Liminal Moments: Designing, thinking and learning

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Abstract

This paper provides a contextual reflection for understanding best practice teaching to first year design students. The outcome (job) focussed approach to higher education has lead to some unanticipated collateral damage for students, and in the case we discuss, has altered the students' expectations of course delivery with specific implications and challenges for design educators. This tendency in educational delivery systems is further compounded by the distinct characteristics of Generation Y students within a classroom context. It is our belief that foundational design education must focus more on process than outcomes, and through this research with first year design students we analyse and raise questions relative to the curriculum for a Design and Creative Thinking course—in which students not only benefit from learning the theories and processes of design thinking, conceptualisation and creativity, but also are encouraged to see it as an essential tool for their education and development as designers. This study considers the challenges within a design environment; specifically, we address the need for process based learning in contrast to the outcome-focused approach taken by most students. With this approach, students simultaneously learn to be a designer and rethink their approach to "doing design".

Key words

design education, design thinking, creativity, threshold concepts

Introduction

The current context of university teaching, as described by Biggs and Tang (2007) and Friedman (2003), focuses on the teaching of the professions to very large groups of students that are not necessarily interested in the "higher" end of the higher education system. This fact alone has a strong impact on all disciplines and an interesting effect on teaching design in a university setting.

Friedman (2003), briefly describes the trajectory of design education from the apprentice artisan craft traditions, through professional education and into universities. He highlights the need to understand design as a planning process that involves a multitude of skills always directly related to the production of artefacts. He states that "artefacts are in fact the implementation of a design solution", and implies that the act of designing starts way before the production of the artefact. Similarly, Buchanan (1998) describes two stages of the evolution of design education and how theory relates to practice in each of them. In 1998 Buchanan envisioned a "third era" of design education as he forecast schools that would be informing the practice through the new knowledge created in their design studios and research efforts. In a setting where theory goes beyond practice to develop solutions for problems yet to be perceived by the industry, instead of following trends, according to his vision, design students would determine and create future trends. We agree with Clark (2003) who suggests that there is "opportunity for design to define itself as a field with its own knowledge/s that facilitate, not only thinking about design and through design, but of design as a way of knowing, thinking and doing" and with Lloyd (2012) who states that the role of designers is changing into becoming more focused on social engagement, collaborative design, and on the process of designing rather than on problem-solving outcomes.

What Clark suggests is a deep, ontological view of design, design as a way of being, a view that has been explored by some design authors and philosophers in the last decade an understanding that "design is what makes us human" (Fry, 2009, Gall, 2013, Nelson and Stolterman, 2001). According to this perspective, we are born as designers, but through social and educational structures that increasingly emphasise outcomes and linear problem solving, we "forget" these design abilities and have to re-learn them. Meyer and Land's (2003), and in a design context Osmond (2009), describe the process of (re)learning on an ontological level, as going through a series of "portals", that they call 'threshold concepts': ideas and principles within a certain area of knowledge that once assimilated change the ways of understanding the subject being learnt and its larger application in a field. The "learning portal", once crossed, facilitates a deep transformation for students.

This paper suggests that design thinking is one of the threshold concepts in design education. It aims to raise questions on how to make these threshold concepts

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visible and as such create opportunities for a design-learning journey that is effective, meaningful and transformative. While it might not offer a final solution or recommendation, it aims to frame the problem and intends to help design educators reflect upon what could be the real threshold concepts or learning "portals" necessary for students to get through during their design course. Processes that encourage students to have an ontological view of design (learning to **be a designer**), as opposed to a functional view of design (learning how to **do design**).

Teaching and learning design in a higher education context

Teaching Design
In order to set the context of this study it is useful to look into what is the current environment around university teaching (and learning) in general, and around design education specifically. Tony Fry (2003) claims that currently the essential thinking activity in university setting has been "forgotten", and that as a consequence,

the abilities of a self to comprehend its (fractured) being, the (difference of the) being of others and the being of the worlds of dwelling constantly diminishes. In contrast, the ability to operationally function in the maintenance and extension of projected, and frequently incommensurate, worlds increases.

