

Educating the New Wave of Designers

Design has matured from what has been often considered a style driven industry to an area that deals with solving complex social and technological problems. Creating a design graduate that adds 'value' to society in terms of someone who excels at communication across a range of cultures, understands the current climate of innovation and entrepreneurial skills needed whilst at the same time has a solid foundation of skill sets and knowledge in a particular disciplinary area is no easy feat. Many bachelor programs focus on the digital, the material or a combination of both however we believe that the skills most important to be a successful practitioner in today's economy are a solid grounding in the principles of human-centred design. We believe that a course structure grounded in the principles of human centred design, design research, cross-cultural communication and how to bring solutions to market are key to creating the 'new wave' of designers. In this paper we show how to support the cross-facilitation of knowledge and skill sets to enable students to become valuable leaders in the industry.

Key words: Design, Human-centred, Industrial, Visual, Interaction.

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Introduction

Post Bauhaus design has become a part of our lives. So much so that every aspect that touches our lives has been designed, from our homes to our experiences in restaurants and at the bank as well as that little tab on a soda can. All of these things have been designed to create a better experience and/or opportunity to engage with something in a new way. In short, design is the interplay between two interdependent spaces: the space of concepts and the space of knowledge (Hatchuel and Weil 2003). The fundamental skills of the designer are the ability to identify meaningful problems, frame them within appropriate contexts, and design a solution (Irwin, 2015). This paper looks at the different contexts and approaches to curriculum design that fosters graduates who can bridge the gap between a post-industrial age and the processes involved in creating products, visuals, services and concepts for a digital age.

Context

As the application of design has expanded so has the need to educate designers and those that use design. "A new wave of designers formally educated in human-centred design—taught to weave together research, interaction, visual and code to solve incredibly gnarly 21st-century problems—will push the industry to new heights of sophistication." – Dave Miller, Recruiter at Artefact (in Lebarre 2016).

There are quite a few dystopian views on the future of design industries to the extent that AI will take over pretty much all jobs. Looking at current trends and industry projections for the next decade it is safe to say that some of the current hot job opportunities are showing a downward trend due to the following reasons:

- UX Designers - "UX design" has become too broad and muddled
- Visual Designers - The days of visual designers being clueless about user centric design are numbered. More and more designers need skills to not only worry about the aesthetics, but also make it real, with programming and prototyping skills.
- Traditional Industrial Designers - industrial designers who are only focused only on "physical form, industrial production, manufacture" aspects of design, will become "designosaurs."
(Webb, 2016)

However, when one door shuts another opens. The new economy needs new skills. Looking ahead it is imperative and appropriate that future graduates should process certain unique combinations of skills to meet and adapt to the new and changing economies. For example; Interaction Designers - Virtual and augmented reality is set to become a \$150 billion industry by 2020, disrupting everything from health care to architecture.

- Post-Industrial Designers - will need to think of the total end-to-end user experience to build "tangible experiences that connect the physical and digital worlds,"

- Specialist Material Designers - will meet the growing need for designers who can work in and across different types of materials
- Organisation Designers - IDEO partner Bryan Walker... says, "[designers] will help reimagine all aspects of an organisation from its underlying structures, incentives, processes, and talent practices to its physical workplaces, digital collaboration tools and communications.
- Freelance Designers/self employed - the future of design is freelance. (Webb, 2016)

Like many professional disciplines, design education faces set of challenges originating from fast changing demands of the economy. To name a few (Heitmann, 2005):

- Changing labour market, rapid changes in industry requirements, globalisation: stresses need for graduates with flexibility and transferable skills, with life-long learning abilities.
- Industry disruptors: Changing dynamics of the industry favours graduates with entrepreneur skills, who are prepared for self-employment.
- Competition and dropping student enrolments: Need future-focused curriculum that not only provides job ready skills but also self-learning skills that keeps them a step ahead in the industry.
- Flexible learning and mid-career upgrade: Use of digital technologies for flexible learning environments to provide flexibility for part-time studies and mid-career upgraders.

The university of Canberra's new design program is in response to a strategic opportunity to reinvigorate and reimagine applied design based on not only on the needs and opportunities that Canberra provides but also responds to national and international paradigms of design and future workforce needs. As Norman & Scott, (2014) have noted: "If design is to live up to its promise it must create new, enduring curricula for design education that merge science and technology, art and business, and indeed, all the knowledge of the university." The course is designed to develop graduates who are leaders in the field of design thinking and innovation, through a program which is distinctly human centred, research-led and focused on design-led entrepreneurial outputs.

