaching and practice within and across disciplines. Based on extensive literature surveys, we have not found empirical studies that explore educator sense-making of design thinking pedagogy across diverse disciplines or within a higher educational context. This study is significant in its conceptualisation of design thinking pedagogy as a phenomenon and varies substantially from a minimal collection of studies that focus exclusively on design thinking curriculum development and its delivery within a specific discipline.

2 Background

While the notion of design in education has a long history, the emergence of design thinking is quite recent, and unlike design has not been contained within the traditional design disciplines. Such wider disciplinary interest can be explained in part by an appreciation of the role of design thinking in nurturing many of the necessary qualities identified as twenty-first-century competencies in educational settings (Diefenthaler, Moorhead, Speicher, Bear, & Cerminaro, 2017; Goldman & Kabayadondo, 2017; Koh et al., 2015; Takeda, 2013).

At present, there are several notable examples of the application of design thinking at a broader level in higher education. An often-cited example is *The Hasso Plattner Design Thinking Research Program*, a collaborative program between dSchool Stanford University and the Hasso Plattner Institute from Potsdam, Germany. The *EDUCAUSE* (Morris & Warman, 2015) project provides several other examples. In engineering education, the well-known example of design thinking is the *ME310 course* at Stanford University, which started in 1969 (ME310 Stanford University, 2010). According to David Kelly, the roots of design thinking as a human-centred process in higher education go back to the 1960s and its development by John Arnold, Bob (Robert) McKim and Kelly himself in the form of the ME310 and ME101 courses at Stanford (Camacho, 2016). The dSchool from Stanford has been substantially involved in shaping the current popular conception of design thinking. The provision of

¹ ‘Sense making’, ‘making sense’, ‘sense-making’ and ‘sensemaking’ indicate (slightly) different meanings. This paper uses the term ‘sense-making’ in par with the understanding of *phenomenological sense-making* (Cerbone, 2015). It is also the process of creating situational awareness and understanding in situations of high complexity or uncertainty.

online design thinking courses² such as those by MIT, Darden School of Business, and Open University UK have also contributed to the popularity of design thinking by non-designers (See also Beligatamulla, 2018; Taheri, Unterholzer, & Meinel, 2016). Currently, there are a number of universities that teach design thinking for both designers and non-designers.

Despite the popularity of design thinking education, our review of the literature on design thinking pedagogy in higher education found very little evidence of research explicitly undertaken to help define and establish it as a body of transdisciplinary knowledge. ‘Transdisciplinary’ is used in this sense to describe knowledge that is not discipline-specific but rather of relevance across disciplines. Our review revealed examples where research and scholarly work on design thinking has been used to solve institutional and system-based challenges (organisational), as well as for policy alteration (see Liedtka et al., 2017 for an overview), and to inform research and collaboration with the society (for example Leong & Clark, 2003). In addition to the development of stand-alone design thinking courses, there are also instances where design thinking is used to strengthen or extend specific skills in existing courses, particularly non-design courses across various discipline areas (see Beligatamulla, 2018; Beligatamulla, Rieger, & Franz, 2018 for an overview). In all, the literature review found no scholarly publications concerned with qualitatively understanding design thinking as a pedagogical phenomenon; in other words, understanding the way in which educators make sense of their experience of teaching design thinking.

2.1 Design thinking as a pedagogical phenomenon

While the etymology of the word ‘pedagogy’ is Greek, it has gone through various linguistic translations to initially produce a very limited literal meaning in English literature (Mortimore, 1999). One such limited understanding of it is as a concept mostly used in child education, subsequently contributing to the alternative concept of *andragogy* for adult education (Knowles, 1980), and *heutagogy* (Hase & Kenyon, 2013) for autodidact (self-taught) learning. However, conceptions of pedagogy have become more accommodating over time to encompass: (1) a focus on different types of teachers; (2) a focus on

the contexts of teaching; (3) a focus on teaching and learning; (4) views which specified relations between its elements, the teacher, the classroom and the content (Mortimore, 1999, pp. 3–8). Further to these, Mortimore also defines pedagogy as, “any conscious activity by one person designed to enhance learning in another” (p. 3). This conscious activity involves teacher awareness of an integral qualitative relationship between the ‘what’ of learning and the ‘how’ of learning (Marton & Booth, 1997).

In the context of this study, design thinking pedagogy concerns the theory and practice of teaching design thinking, including the strategies, actions and judgements that inform curriculum design and delivery. Given the fragmentary appropriation of teaching design thinking to date and the different ways in which it is implicitly understood, this study regards design thinking pedagogy as a phenomenon in crucial need of investigation.

From this position, this section moves to a review of the scholarly literature that professes a focus on the phenomenon of design thinking in higher education in a transdisciplinary way. A case in point is the research by Donar (2011), which involves an examination of five Canadian courses. Although the particular paper provides information on course structure and in some cases on how the participants define design thinking, it was not the focus to provide a more comprehensive picture of how design thinking has been experienced in those tertiary education contexts. The use of the term ‘experience’ is used here in the broader phenomenological sense that recognises the contextual nature of understanding. In the case of Donar’s research, this would demand an understanding of the range of factors impacting decisions about course development, including any explicit and implicit theory. Certainly from an IPA perspective, it would also acknowledge idiographic experiential differences across individuals and the courses.