When Biggs and Tang (2007) describe shifts in university settings, they mention the change in the type of students that search for a higher education degree, with special emphasis on students who now come from a broad range of backgrounds and that in their majority are not necessarily "used to" the traditional academic ways of learning; their main objective at university is to acquire the necessary skills and knowledge that will guarantee them a good job. In other words, they are not used to and some times not interested in thinking about or reflecting upon their practices. They want to learn to "do", instead of learning to "be".

In addition, Smith, Hedley and Molloy (2009) observe that most students' lives are "often fractured between work, family commitments, personal issues and study", and that this context influences and contributes to the way they learn. The situation is no different with the contemporary design students. Both Biggs and Tang (2007) and Smith, Hedley and Molloy (2009) suggest that models of teaching (and teaching design, specifically) should evolve in order to accommodate the new needs of the students. Biggs and Tang (2007) emphasize aligned teaching as a

way to help most students to engage with learning on a "higher level". Smith, Hedley and Molloy (2009) propose a model of delivery that is focused on problem-solving activities strongly rooted on experimentation and theory. Following this thought Sharma (2011) observes a movement towards cohort-based learning where smaller groups of students engage with academics in more informed discussions based on already available, open-source online material. He believes the movement in this direction has already started and the general low lecture attendance rates are a good sign of this change.

On the flip side, contemporary design practices have a strong focus on design thinking as its main product, rather than any specific media or product type as it once was. With the evolution of technology the production of design artefacts has become easier and cheaper, and most of the time the designers themselves have full control over the whole process – from creation to production and marketing. These shifts indicate that the differentiation of a design service/consultancy no longer relies on the quality of the graphics, or the aesthetics of the products. Rather, the main point of difference is the thinking that goes behind that solution and how that solution will transform the client's business, life, social interactions and create new cultures (Brown, 2009, Brown, 2008, Vogel, 2010). High level, top edge design companies value and focus on the transformative powers of design through multidisciplinary teams, collaborative work within teams and with stakeholders, and community/social development around their products. Therefore, the current challenge for the academics in higher education design courses is to find ways to prepare the students for this world of critical, strategic design, that is highly technological but should still be focused on human experiences.

Friedman (2003) advocates the need to think of the design solution as a series of skills, tasks and planning process that comes before the production of the artefact. Design courses should focus on developing design thinking skills rather than focus mainly on production. Buchanan (1998) agrees by stating that the focus on developing skills to solve problems of the present through a stronger flow of communication between industry practitioners and educators is valid, but that this should evolve into a different relationship between theory and practice. He believes that theory should go beyond practice developing idea and solutions for problems yet to be felt by the industry, through studio practice and design research. Tim Brown (2008, 2009) crafts the term "Design Thinking" to represent the strategic role of design in igniting ideas and the identification of issues at very

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early stages of development of a "solution", as opposed to the common view of design as a "tactic" activity that "builds on what exists and usually moves it (only) one step further. Designers than have their roles shifted from simply solving an aesthetic problem to become the core strategists and thinkers, helping not only to solve, but also to better outline the problems (Brown, 2008, Brown, 2009, Lockwood, 2010). These arguments easily underpin the idea of aiming for a transformative design education, where the higher levels of reflection and transformation are achieved through the act of learning how to **become** a designer.

As teachers of design we understand that "creative spaces" need to be devised for students so that they exercise their own ideas and design processes. These spaces involve not only physical space, diverse opportunities and freedom to experiment, but also time to think, research and connect ideas, and to engage on rich conversations that allows for multiple perspectives to be explored (Gadamer, 1977, Shaw, 2002, Polanyi, 1967, Rust, 2004, Senker, 1995). These can help consolidate formal "new knowledge" acquisition, harness and build upon learners' tacit knowledge (Polanyi, 1967, Rust, 2004, Senker, 1995), and also help new knowledge and innovative ideas to emerge. In addition, as suggested by Osmond and Turner (2010), the tacit dimension can also be also one of the drivers of curriculum design, where key concepts and pedagogical practices are chosen to be added or removed from program based upon what teachers think students should learn.

Literature shows that creativity is strongly related to trust and diversity (Goldschmidt and Tatsa, 2005, Myers and Torrance, 1967); (Atkinson, 2002, Polanyi, 1967, Torrance, 1967). Trust, however is something that takes time and effort build, and it does not exist if it is not authentic (Cole-Edelstein, 2004, Healey, 1997)mar(Marzano, 2006, Palmer, 1997, Polanyi, 1967). One cannot be "forced" into trusting someone else. As is well described by Brookfield (1995), it is the very subtle actions of the teacher that will make students feel secure enough to trust, or that can easily undermine any possibility for trust to happen.