The Development Process:

The curriculum development process follows Biggs "constructive alignment" approach. Where the development process starts with intended students learning outcome. Teaching methods used and assessment tasks are aligned with the intended learning outcomes of the students. The focus is on "knowledge construction" as against "knowledge transfer" where students engage in different learning activities undertaken by the student in order to meet the intended learning objectives (Biggs, 1996).

Traditionally design courses have been created in disciplinary silos structured around core competencies related to the areas of Graphic Design (also known as Communication Design and Visual Communication), Industrial Design (also known as Product Design) and Multimedia Design (also known as Media Arts). In current industry practices we see these areas merging more with the lines between the outputs as “material” or “digital” and who is responsible for the skill set in creating these outputs (eg. a Graphic Designer or Product Designer) becoming ever more ambiguous. In order to keep up with the rapid pace of technological advancement over the last decade, design education has had to evolve. This has resulted in creation of new disciplines, such as interaction design and the blurring of lines between more established disciplines such as graphic and industrial design (Bean and Rosner, 2012). We have also seen the acceptance of areas such as design strategy, design leadership and design thinking as subject areas in their own right and the ambiguity with where these subjects are placed in an overall university structure. What has become evident in this ever evolving landscape of design professions is the need for all design practitioners, regardless of their end profession, to have a solid skill set in understanding, researching and interpreting human behaviours. Furthermore a skill set in cross-cultural understanding is necessary for the design graduate in an increasingly globalised world cultural communication skills will give graduates an edge in creating products, services and designed objects that more thoroughly address the needs of the end users in our multicultural society.

When approaching the re-design of a curriculum with a multidisciplinary focus, it is essential to look back at the multiple theories underpinning the study and nature of ‘design’ as a whole. Merriam Webster’s defines ‘design’ as a transitive verb meaning “to conceive and plan out in the mind.” A ‘designer’ is defined as “a person who plans the look or workings of something prior to it being made, by preparing drawings or plans.” (Merriam Webster, 2017). This very basic definition gives evidence of the obvious importance of the designer in the creation of ‘looks’ or ‘styles’ but doesn’t fully explain the complexities involved in the creation of any type of object – be it a product, building, service, digital application or campaign. Design has been used as a blanket term to describe many areas from Architecture to Craft (Designed objects) to Art (as in the “designer-maker”). For the purposes of this paper we look at design from the perspective of applied design; mainly the areas of graphic, industrial and interaction design however there are many traits that designers have that transcend practice areas.

As Gilliam Crampton (in Franinovic, 2008) notes [there is] “the need to consider both “designing the right thing” and “designing the thing right.” To be a ‘designer’ one must take on roles that deal with learning, making, working together, communicating and investigating. The main role of the designer is to “work creatively to generate design insights and solutions” (Crismond & Adams, 2012). Crismond and Adams (2012) explain that in all fields of design, designers “learn while designing.” They are continual learners – they learn by doing and through a continual process of trial and error. Through this process designers learn important skills of how to continually adapt to failures and changing conditions. They must understand and use design strategies and tools effectively and possess a range of skills in their own practice area but also in the ability to deal with diverse groups of clients and other service providers (Adams, Turns, & Atman, 2003 and Crismond & Adams 2012). Designers’ “perceive and take perspectives intelligently” in that they are able to see the ‘big picture’ and can establish intentions and priorities in their design work (Crismond and Adams 2012, Cross 2009). They are good at “making and explaining knowledge-driven decisions” in that they use intuition and insights from experiments to inform the process of making and also of revising a design (Crismond & Adams 2012,

Zubrowski, 2002). Characteristics that highlight the skills often associated with good designers (Dym, Agogino, Eris, Frey, & Leifer, 2005):

- Ability to tolerate ambiguity associated with interactive process of divergent-convergent thinking.
Ability to switch between micro and macro level thinking. Holistic way of thinking.
- Handle uncertainty, ability to make decisions in uncertain conditions
- Ability to think as part of a team
- Ability to communicate using appropriate language of design.

According to Chou et al. (2013) "Design is defined then as the interaction of concept and knowledge spaces." This relates to the 'C-K theory,' introduced by Hatchuel and Weil (2003), which asserts "that design can be modelled as the interplay between two interdependent spaces: the space C of concepts and the space K of knowledge." This can be further explored in the application of design thinking. Design thinking differs from other modes of problem solving in that is very solution focused (Kruger and Cross, 2006) In the design thinking model, information and knowledge is selected strictly to solve a problem and designers are able to quickly filter out unnecessary information. "A theory of design thinking is extremely useful for design teaching, because it can be taught and learned in a relatively short time, in controllable processes, with evaluation and exercises to improve creative efficiency," explains Chou et al (2003).