At this point, it is essential to distinguish between research that focusses on *design thinking pedagogy* (albeit limited) and research that focusses on *design thinking* as a concept in education. For example, Koh et al. (2015), in their book, *Design Thinking for Education*, showcase several instances of the use of design thinking in the context of Singapore and Taiwan school classrooms. From this, they propose that design thinking is understood or framed from different perspectives, including a process-based perspective, a knowledge-based perspective, and a contextual perspective.

The Australian higher education context reveals several studies that have relevance in the context of stand-alone cross-disciplinary design thinking pedagogy. One of them is an Office of Teaching & Learning (OLT) seed

² Here the focus is only on design thinking courses from higher education institutes. However, there are other organisations that facilitate design thinking such as IDEO-U.

project led by James Cook University (JCU) in collaboration with several other universities: the Queensland University of Technology (QUT); Swinburne University; Edith Cowan University; and Charles Darwin University. The project ‘*Design thinking frameworks as transformative cross-disciplinary pedagogy*’ from 2014 aimed to: “examine the way design thinking strategies are used across disciplines to scaffold the development of student attributes in the domain of problem-solving and creativity in order to enhance the nation’s capacity for innovation” (Anderson et al., 2014, p. 5). While this study did not include stand-alone design thinking courses and focused more on design thinking in a scaffolding context, it is included here in greater detail due to its professed aim of contributing to the development of cross-disciplinary pedagogy. According to this report, it disclosed “different design models, theories and anecdotal evidence of their use and that no substantial case studies have been conducted on design thinking use in higher education curriculum and teaching approaches despite this being a pressing need” (Anderson et al., 2014, p. 52). The seed project was an attempt to address this need. The study found that educators use a variety of ways to scaffold student learning using design thinking strategies, but at the time of the study there was a tendency to use these in a superficial way with limited outcomes. This prompted the recommendation for further work in respective discipline areas to: “provide educators with knowledge and experience in using strategies and understanding where these strategies fit within the various components of the methodology” (Anderson et al., 2014, p. 6). Unfortunately, this project falls short on its focus of moving beyond disciplinary boundaries and developing what they term *cross-disciplinary design thinking pedagogy*.

The chapter, *Engaging University Teachers in Design Thinking* (Elliott & Lodge, 2017) in *Visions for Australian Tertiary Education*, explores the concept of design thinking as a means of generating novel educational approaches that respond to the challenges of a rapidly changing higher education environment. In this chapter, the authors have provided several strategies for adopting design thinking in non-design contexts. To further demonstrate how some university teachers have applied explicit design thinking to enhance various aspects of their teaching practice, the chapter includes three case studies that draw on published accounts from the literature. In summary, these are concerned with the way in which design thinking has been used to: enhance a lecture; support the development and implementation of active learning strategies for students in a flipped classroom model; develop and implement online inquiry projects to enhance bioscience students’ understanding and appreciation of scientific

inquiry. In these cases, design thinking is regarded as a pedagogical tool to enhance student learning.

A recent investigation (Wrigley & Straker, 2017) was conducted of 51 courses offered across 28 international universities to determine the content and mode of teaching design thinking in response to an increasing realisation that no one agrees on how it should be taught. From this research, Wrigley and Straker (2017) propose an approach to the organisation and structuring of a design thinking programme that has application across disciplines. The approach is based on five thematic levels that form the basis of ‘The Educational Design Ladder’ model. The model is intended as an educational resource for informing content, assessment and teaching-learning modes of university-wide design thinking units; either embedded in existing courses or as stand-alone design thinking courses. While the research is to be commended in responding to calls for further research to do with design thinking in higher education, there are several flaws and deficiencies that should be recognised. Of fundamental concern is its reliance on a positivist informed SOLO taxonomy (see Biggs & Tang, 2011) which in this case not only provides a simplistic understanding of pedagogy but also establishes a hierarchy in terms of design concerned with a product outcome. A significant concern of the study is its reliance on secondary data sources removing the opportunity to understand it in context. In addition, the study reflects a limited understanding of pedagogy: one where pedagogy is about content, learning modes and assessment with no consideration of underpinning teaching-learning or educational theory and philosophy as understood implicitly or explicitly by educators involved in the development and implementation of design thinking curricula. As opposed to Wrigley and Straker (2017), Luka (2014) argues that design thinking pedagogy as an iterative process is more in line with Kolb’s experiential model of learning (Kolb, 2015).

In terms of the teaching of design thinking, there are numerous publications that have paved the way to the development of a multitude of strategies for facilitating various aspects of designing. As an example is a work by Oxman (2004) on ‘Think Maps’. She discussed the development of strategies that acknowledge the central role played by cognition in designing but also how in the early part of this century such work is still very much considered in its connection to domain knowledge. Such connection has become more tenuous in the last decade with additional publications focussing on design thinking (see (Ambrose & Harris, 2010; Cassim, 2013; Leifer & Meinel, 2015; Meinel & Leifer, 2011; Plattner, Meinel, & Leifer, 2015)). In addition to increasing interest

in design thinking for non-design areas, technology and the changing nature of higher education have also played significant roles in the compartmentalisation of (and one might also argue, the commodification of) the design process. An example is a work by Lloyd (2013), *Embedded creativity: Teaching design thinking via distance education* in which he explains how design thinking can be taught in an Open University UK's educational model via online teaching and learning.

The paper *Engineering Design Thinking, Teaching, and Learning* (Dym, Agogino, Eris, Frey, & Leifer, 2005) has provided an overall picture of teaching and learning design thinking in engineering in American universities. Here, project-based learning is identified as an important pedagogical model for teaching design thinking.