On the other hand, Clarke and Clayton (2010) state:

Australian design schools appear to share an assumption that the undergraduate degree is structured around the imperative of educating graduates capable of taking up—or generating—employment in design: that students will have the skills, conceptual reach, entrepreneurial capacity and confidence to make a transition from university design education to paid work in a design related field, or to higher degree research and its implicit professional pathway.

This outcome-focused view of design education although understandably necessary, can undermine or make it harder for students to engage with concepts that are not obviously related to the direct outcomes described by Clarke and Clayton (2010). Therefore, the ultimate transformative experience in design teaching will come from a solid bonding of creative trust between students and tutors, which should provide stronger engagement with more abstract issues and also reinforce and inform connections to the needs of the industry. We believe design thinking combined with process-based learning can help engage students in their self-transformation.

The contrast is clear between the needs of the market and what is being currently offered in design education: educators deal with students that live "fractured lives" (Biggs and Tang, 2007, Smith et al., 2009), where "thinking is removed from learning" (Fry, 2003). Current design practice, however, expect designers to take a more strategic role where design thinking is a fundamental skill and philosophy, where young designers are asked to "think beyond solutions", and where solutions are expected to – and will, even if not intentionally – transform lives (Brown, 2009; Vogel, 2010).

Smith, Hedley and Molloy (2009) suggest a model of learning to the course of Interior Design that builds upon students tacit knowledge of design – the knowledge they already have about the designed objects and environments they interact with. Students develop and improve their own design process through adding and relating knowledge they already have with the knowledge they gradually "acquire" during their university program. The connection between these different instances of knowing, the comparison, usage and adaptation of knowledge to solve design problems is what constitutes their learning, and what will build the scaffolding for the creation of new knowledge.

This was the sort of approach we incorporated to the Design & Creative Thinking unit recently introduced to the School of Design, Creative Industries. The aim of the unit is to offer a foundation in design thinking and introduction to the processes and methods designers employ when working in a contemporary cross-discipline environment. It does so by introducing design history, creativity theory and the evolution of design thinking. The delivery was structured between weekly lectures (1h) and studios (3h). Lectures address social, cultural, economic and technical

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themes that have continued to shape the design industry and the role of designed objects in society, as well as its practitioners, styles and methodological approaches. Studios consist of problem-based learning activities and group discussions. During studios, apart from creativity and observation and interpretation exercises, students were given a variety of design briefs and had different time frames to work on them. Their solutions were presented during in class critiques. Assessment consisted of two items: (i) a written essay – as one of the unit objectives is to develop academic writing skills – and (ii) a Design Charrette at the end of semester, where students were given a brief and had 48 hours to develop and present their design proposals. While focused on interactive and visual communication design, the briefs given to the students were broad, with loosely defined problems that needed refinement and could generate solutions in any field of design.

Learning Design

The main current challenge of design education is to prepare the young designers for this "new" design world, where they are expected to think critically, engage strategically, create integrated solutions, work in a multidisciplinary environment and deal with the human aspects of the design process. These aspects should be a natural progression, however, the focus on learning how to produce solutions / design outcomes – which guide most of the current design curricula – poses a major challenge for student engagement in courses that focus on the more theoretical and philosophical, media-independent views of design.

Our experience teaching first year design students has directly encountered some of these challenges. During the course, one of the main issues was to engage students, motivate them to attend lectures and secure their attention and meaningful participation on the practical activities. After the course and through analysing the survey data, we realised that students could not grasp the real purpose of the unit – possibly the cause of our engagement issues. One of the students expressed in the end-of-semester survey, "I feel like hardly any of [what we learned during semester] is actually relevant to what we should be learning".

It has been our experience that classroom numbers drop off dramatically after four to five weeks, leaving tutors to reinterpret and deliver lecture material. This practice counters what we hope tutors accomplish in their tutorials, namely, process-based activities that encourage students to problem solve. In addition to this issue is the acute focus that most students give to assessment. While this is

an understandable goal of students in a university environment, it seems to be at the expense of learning to work through problems to achieve better outcomes. There's a reluctance to engage with new and unexpected tasks or processes unless they will be assessed in some manner.