The first step of the design thinking process is to "step into the shoes of the user" and come to a solution from a position of empathy (Brown, 2009). The terms "user-centred" or "human-centred design" are often used to describe the process of designing something from the human perspective. According to Krippendorff (2004): "Human-centeredness takes seriously the premise that human understanding and behaviour goes hand-in-glove; that what artefacts are is inseparably linked to how their users perceive them, can imagine interfacing with them, use them and talk about their stake in them with others." In this view, everyone assigns embedded meanings to a product based on their own personal experience with it. The product will have a deeper connection to the user if we can more thoroughly understand and address their needs.

Prior to the advent of user centred design, design was seen as occurring in a vacuum, and the process of designing was understood as an individual creative process. Early pioneers of industrial design such as Henry Dreyfuss and Bell Geddes and authors such as Norman transformed this approach, by placing end users of products at the forefront of the design process (Norman, 1990). From this perspective, design is understood as the process of identifying problems and needs of users and developing responses to those issues. User centred design is a major theme in the development of theories and expanded practice of design. For example, making information understandable is related to user centred design because it helps users interface with information, technology, the design process and the final product. This can expand into areas such as experience design, where the psychological aspects are as important as the physical. This area of study considers our emotional and psychological responses to design, and how these interact with the usability and functionality of the product or system.

This understanding of the centrality of users has also changed over time as the definition of the concept has been progressively broadened. Current definitions of users include the whole spectrum of those who interact with the product – for

example, those who manufacture and dispose of products are also included in this scope. Usability studies now consider the way different people interact with products over the entire life cycle of that product. According to Giacomini (2014, p.609): "Today's human centred design is based on the use of techniques which communicate, interact, empathize and stimulate the people involved, obtaining an understanding of their needs, desires and experiences which often transcends that which the people themselves actually realized."

User-centred design often applies a process of 'participatory' or 'co-design' to create solutions along with the user. Co-design (also termed co-creation and participatory design) is a process that merges the roles of designer and user (Sanders 2002). Participatory design is based on three interconnected concepts all of which acknowledge the importance of the user in all complex systems. The first objective of participatory design is "improving the knowledge upon which systems are built," followed by "enabling people to develop realistic expectations and resistance to change," and finally "increasing workplace democracy by giving members of an organization the right to participate in decisions that are likely to affect their work (Bjorn-Anderson and Hedberg, 1977)." According to Bratteig and Gregory (2001), "participatory design approaches seek to include the future user in most parts of the design process; even as co-designers." It has now become commonplace to accept that users are valuable sources of information and that when they engage in the design process, new innovations and creative solutions can occur (Wheelwright & Clark 1992).

When dealing with elements of human-centred design it is essential to understand the cultural context of the "human" or "human(s)" involved and the embedded cultural meanings that they apply to objects, services and constructs. We are functioning in a global marketplace and therefore designers are increasingly expected to design objects or services for clients that will be used in diverse locations. Australia is a multicultural country in which over a quarter of the population was born overseas and a further one fifth has at least one overseas-born parent (Anon, 2017). We tend to assume that proximity of cultures in a multicultural society will make us more informed citizens and that we will organically absorb cultural understanding however this is not the case. In a study on teacher education in Turkey, Demir and Ozden (2013) explain "most of university students want to work in diverse racial, ethnic, and socio-economic environments, but are not ready for the cultural diversity which they are to encounter at such schools because they have no or little knowledge about it." It is therefore essential to foster an understanding of multicultural views and create opportunities to improve a students' cultural intelligence (CQ), their ability to function in various cultural contexts. CQ comprises a set of capabilities that include metacognition, cognition, motivation and behaviour (Wood and St. Peters 2013, 561) however the most significant element of cross-cultural awareness is 'the ability to be open to new ideas and have the capacity to change such ideas when necessary' (Williams and Best 2014, 242).

A 2012 paper by Peter Lloyd on "Embedded Creativity" explores the composition of the labour force in the creative industries in the UK. In this paper Lloyd explains that although many students go on to work within the creative fields they have studied – many also go on to work outside of the creative industries. They are still employed in "creative labour" however it is often "embedded" in other areas that have not traditionally been seen as "creative employment." "The need for 'embedded' creativity outside of the creative industries is as big as the need for specialists within the creative industries so it seems plausible to think that an equal proportion would go on to work in this 'embedded' mode (Lloyd, 2012)." This statement gives weight to the benefit of re-thinking the traditional disciplinary structures; creating more fluid

knowledge flows between them. In this current climate, students need to learn and understand that their career path may not be clear cut and therefore teaching students to learn to deal with uncertainty and to take productive risks while working with their ideas in creative ways will be the best way forward (Crismond & Adams).