Concerning the fundamentals of design thinking education, many scholars refer to problem-based learning where students work in teams on open-ended problems deciding quite autonomously how to move their projects forward. With this notion, teachers do not claim “authority of knowledge”; rather, they act as facilitators (von Thienen, Ney, & Meinel, 2019). According to Von Thienen et al. (2017) design thinking pedagogy has differences from other approaches to problem-based learning and conventional education. With design thinking, problem-based learning is not only used to enhance problem-solving skills, but also to enhance creative skills and the potential to manage future complexity and uncertainty. “When a design thinking project succeeds, students experience creative mastery” (von Thienen et al., 2017). With project-based learning and design thinking in pedagogy, collaborative work (Koria, 2015) is also valued by several authors.

Reflecting on these scholarly contributions to the understanding of design thinking pedagogy, what emerges is lack of rich, substantive evidence to support conceptualisations, particularly within the transdisciplinary higher education context. It appears almost axiomatic that teaching design thinking utilises many active learning protocols, and yet a clear articulation of the specific pedagogical approaches and the purpose of design thinking education remains elusive. What is missing from these studies is a committed engagement with a broader pedagogical theory that can aid a deeper conceptualisation of design thinking pedagogy.

3 Research Methodology

This section first explains Interpretative Phenomenological Analysis (IPA) in general; the use of IPA from psychology

to other areas; then in education; and finally, how we have used IPA in this study to explore the meaning the educator participants assign to their experiences of design thinking pedagogy.

IPA is a recently developed qualitative research approach which is concerned with the detailed examination of personal lived experience, the meaning of an *experience* to participants, and how participants make sense of that experience (Smith et al., 2009) through a reflective process of interpretation involving the researcher and the participant. Since its inception, IPA has rapidly become one of the best known and most commonly used qualitative methodologies in psychology (Smith, 2011). Given its potential to explore the human lifeworld, it has also been used in many other knowledge domains (Reid, Flowers, & Larkin, 2005).

IPA is rooted in the traditions of phenomenology, hermeneutics, and idiographic inquiry (Smith et al., 2009). IPA recognises that people perceive the world in very different ways, depending on personalities, prior life experiences and motivations. It attempts to understand the meanings of lived experiences as made sense-of by the individual participants themselves (Reid et al., 2005). In IPA studies, the central focus is a “detailed examination of personal lived experience” (Smith, 2011, p. 9) of a certain phenomenon. The researcher is involved with the participant in a detailed examination of the particular experience of a phenomenon which is significant to both the investigator and individual research participants. In line with the interpretative nature of the methodology, it recognises that researchers have a primary role with participants in helping make sense of what the participant is saying. The interpretative work of the researcher is often recognised as ‘double hermeneutics’ (Smith & Osborn, 2008b). Hermeneutics provides the base for IPA researchers to communicate a combined voice of the particular participant and the researcher. The IPA researcher does not merely examine the individual participant on his or her terms, instead, the hermeneutic process is guided by engaging in a dynamic process of exploring the phenomenon as lived and sensed by individuals while also recognising the broader significance of this phenomenon in relation to extant theoretical constructs (Smith et al., 2009).

While IPA originated in psychology, its relevance to other disciplines and areas of research has grown (Smith, 2011). Recently IPA has been used in educational research to understand the experiential aspects of teaching-learning (See Bainger, 2011; Cope, 2011; Pipere & Micule, 2014). Given IPA's potential to explore deep personal meanings, it has been used in educational disciplines

Table 1: Participant demographic group profile.

| Participant (Pseudonym) | Current discipline where teaching design thinking | Background (Educational / Academic) | Employment status | Gender | Geographical Location | Approximate years of engagement in education/ teaching | Industry involvement |
|-------------------------|--|-------------------------------------|-------------------|--------|-----------------------|--|----------------------|
| Tina | Design / Business / Interdisciplinary | Design, Business Administration | Senior Lecturer | Female | Australia | 15 | Yes |
| Mike | Design / Business / Innovation / Interdisciplinary (Master/PhD only) | Design Business Management | Professor | Male | UK | 15 + | Yes |
| Jerry | Design / Interdisciplinary | Design, Arts and Humanities | Professor | Male | UK | 20 + | Yes |

that generally adopt a positivist stance toward knowledge generation even when the underlying interpretive tenets of IPA are in conflict philosophically (Kirn, Huff, Godwin, Ross, & Cass, 2019).

The IPA informed research question for this study is, *how do educators in higher education make sense of design thinking pedagogy?* Hence, the study focusses on the personal meaning and sense-making of design thinking pedagogy by educators who are experiencing the phenomenon in the higher education context. The use of the term ‘experience’ recognises the context-bound and idiographic nature of understanding. “Human beings are sense-making creatures, and that sense-making is reflected in the meaning of what is being made sense of” (Smith, 2018, p. 2). According to Smith (2018), IPA is concerned with five levels of meaning: literal, pragmatic/textual, experiential, existential-significance and existential-purpose. In this paper, the interest is in the experiential significance of design thinking pedagogy, where design thinking pedagogy concerns the theory and practice of teaching design thinking, including the strategies, actions and judgements that inform curriculum design and delivery. In a nutshell, in this study, the researchers are exploring through in-depth interviews and interpretation the educator’s personal sense-making of design thinking pedagogy in the higher education context.