The authors are sympathetic to the challenges university graduates face – decreased employability and pay rates, increased competition for jobs. What might compound this pressure on educators are the characteristics of this generation of students, Generation Y (Gen Y): an age group born into technology, reliant on it in every manner, distracted by it in every context, and who have short attention spans and demand immediate rewards. How Gen Y attributes relate directly to some of these pedagogical challenges is difficult to quantify: the authors express this based on their experience with this age cohort.

We are assuming that the creative process is a complex one, and within the context of design, this process gets compounded with design's inherent goal of posing solutions through a variety of tangible design outcomes generated through processes of interaction, feedback, prototyping, and ultimately a product (or experience) of some sort. Yet, from our experience teaching Design and Creative Thinking, there appears to be resistance to focus on the process aspect of design. Most students look for quick solutions and don't engage with the criticality of the design work. Research skills are limited, and there is very little will to do further research into the design problem they are working on.

It has also been our experience that students in our design course (as opposed to other courses such as architecture) are quite reluctant to critique each other's work as part of the design process. We might speculate that this may be one, a reaction to critiques where the teacher asserted their power; or, again a generational tendency to get affirmations and recognition for just showing up. While scant literature may support these assertions, it has been clear that there is a certain anxiety towards the future that is pervasive in the study body that supports this contention. We also want to make clear there are many students who do engage with process, who focus on the problem-solving – and "problem-finding" — aspect of design and are not wed to immediate outcomes, as can be demonstrated by another student's statement on the end of the year survey: "The best aspects were that I learnt from the assignments and tasks in the studio. *I had a lot of moments where things all came together and related and I understood things*". Further, we have

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	Transformative	Irreversible	Integrated	Troublesome	Bounded
Concept definition	deep changes epistemological and ontological	cannot be "unlearnt"	integrates and transcends fields of design and media	creates a level of discomfort and uncertainty "hard work"	defines the boundaries of the field
Curriculum expression	Focus on defining the problem before solving the problem— understanding that research and engagement with users/ stakeholders is an integral and essential part of the design process, and will determine its uniqueness and originality		Field / media independent projects meant that students were free to explore a more holistic design experience	open and social challenging design briefs takes students "out of their comfort zones", creating space for innovation	questions the role of designers and the impact of design solutions and redefines design as an strategic tool

Table 1 – Threshold concepts definitions and heir interpretation at the unit curriculum

encountered many students who actively seek critique for their design process and are enthusiastic about reworking their designs to better respond to mock briefs.

Design thinking: threshold concept in design learning?

Meyer and Land (2003) define threshold concepts as "portals" of knowledge that the students go through when advancing on their learning. They characterise these units of knowledge as being transformative, irreversible, integrated, troublesome and bounded. Transformative and irreversible because as students learn the concept their understanding of the discipline, industry or self is transformed and there is no going back to seeing things the way they saw before – an ontological change, ostensibly. Integrated meaning that it pulls together a broad range of knowledge in the discipline and helps make sense of it. Bounded as it helps delimit the boundaries of the discipline; and troublesome because it is not always concepts that are "easy" to understand and make sense of, and it can be often counter-intuitive or seem "illogical" to the students coming from a certain point of view.

By removing the immediate focus on tangible / aesthetic design outcome from the aims of this unit, and concentrating on the methodologies of design strategy, creativity theories, research methods and prototyping as a development tool we intend to get students to understand the value of spending time on and developing the research and thinking stages of the design process. This, however, adds a level of "troublesomness" (Perkins, 1999) to the unit that we did not foresee. Flagging the

idea that Design Thinking characterises as a threshold concept in design education.