A New Approach

Overall the aim of our new programme is a paradigm shift from: disciplinary to multi-disciplinary; specialised to holistic; product based to systems based and fixed path learning to a flexi-path approach (Kaur Majithia, 2017). We need to equip those currently inside design programs to an emerging post-industrial design world. This requires changing the mindset of those who set limits on what the application of design can or should be, and we likewise need to find new terminology which reflects, rather than limits, these potential futures. Finally, the designers of today will have to become, in the future, the disseminators of design principles beyond the profession of design to the wider world.

Design undergraduates

Universities must resist the urge to make undergraduate design courses all things to all people. Instead, the focus should be on key areas of design principles which will be more adaptable to a range of settings. Specific skills-based requirements should be shifted to more stand-alone add-on modules to meet current employment requirements. These could be made available to both undergraduates and existing members of the profession.

Existing links between design disciplines should be broadened to encompass non-design disciplines such as science, health and the social sciences. These interdisciplinary interactions at the undergraduate level should then be extended to postgraduate and beyond. The interdisciplinary approach taken in regard to course design should also be applied to teaching staff. New topics and ways of thinking may need new ways of teaching. As innovation extends the reach of design to novel applications in health, government or education, experts in those fields could provide teaching perspectives, aided by design educators to tease out areas of commonality.

Existing design workforce

The existing design workforce requires significant retraining to learn to apply their existing skills and knowledge in new and innovative settings. What is required is to add to their existing models of knowledge and practice, which tend towards the producer-focused end of the continuum, through the addition of expertise within the community-focused part of the spectrum. In the University of Canberra context, and carrying forward the work done in undergraduate projects, this focus would be applied to government settings. Understanding the language and processes of government, and of policy development and program implementation, would be the first step. Working through how these processes map to the design process could illuminate opportunities for value adding, and the potential role for design thinking to be applied.

Non-design undergraduates

Design educators need to find a way of exposing non-design students to design approaches. Cross-disciplinary approaches are required. These could include

interdisciplinary projects, where students from various disciplines work together on a problem-based project, under the guidance of design approach. There may also be opportunities for shared modules, where the units would have credit for various disciplines including design. Another approach may be for design units to be recognised as electives for a broader range of courses. Perhaps a 'fundamentals of design thinking and approaches' unit could be developed which would have cross-disciplinary application. The object of all these options would be to increase the awareness of a range of undergraduates of design principles and their potential application in their fields.

Existing workforce

Design thinking principles have extensive application across a range of industries: health, banking, tourism and hospitality, to name a few. However, few in these industries have any understanding of the potential benefits of such an approach. Under this approach the aim of the profession is to raise the awareness of those in non-design fields to these possibilities. The idea proposed above of holding round table forums bringing together representatives from government agencies and others would have a dual purpose. As well as informing designers about government, they would inform other non-designer participants about the potential application of design thinking in their fields.

Conclusion

In the design of a new curriculum for University of Canberra we have taken a "knowledge construction" approach as opposed to a "knowledge transfer" where students engage in different learning activities in order to meet the intended learning objectives (Biggs, 1996). Students need to learn and understand that their career path may not be clear cut and therefore teaching students to learn to deal with uncertainty and to take productive risks while working with their ideas in creative ways will be the best way forward. Our new program will focus on key areas of design principles which will be more adaptable to a range of settings. Specific skills-based requirements will be shifted to more stand-alone add-on modules to meet current employment requirements. Through a cross-disciplinary approach, we aim expose non-design students to design approaches as well as encouraging design students to interface with a wide range of programs such as health sciences and sports, to enable more a larger dialogue around issues that affect a wide range of subject areas. Underpinning our entire approach is the importance of human centred design and the "user experience." We have embedded an understanding of participatory design principles into our course as a means for students to create meaningful experiences, products and services. Moreover we are aware of the importance of introducing students to the multicultural context of design and through a program that provides students with a foundation of knowledge of dealing with different cultural contexts, we aim to imbue a sense of cultural awareness in our students. In short, it is our ultimate goal to produce designers that are the disseminators of design principles beyond the profession of design to the wider world.

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