3.1 Participants

Characteristically, phenomenological work in psychology focuses on personal meaning, and so the relationship between person-and-world is operationalised at the individual level. Thus, in IPA projects, the most common research projects involve collecting qualitative data from a reasonably homogenous group, in this case, a group

who share a common focus. Thus, “we ask questions about people’s understandings, experiences and sense-making activities, and we situate these questions within specific contexts, rather than between them” (Smith et al., 2009, p. 47). Here in this study, the selected context is higher education. This gives us an in-depth view of the experience of design thinking pedagogy at a recognisably personal scale.

In the study, the aim was to select a group of design thinking educators across several higher education institutions (see Table 1). The sample consists of two educators who were geographically located in the United Kingdom (UK) while the remaining participant was based in Australia. One participant from the UK is well known in the design community with years of research experience and publications in the design field. The other participant from the UK was suggested by another colleague, who is also an educator who researches design thinking. The participant from Australia was selected through an online desk search.

Although researchers who utilise IPA typically use homogenous participant samples exploring shared perspectives on a single phenomenon of interest, to capture more complex and systemic experiential phenomena consideration can also be given to multiple perspectives (Larkin, Shaw, & Flowers, 2018). Our participants, for example, did not work together, nor did they teach design thinking together, nor were they located in the same university or geographical continent. What they had in common, however, was that they are university educators, and they are all pedagogically involved with design thinking. Participants who have not engaged in the *exact* same experience of teaching design thinking in a higher education context are likely to have different views of it, and thus provide for a more multifaceted overall account of meaning-making (Reid et al., 2005). The aim

of the selection of participants, then, was to recruit a purposive sample as opposed to a strictly representative sample. Hence the results in this study represent a specific group of design thinking educators and in this way are not representative of all design thinking educators in the UK or Australia.

Developing from phenomenological psychology, IPA rejects the notion that one can construct an objective ‘truth’ about an experience; instead, the focus is an individual’s perception or account (Smith et al., 2009). As such, there is no attempt to construct an objective truth about the experience; rather individuals’ experiences, understandings, perceptions and accounts are honoured (Reid et al., 2005). As IPA is concerned with the subjective account and meaning of an experience, this study honours the perceptions and understandings of the interviewed educators, rather than prematurely making more general claims (Smith & Osborn, 2008a) which may lead to false assumptions and misunderstandings. Findings should be judged in terms of their ability to enhance understanding, meaning and insight, to contribute to existing theory and to generate new hypotheses and research questions on the phenomenon of design thinking pedagogy.

3.2 Data collection and ethics

Smith (2011) identifies several criteria to produce a quality IPA research paper, and one of the stressed criteria is to collect a high-quality data set by conducting careful interviews. For this study, following the approval of the relevant ethics³, the first author undertook interviews with the participants. Interviews took place in person at the participants’ offices and lasted around sixty minutes. The semi-structured interview guide consisted of questions⁴ exploring how the participants define design thinking personally; how they go about teaching design thinking;

³ Ethical approval for this study was granted by QUT and participation in the interview was voluntary, anonymous, confidential, and based on written consent. The date, time and the location of the interviews were arranged at the participant’s convenience.

⁴ For example: First, by way of context, can you tell me a little about your history as an educator, and what is your current engagement with design thinking teaching? What does design thinking mean to you as an academic in Higher Education especially in your domain? Can you explain to me how you have structured design thinking courses you are doing? Can you give me a concrete example of something you have done to help students to learn design thinking? If you had a friend who had never done design thinking before and they asked you to tell them what the study of design thinking involves, what would you say? What is the purpose of teaching design thinking in higher education?

what they want to provide for their students; how they prepare their lessons and structure the teaching sessions. It also asked for concrete examples to illustrate accounts. The goal of the semi-structured interview is to gain a first-person description of a specified domain of experience, where the participant mainly sets the course of dialogue (Kvale, 1996). The interview began with a broad question: “can you just tell me about your background with design thinking and teaching design thinking?”.

3.3 Data Analysis

IPA is not a prescriptive methodology and permits individuality and flexibility of approach in the analysing stage (Smith, Flowers, & Larkin, 2010). In this study, we analysed the interviews in four stages informed by Smith (Smith et al., 2009): 1) reading and re-reading the transcription; 2) initial noting based on free associations using descriptive (the subject of the participant’s response), linguistic (the language used by the participant) and conceptual comments (at a more overarching level); 3) developing emergent themes and expressing these as phrases that highlight psychological essence; and 4) searching for connections across emergent themes which ultimately led in the case of this study to a discrete theme being accommodated through other themes.

The first author took the initial lead in analysing transcripts of the interviews. Transcripts were analysed in their entirety one at a time. Each transcript was read and re-read, and then initial detailed notes were made. Some sketches also were made in addition to the notes as part of the researcher interpretation of what the participant is saying (see Figure 2). These notes were then developed into emerging themes, capturing key elements of the participant’s experience of design thinking pedagogy. Themes were drawn up into a table of themes illustrated and supported with relevant extracts from the transcript. To enhance the rigour of the study, another author-researcher conducted what Smith et al. (2009) refers to as ‘mini audits’. These audits occurred at various stages before and during analysis by the first author researcher, namely: an independent analysis of the transcripts by the second researcher producing tentative themes which were not shared until the first author-researcher had produced themes; cross-checking of annotations against the transcripts; sharing of themes requiring illustration, substantiation and deliberation. The remaining author researchers participated at various stages through questioning and seeking clarification. In this process, the researchers were very aware of the double hermeneutic

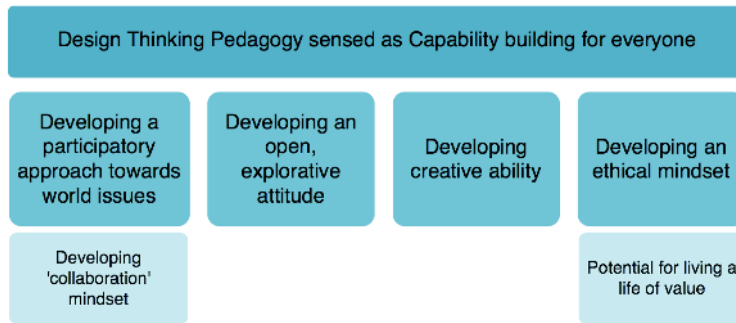


Figure 1: Thematic summary of findings.

aspect of interpretation for IPA and of the need for there to be a primary researcher managing the process overall.