In a preliminary analysis, Design Thinking as a concept in itself fits within all five attributes of threshold concepts described by Meyer and Land (2003). There is no question that once you understand the meaning of Design Thinking it completely changes the way you see your role as a designer, the design activity and its outcomes, and after you cross this "portal" it is almost impossible to go back to the previous perspective of what design might constitute. This therefore characterises Design Thinking as a "transformative" and "irreversible" concept (Meyer and Land, 2003). In terms of being a "bounded" and "integrative" concept, Design Thinking does help define the boundaries of what is meaningful design and what is merely "aesthetic" design. More importantly it defines design as a highly human-dependent and interdisciplinary activity — as opposed to the current technocentric view that good design (specially graphic design) can be made by one single person (a competent trained designer, preferably) sitting behind a computer screen. Design Thinking also allows students to realise the connections between the concepts they are learning in other units and how they integrate these concepts into a holistic, critical and meaningful pedagogical process. Table 1 synthesises the definitions of threshold concepts and the curriculum items that express each of these concepts in the Design & Creative Thinking unit.

Interestingly, Design Thinking demonstrated to be a "troublesome" concept (Meyer and Land, 2003, Perkins,

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1999) for student learning. It was noted that the concept of design thinking in fact contradicts students expectations that design is about "making things" and using technology to generate the desired outcomes. Most of the students were surprised – and somewhat disappointed – to sit on a class where they were taught about the thoughts behind design and sometimes asked to do nothing but observe a certain situation and think about the constraints and opportunities that could emerge from it. This sense of discomfort of the students is demonstrated by their comments on the end of semester survey. Some of these comments describe feelings of time being wasted and information not being relevant "to what we should be learning".

Therefore, our main question is: What can we to do and what should we change in the way the unit is delivered and assessed in order to take students through the "Design Thinking Portal" in a more subtle, confident and conscious way?

A Second Chance
Considering the contextual issues and the questions raised in the first iteration of the unit, and using a design thinking approach, the unit delivery was re-designed for its second iteration in Semester 1 2013. The changes were designed taking into consideration some broader aspects related to

the unit, such as student lifestyle, teachers profiles, general expectations from students, teachers, the department to which the unit belongs, the university as a whole and more importantly the role of this unit in helping students become designers and thinkers that will make a difference in the future of the industry.

The first step of this process was to map the environment around the unit (Figure 1), determine the main issues (constraints) we want to address and the outcomes we want to generate – these are more than the learning outcomes of the unit, they represent what we want to achieve with and through this unit by the end of the semester in general terms.

We chose to address two main topics in the first iteration of change:

Issue 1: design thinking = a troublesome portal

Design thinking was identified as a threshold concept which offers some contradictory troublesome knowledge that is mainly caused by the mismatch between students expectations of what they "should be learning" in such a unit, and what is actually delivered. In order to tackle that, we feel we need to address the differences between learning to do design and learning to be a designer, an
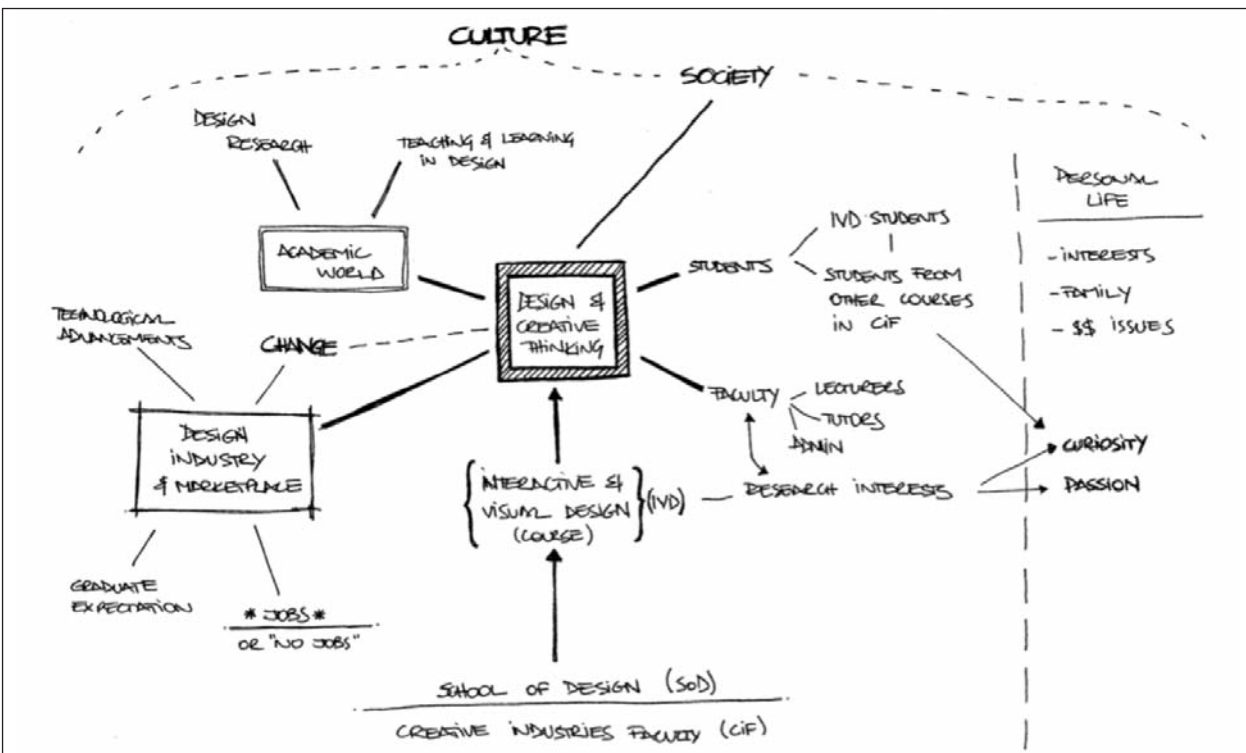
Figure 1 – Design & Creative Thinking environmental map