4 Findings

We identified one overarching or super-ordinate theme: design thinking pedagogy sensed as capability building for everyone; and four constituent sub-ordinate themes; developing a participatory approach towards world issues; developing an open, explorative attitude; developing creative ability; and developing an ethical mindset. Each theme has its own focus yet is intrinsically interwoven and pivotal to a comprehensive understanding of how the participants make sense of design thinking pedagogy. These themes are presented first as a summary in Figure 1 and then extrapolated and illustrated using anonymous extracts from participant interviews. The extracts are identified using pseudonyms.

IPA usually maintains some level of focus on what is distinct. It is in this respect, ideographic (Reid et al., 2005). In this analysis, the capability approach to human development was revealed as a distinctive sense-making understanding that was also shared by all the participants. What we found in this analysis was that the participants shared the idea of making people more creative, collaborative and opening their life world to endless possibilities. It should be noted that during the process of inductive analysis of the transcript data, we were not guided by any preconceived categories or theoretical structures of design thinking pedagogy.

4.1 Super-ordinate theme: Capability building for everyone

Our participants understood teaching design thinking as involving something beyond transferring knowledge

or developing specific skills. Students were guided to assimilate their knowledge and use their skills to live a life of value and to respond to world issues affecting people's lives. The underlying premise is that design (or designing) in its full sense is capability – if someone has a *design* frame of reference to the world, they have the capability for dealing with life's challenges as well as opportunities (see Figure 2). Even though these educators cannot make everyone a *designer*, they provide the possibility for these capabilities to be developed through 'design thinking'.

I've got this idea that designers are suspended between – they've got their feet on their ground in the concrete world, then they get their feet in the clouds in the abstract world, and they're also suspended by analysing what's happening now and creating for the future. [Jerry]

As a pedagogical approach, the educators provide learning situations in order for their students to build capability to be able to manage future uncertainty and complexity.

My take on it is that, within constructivist pedagogy the big idea is that – as the name says students build up, they construct their own knowledge within themselves in their own heads. So that means that the role of the teacher is more of a facilitator and somebody who helps students to access knowledge. So, you help to access knowledge through facilitating situations of learning – situated learning. So, you create the situation where the learning can happen. You are also in a way structuring the knowledge: in a way through creating the situations. So, you are teaching not only what would come out of it but you are also teaching in some ways the process of how to engage with it. And you're building up the capability through those things. [Mike]

The participants were concerned about the stereotypical nature of education, especially in schools where students are encouraged to give single or pre-determined answers. What they believe is even though the answer is well reasoned if it is not creative and original, then students should be encouraged to look for more unconventional responses. So, it is about establishing in a person through

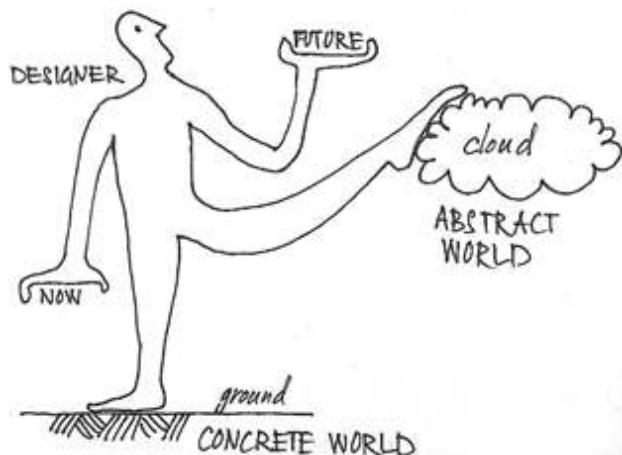


Figure 2: ‘Designers are suspended between the concrete and abstract world’ – researcher illustration based on the IPA analysis.

their education the basis to grow and become a more valuable citizen in the world. It is about having the potential: it is not about having a specific skill although skills can be a part of capability development. This is in contrast to the notion that if students have knowledge, they have the capability. In Tina’s words:

I spend all my time encouraging people to think, to not accept anything as a final answer – obviously sometimes we have to go with the solution but it’s like don’t stop there ... keep looking for more needles ... I spend all my time saying it’s never all done but we people want that certainty they want that tidiness they want that neatness of being able to, you know, sort of close the book and say it’s all finished. And I’m in this horrible little voice that says ‘no it’s not’. [Tina]

Jerry provided another view on the importance of design thinking education for everyone. He mentioned about the economic relevance in the process of teaching design thinking in non-design contexts rather than teaching ‘design’ in studios.

Design – if you teach designers architects and car designers with clay modelling studios and fashion designers with rows of textile print machines and, you know, it’s expensive. Design Thinking is a kind of popular lower-cost: it’s theoretical models, it’s post-it notes, it’s brainstorming, it’s... you know. So, there’s an economic argument for teaching design thinking. That’s the cynical aspect. [Jerry]

4.2 Sub-ordinate theme A: Participative approach towards world issues

All three participants shared the idea of the need to collaborate in order to effectively address the messiness and uncertainty of world issues. In this regard, they saw

it necessary to help students develop skills that enabled them to participate as individuals, as groups and more broadly as a society. This notion of participation can occur in the dichotomy of business focused challenges, and human society focused challenges. The educators were more focused on developing the collaborative mindset at the student-student level, group level, cross-disciplinary level, institutional level, and also at the academia-industry level.

I do think that the best parts of design thinking for me at least those intuitive moments those insights which are very hard to actually measure and quite often that comes from people’s own personal experience, their own connection with the topic: and particularly when you get a group of people who are motivated there’s like an energy in that thinking. That doesn’t come from a formula. [Tina]

One way to look at it was seeing design thinking as ‘collaborative work’ where individuals are working with others in order to co-create with somebody or co-create for somebody. The underlining premise is that to solve ‘wicked problems’ (Buchanan, 1992) people need to make responsible, creative decisions, but individuals cannot do that alone because individuals do not have the ability, capacity, mandate, significance or the legitimacy to do that. Consequently, individuals need to make decisions with stakeholders, which involve some consensus. Accordingly, with the educators understanding, that consensus is usually built-up through conflicting views, conflicting ways of seeing things: and design thinking, for them, is well suited in dealing with conflict in a collaborative way.

I think that in order to make collaborative work, teaching collaborative work possible, you have to create a real-world circumstance or simulate a real-world circumstance: because if you don’t do that you’re teaching collaboration is only theoretical and it doesn’t really reach the level where you are in terms of your learning. You have to deal with different points of view, conflicts; people who don’t agree, people who do agree. You also have to deal with resource scarcity. You have to deal with the fact that not everything is acceptable in terms of society, in terms of their ‘this and that’. So it’s divergent views; and it’s the diffusion of the views which is tricky. This is why you need real-world challenges or what we call challenged based education or challenge-based learning: that underpins the kind of collaborative work. [Mike]

The participants used several concepts to describe how collaborative work is being done in an educational setting. Project-based learning, practice-based learning, challenge-based learning situated-learning were some of those concepts. They provided a real-world issue, a challenge from a design competition, or at least a

real-world simulations for their students to engage with while learning the design thinking process. The potential to develop collaborative skills was understood to be enhanced because students come from different backgrounds; backgrounds, which also provide varied perspectives of an issue.

Further, Jerry is keen to teach people not only how to work as a designer but also how to work with a designer. Knowing how to design helps one work more effectively with designers in terms of effective collaboration.

The design thinker in businesses is like the commissioner who works with their designer and has some skill in that kind of creative game. So, the development phase they'll work with the designer to develop a whole series of prototypes that people will try out. [Jerry]

4.3 Sub-ordinate theme B: Developing an open, explorative attitude

All the participant educators acknowledged how design thinking contrasts with other approaches in higher education. Their approach is to develop an open, explorative attitude in contrast to a single solution for world issues.

In most cases, you do an exam and there is a right answer and a wrong answer. Well, design thinking doesn't work that way: because with design thinking you might have multiple answers and then you have to sort of think your way through and you might not even be asking the right question. So, you are being taught in industrial fashion in, you know, primary, secondary, and first cycle university studies that, you know, in a positivistic way where there's a right answer, there's a linear causality between things and then comes along design thinking which says, well, all that doesn't really hold, does it? So, it is a process of unlearning 12 years of education or 14, 15 years of Education. And that is what makes it very difficult for many people to get into Design Thinking because you are unlearning sort of bad education. [Mike]

In this respect, the educators' see their role as preparing students for the future by helping them develop an open, explorative attitude. They see the purpose of design thinking pedagogy as shaking up preconceptions by testing proposals; opening students minds for all kinds of possibilities; getting first-person input from students (not necessarily having external validations); generating free thinking, self-monitoring, playing with ideas; and breaking boundaries for experiential aspects of problem-solving.

So, you solve problems not by being an expert but by being open and participatory, perhaps naive and asking dumb questions. You solve problems by putting yourselves in the shoes of the user – that's very kind of user-centric. You solve problems through experimentation and trial and error, you know. Fail faster succeed sooner all of that. And you solve problems by transposition and cross-pollination from one sector to another. So, it has different aspects to it, but in essence, I describe it: it's a way of innovating and solving problems and coming up with solutions; you're doing it by thinking like a designer. [Jerry]

In order to achieve these goals, they described the different strategies that they use. Tina's approach is very open to the student as they need to take the total control of the challenge. She explains,

I'll throw some really open challenges and because they're so used to this really rigid format of here's the challenge, here's the criteria sheet, it's due on Tuesday at 4 o'clock, and you'll get a grade: and that's it. I don't do that I give them a challenge every week they don't have to complete it that week. But if they do it helps them because it breaks that ice. So the brain doesn't like unfinished business it nags at them all week after week and then they have an idea suddenly... [Tina]

4.4 Sub-ordinate theme C: Help develop creative ability

Being creative is seen as an essential aspect of the design thinking process and of the potential that resides in all students, albeit something that has to be recognised and nurtured.

So, it is about trying to find that sweet spot and we know that creativity works! – sadly, once again we're seeing that disappearing because of that pressure for the dollars and the numbers and things like that. So under that one, we start off and we identify first of all 'how are you creative'; not 'how creative are you', but how are you creative. [Tina]

Although the participants were not specific about creativity as a specific individual skill, they saw the need to provide opportunities for empowering people for innovation and creativity.