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Survey Question	Student Response
What was the most important thing they learned during the semester?	"Learning the difference between a strategy and a solution." "That though a concept or solution may be wrong, there is still something you could use or learn from it." "Thinking outside the box, and working in a group. Learning to design through thinking through the problem." "That those who are inspired are infectious, and to always give things a go and try to get things done.
Did you feel there was a specific moment where you realised you learned something important?	"I think it was sometime late at night at home, after doing my own research on design processes I finally had a "a-ha" moment where I realised the intentions of the course." "In the mini-charrette when the entire group agreed on the fundamentals of our plan. We had created an innovative way of redesigning the healing garden and its experience."
How do you think this unit could be improved?	"Be assessed for projects that cut into our own time, otherwise it is pointless to be working on something that isn't being assessed when we could be spending time on something that is." "Firstly, I'd like to say that this subject was effective to encourage creative thinking and express the fundamentals of design. However, there were times that felt like there was little incentive to complete tasks to a high standard, especially with more intensive assessment occurring at the same time…"

Table 2 - Students responses from end-of-semester survey and blog posts

epistemological obstacle between the roles making and being, acquiring and becoming, which determines how transformative the journey through this unit will be for the student.

Therefore, it was intended to create a "smoother passage", a conscious crossing of this conceptual portal, where students could identify and reflect upon their liminal moments of learning, as they learn what to expect and understand the transformation they will go through.

The focus on process was made explicit from the beginning of the unit by clearly stating it and by embedding it into the first studio activities.

Issue 2: weak engagement with the new knowledge and activities

As part of the process of **becoming**, or for the "transformation" to happen and the crossing to occur it is crucial that students engage with the designed learning activities. As described on the previous sessions of this paper, current Gen-y students have diverse modes of learning, a busy lifestyle and an urge to get things done quickly. They are also described as performing better

when challenged and left alone to complete a certain task. The new activities were designed to tap into that potential, offering guidance as an exciting road of "discovery"— almost disguised as game tokens that they will "find by themselves". This implied changes in modes of delivery and assessment activities.

In 2013 some online resources were added to the unit, including a specially developed study guide and some on-line tutorials from Lynda.com. These were integrated to the studio and assessment activities. Studio activities included quick mini-challenges that helped students put in practice some of the abstract concepts of creativity and design process, and to improve their skills. These activities were not directly assessed, but were to be reflected upon and this reflection composed one entry in their design blogs – which was their actual assessment item.

Another change on the activities for this second iteration was the addition of a "practice mini-charrette". At the mid-semester point students had a half-day session where they were divided into groups and given a substantial brief to be resolved and presented in within hours. This activity was also not directly assessed, but it was a direct practice to Assessment 2 – Design Charrette where they can

choose their groups and have 48h to deliver the results, which also became a subject for another blog entry.