It's more like a matrix structure – I often tend to refer to design thinking as it's almost like a rhizome. So, think of mushrooms. Underground you have a web of roots and then the mushroom pops up somewhere. But it could pop up somewhere else, and then somewhere else again. And I think that's how design thinking education works, is that you almost like help to create those roots, and you never really know when it's going to pop up. It just pops up seemingly at random. But there's always a logic that you can backtrack: why did it come up there; when; why was it; why did

he come into that specific space. There is a rationale but you can only see it afterwards. [Mike]

According to Jerry, although creativity is vital in design thinking, it is not independent of other attributes.

Design thinking is not just about coming off creative ideas; it's collecting all the right information, very detailed interactions with equipment and creating within. [Jerry]

4.5 Sub-ordinate theme D: Developing an ethical mindset

An essential quality associated with a capability understanding of design thinking pedagogy and living a life of value to others as well as oneself is the development of an ethical mindset. Their expectations are seemingly at the broader social level as the students who learn design thinking will engage with issues which relate to sustainability, for example and which then are inherently ethical.

The big idea of education is that you want to pass knowledge to the next generations and I mean in order to for people to have a good life, to be able to achieve wellbeing. And you're also transmitting culture through learning. So it's not only factual knowledge it's the way that society is doing things. And I think that this is why design thinking is important because design thinking is not a discipline in itself: it is an approach to take the human factor into account when we are doing things, when we are creating the artificial world. We live in an artificial world and it increasingly artificial. I mean, we are biological beings but we have created an artificial world. So how do we do that, why do we do that? You know, and design is doing lots of horrible things to this world. I mean if you look at the rampant consumerism and the economy of throwing away things. That's not very useful for our planet. So design thinking, it should also act with a very high ethical sort of background which it doesn't do – design thinking is not critical; but, that is my problem with it. Design thinking is not ethical, necessarily. Design thinking doesn't sort of conceptualize alternative futures: design thinking is a slave for commercial activity in most cases. And that is my big problem with design thinking. [Mike]

The participants seem to be critical about the popular use of design thinking, which focusses exclusively on the individual.

So the ethical consideration is that that design thinking should take into account have not been covered, generally speaking. So, what is happening is that there is a methodology for tapping into people's desires at ones, without consideration for, well, how do these desires and ones actually play out in in the big picture, and what is then the nature of these desires and ones which tend to turn into political desires at ones. [Mike]

They also acknowledge that while there may be different descriptions for *design* that attempts to address broader social issues, such as human-centred design, people/user-centred design, universal design and inclusive design, when it comes to teaching design thinking these all help to mediate individual desires with society as a whole.

[Inclusive design and design thinking]... I think they are twins kind of thing. I mean in [our] center, we say we're about inclusive design and design thinking now. The design thinking bit allows the client the stakeholder into the design process around inclusivity. ... Empathy is used in as much that unite them – we need to understand, get under the skin of the consumer and the people who will spend the money but it's a Vance Packard approach to, you know, 'the hidden persuaders'. We need to know, you know. Lot of people use design thinking because they want to vlog more stuff or make more profit. We use design thinking because we're trying as a research centre or charter our mandate is to address social issues. [Jerry]

5 Discussion

Sense-making in relation to design thinking pedagogy in higher education is revealed through our discussion about the personal experiences of our study participants and specifically the IPA approach employed. The overarching theme related to capability building and the four sub-ordinate themes revealed meaning making with reference to participatory approaches, exploration through designing, developing creative abilities and an ethical mindset. To begin, our design educators believe that design thinking can support the development of specialised capabilities that are unique to design thinking and that these capabilities are built through engaging in design thinking through theory and practice.

The findings of this study reveal an appreciation (albeit mostly implicit) by educators across disciplines of the role of design thinking in capability building and the development of the whole citizen person; a capability that empowers individuals regardless of background or socio/cultural capital (Strickfaden & Heylighen, 2010). In our study, the participant educators were helping students develop capability for a future of meaning to them and others. Capability in this sense is more than just knowledge; more than just skill: it is also about attitude, about value, the circumstances people are in that allow them to capitalise on opportunities to realise capability and to develop further.

This sense-making by the participant educators regarding design thinking reflects many of the qualities of a capabilities approach to education; an approach that

places ‘design thinking’ at the fore. In addition to a focus on living a life of value as already mentioned wherein everyone has potential as well as obligation (superordinate theme), the sub-ordinate themes also reveal a connection to many of the central human capabilities identified by Nussbaum (2011) as well as to subsequent research noted previously. The sub-ordinate themes to do with developing an open, explorative attitude and the ability to imagine and create align with Nussbaum’s capabilities concerned with: ‘senses, imagination and thought’; ‘emotions’; and ‘play’. Developing an ethical mindset supports the focus on social and environmental value while also connecting to Nussbaum’s categories of ‘other species’ and ‘control over one’s environment’. Appreciating the need for collaboration and adopting participatory approaches in professional work aligns with Nussbaum’s notion of affiliation.