As a result of these changes we did observe a higher level of engagement and interest in the units, and more thoughtful and insightful solutions for the open brief projects. Students were particularly happy with the "quick" weekly creative exercises, although they did express that they wished to be directly marked for all activities. Table 2 shows student's' quotes retrieved from their blogs and from the end-of semester student survey.

Plans for the Future
For the future iterations of the unit, further changes are to be introduced still considering Issue 2, and focusing on improving engagement of students through enhancing their ownership of the unit and projects.

Through applying co-design principles fundamental to design thinking, the intention is to give voice and ownership of the unit to the students without losing control of its content and learning objectives. The work will to be done in two levels: the first focused on helping students think about the purpose of the unit on a high level; the second on engaging students on developing their own briefs and designing some of the assessment criteria.

More specifically, to tackle issue 1, we intend to survey the students at the beginning of the semester and ask them what they think the purpose of the unit is. The answers will be shared in class and together we will outline and explain how each activity will lead and prepare them to achieve that purpose. This will be approached the first design brief they have to think about. Collective design processes will be implemented throughout the semester. At the end of the semester students will be asked again what they thought the purpose of the unit was, if they think they had achieved it, and how it was achieved. The comparison of the two answers will help us have a better idea of how students expectations change during semester and which activities give them a sense of achievement of their goals, which activities clearly relate to the "passage" to the understanding of the threshold concept.

We will address Issue 2 by involving students in designing their own assessment criteria. One of the assessment items in this unit is related to academic research and writing skills. It is our intention to make this more aligned to industry standards of writing not losing focus on academic rigor. So students will be pointed to and search for examples of outstanding practice in industry and

academic writing in the field of design thinking, critical design and creativity. Together we will deconstruct these examples and they will be asked what elements they think make those pieces exemplary. From the results achieved with this, we will design their assessment item (around industry and academic writing skills and styles) and criteria. This way, students will be defining parts of the delivery mode and activities of the unit, as well as the parameters of assignment. We believe that by giving more ownership of the process to the students we might achieve better results in terms of engagement and quality of assessment.

We understand however that giving that much power to the student cohort could have negative implications on the unit. For instance, students might read that the coordinator and teachers are not sure what to do about the unit; they might feel insecure about the quality of their learning if so much is being defined by them, who are just entering the university; teachers might feel unsure about the possibility of having to deal with unexpected results from the interaction with students. All of this, however, indicates issues that the process of Design Thinking brings, and it needs to be based on trust on the process and on the creative and tacit knowledge of the stakeholders (students and teachers in this case).

Conclusion
Course curriculum can be seen as a sequence of portals that students go through during their journey of learning and discovery. One of the challenges of doing this is that this should not be limited to change of curriculum on isolated units, rather there is a need to identify and map the threshold concepts that students should go through at a course level and apply the changes consistently.

Buchanan (1998), Fry (2003) and Palmer (1997) analyse teaching from a philosophical perspective and advocate that teaching can be a way of changing paradigms and shift ontologies, and question the paradigmatic assumptions (Brookfield, 1995) that surround their teaching and their practice. Buchanan (1998) states, "in the very process of teaching students how to design, the design educator is also investigating the nature of design, seeking to better understand its methods and principles". This is in line with the design thinking approach and the cycles of prototyping iteration and improvement through reflection on the process.

This paper is the result of the realisation of design thinking as a threshold concept in design education and on its role as transformative – though contradictory – notion. Using a design thinking approach to re-design the curriculum for this specific unit is an attempt to facilitate change from

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bottom-up by altering the way first-years engage with the design activity through creating an environment of trust and devising spaces for creative and strategic thinking to happen. The ultimate aim is to foster student approaches that are more holistic, critical and media independent, and to guide them through conscious transformations to **become** designers and critical-thinkers.

As designers and teachers we agree with Buchanan (1998) statement that "we must be alert to new developments and prepare our students for a changing world—not only in technology but in the needs and expectations of the human beings whom we ultimately must serve" (Buchanan, 1998) (Buchanan, 1998) (Buchanan, 1998) (Buchanan, 1998) (Buchanan, 1998) (Buchanan 1998). If we teach what we love (Palmer, 1997) and teach to change the world (Brookfield, 1995), we need to enable our students to envision the future of a viable world (Fry, 2003), and to empower them with techniques, skills and wisdom to (re)design this world.

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