The value for building capabilities has been studied in design (see Dong, 2008); however, the specific capabilities identified by our participants reveal the elements that currently make up the landscape of design thinking. In the case of our study, these elements can be categorized into two areas: instilling attitudes in students; teaching about processes that can be used in designing. These two areas of capability building relate directly to the translation of theory into practice. Our designing thinking educators predominantly spoke of ‘soft’ and sometimes even implicit elements taught through and about design thinking. These included elements such as handling conflict, defining problems, being open to various ideas and solutions, and considering the well-being of others. It is clear from our research that design thinking is not a concrete system of attitudes and processes, but rather a more intuitive impression and translation of how to think about audiences, users and oneself while designing. For example, the educator who discussed learning as a shift from ‘abstract to concrete’ was acutely aware of the challenges and the necessity to translate theory to practice in a field where the practice is paramount.

Teaching theory to students was about identifying the nature of designing, which is identified as ‘future thinking’ that requires a great deal of questioning, exploration and participation that has sometimes been defined as ‘creative thinking’. These could easily be equated to having a *designerly attitude* and also included ‘putting oneself in the shoes of others’ (i.e., human centred design), ‘transmitting culture’ (e.g., relevant design for diversity), and ‘thinking beyond consumption’. These attitudes have been explored within *design* and could be described as being part of common knowledge about what it means to be a designer (Strickfaden &

Heylighen, 2010). Naturally, attitudes towards design can relate to the general culture of design but also to the idiosyncrasies of the individual educators teaching design thinking. For example, the concept of design thinking as an open problem-solving process is relatively common within design studies, whereas the concept of embracing randomness and planting roots in the students design process could be interpreted as more idiosyncratic. The fundamental ideologies of design practice involve having an attitude about the world that includes the very nature and definition of design: designed things are created by people for people to be used in the future. These attitudes are evidenced through our study.

Somewhat more concrete than teaching and learning about design attitudes is teaching and learning about design processes. Processes of designing include linking knowledge to previous understandings of the world, engaging in deep enquiry, recognizing characteristics of personal creativity, and doing research in design (e.g., collecting information). What is interesting is that our participants make sense of design thinking in a way that is not uncommon to ways that design studies have been made sense of design through design research. That is, design research initially established studies into design methods, methodologies and processes as central to designing (e.g., through Cross, Alexander, Jones, and others) and linked the designing process to cognitive psychologist’s understandings of creativity (e.g. see Oxman, 1996; Purcell & Gero, 1998). In more recent years, design research has focused on human centred design practices (e.g., participatory design, user-centred design, strategic design, and more) and particularly designing for diverse users through inclusive design and other practices.

In sum, while the literature reviewed in this paper affirms the benefits of design thinking, it was not clear about how design thinking pedagogy enhances student potential, nor did it convey an understanding of potential in terms of capability and human development in its fullest sense of social value and responsibility as proposed and developed by Sen (1985), Nussbaum (2011) and several other scholars. Sen was initially responsible for drawing a connection between capability and its moral significance in helping achieve the kind of lives people have reason to value (Sen, 1985). Building on this from a human dignity perspective, Nussbaum proposed the following as central human capabilities: life; bodily health; bodily integrity; senses, imagination, and thought; emotions; practical reason, affiliation; other species; play; and control over one’s environment (Nussbaum, 2011). In recent years there has been increasing interest in Sen and Nussbaum’s work by educators and scholars (see Franz, 2019; Stephenson

& Yorke, 1998; Walker & McLean, 2013; Walker & Wilson-Strydom, 2017). Specifically, it is seen to be relevant for the moral evaluation of social arrangements beyond the development context to professional practice (Walker & McLean, 2013), participation (Walker & Wilson-Strydom, 2017), creativity and innovation. These values are most certainly echoed through our participants where, as noted, developing an ethical mindset in students is considered fundamental to their development personally and professionally.

Our study reveals common ground among educators' approaches and sense-making of design thinking that informs the discourse on design thinking pedagogy. In addition, the study lends support to emerging research such as that by Franz (2019) and Koria (2015) that explores the interrelationship of design, education and wellbeing to capability (See also Grande, 2014; Koria, 2009; Stables, 2013; Walker & Wilson-Strydom, 2017).

Naturally, with all research, there are questions that can be raised in relation to the breadth and depth of the study, methodology, study design, population, researchers, time frame, and context. In the case of our study, we chose a deep analysis of a limited number of participants who are well versed (and even well known in the design community) in educating on design thinking. This decision was linked to our literature review that revealed little research on design thinking pedagogy and our chosen methodology that involves an intensive data analysis process.

6 Conclusion

In this study, we utilised IPA to explore design thinking pedagogy at an experiential level in order to address the tendency in design thinking education research to ignore how design thinking is made sense of by those involved in developing and teaching design thinking curricula. Specifically, this research focused upon the detailed examination of the personal experience of design thinking pedagogy, the meaning of the design thinking pedagogy to participants who are educators in the higher education context and how they make sense of the experience of design thinking pedagogy. After an in-depth analysis of three educators' experiences of design thinking pedagogy in the higher education context, we arrived at one super-ordinate theme: design thinking pedagogy sensed as capability building for everyone. This super-ordinate theme was then further qualified in terms of four subordinate themes; developing a participatory approach

towards world issues; developing an open, explorative attitude; developing creative ability; and developing an ethical mindset. From these findings, design thinking educators have the basis for a pedagogical rationale that transcends disciplinary boundaries and provides common ground for collaboration and on-going development of this emerging field. In this respect, the study makes an original contribution to design thinking pedagogy and to critically informing future research and deliberation.

Acknowledgements: We owe a debt of gratitude to the participants who openly shared their experience of teaching design thinking. We would also like to express our gratitude to QUT's research scholarships and Creative Industries Faculty research support fund as the funding bodies for this research.

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