Industrial and graphic design in the 'Innovation Nation': the importance of interdisciplinary collaboration and exchange in design education

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Abstract

Current Australian government policy promotes the country as an '*Innovation Nation*.' This policy focuses on the areas of culture and capital, collaboration, skills and talent, with the ultimate goal of 'inspiring people to be more creative' and thus creating an 'ideas boom' with valuable IP and inventions that will effectively set Australia apart as a creative economy leader in the '*Asian Century'* (Osborne, 2016). The discipline areas of Graphic Design (GD) and Industrial Design (ID) are both areas that deal with creative concepts and innovation. They have become more and more aligned in recent years such that industry knowledge in both areas is highly beneficial for future employment. Graphic Design (GD) is an area traditionally associated with the knowledge of the *visual communication* of signs, symbols and visual systems whereas Industrial Design (ID) is traditionally an area associated with the production of *material objects*. In contemporary practice, particularly in the design of new technologies and design thinking for business, the areas are interconnected. According to Buchanan (2001, 6), 'In fact, signs, things, actions, and thoughts are not

only interconnected, they also interpenetrate and merge in contemporary design thinking with surprising consequences for innovation.' This paper explores the roles, overlaps and collaborations of ID and GD in professional practice and how these can be implemented in both ID and GD education, especially in cross-disciplinary, cross-cultural work-integrated learning projects with a global focus. Through an overview of previous professional practice experiences by the authors, a brief literature review, and case studies of multidisciplinary projects, the authors aim to show how interdisciplinary collaboration and cross-cultural awareness in GD and ID are essential for employability in the current climate.

Keywords: Industrial Design, Graphic Design, Work Integrated Teaching & Learning, Cross-disciplinarily, Cross-culturality, Innovation

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Innovation is a term that has recently appeared in national policy in countries such as the UK and Australia. As a simple definition to innovate means 'to make new' and innovation itself can represent 'economic growth by finding and developing more efficient, less costly means of production, as well as offering new equipment and technology (Harding, 2015). In the European Union (EU), "Innovation" as a policy objective has been embedded into the Europe 2020 Plan. According to the European Commission, 'In a changing world, we want the EU to become a smart, sustainable and inclusive economy. The 2020 Fund is supporting the five key ambitions of the EU; the top three being employment, education and innovation (2016).' Similarly, Australia's "Innovation Nation" plan focuses on the areas of culture and capital, collaboration, skills and talent, with the ultimate goal of 'inspiring people to be more creative' and thus creating an 'ideas boom' with valuable IP and inventions that will effectively set Australia apart as a creative economy leader in the '*Asian Century*' (Osborne, 2016). The National Innovation and Science Agenda (NISA, 2016) states that 'in the next decade an estimated 75 per cent of jobs in the fastest-growing industries will need skills in science, technology, engineering and mathematics (STEM).' While this is important for Australia, internationally there is also a strong movement for "STEAM," where the added "A" stands for "arts and design". As noted by the STEMTOSTEAM organization, 'Art + Design are poised to transform our economy in the 21st century just as science and technology did in the last century' (STEMTOSTEAM, 2016).

Innovation as a driver for economic growth also falls in the realm of "The Creative Economy." The "Creative Economy" is a term used around the world to define the cultural and creative industries that can foster growth in post-industrial urban environments (Pink 2005, Florida 2002). The creative economy can be defined as an economy based on transactions in creative product. Creative products are grouped in the areas of culture, enterprise and technology. A large component of the creative economy is the design of both the physical application of art and design, and the integration of the design process in approaching the urban environment. Design integrates a range of considerations such as material, function, aesthetics, culture, engineering, human factors and lifestyle. Design helps to solve problems, realize potential and create new value and markets.

To be "innovative" requires a fluidity of thinking and an ability to look beyond norms, stereotypes and traditional ways of practice. In education and in industry, since the last century, designers traditionally labelled themselves in terms of their specific practice such as industrial (or product) designer, graphic designer, packaging designer, etc. However, in contemporary practice the perception of a 'silo' system of disciplines that do not interact is shifting. 'Creative process is sustained by the cross-pollination from one area of practice to another,' explains Butler (2013) in his article *'The Future Belongs to Multidisciplinary Designers.'* He furthers this with the warning that 'a designer who is not multidisciplinary on some level has no future' (Butler, 2016). Along with multidisciplinary approaches, the ability of designers to facilitate cross-cultural innovation can translate into effective competitiveness. With the further progress of globalization, increased social mobility, and multi-ethnic mixing, cross-cultural exchange has become the new normal. In practice, the differences in culture can either be a source of conflict or innovation; however, this paper argues that cross-cultural exchange is a resource for innovation. Discipline areas of Graphic (GD) and Industrial (ID) design are both areas that deal with creative concepts and innovation. They have become more and more aligned in recent years such that industry knowledge in both areas is highly beneficial for future employment.

Multidisciplinarity and cross-culturality in design:
Culture is a major element of innovation. Jarvinen and Koskinen (2001) explain: 'Culture can be an important source of new ideas and business. At best, it can articulate scientific, artistic and popular cultural values in the marketplace in those products that people use in their lives.' Inherently, designed objects, services, spaces and experiences express cultural values. Design, notes Jarvinen and Koskinen

(2001), 'introduces content to our lives and thus enhances the quality of our interactions with the material world - and increasingly to services that accompany them.'

Today's globalized world offers increasing opportunities in which cross-cultural and intercultural relationships and interactions, as well as multicultural contexts occur more frequently. Multi-cultural refers to a society that is compiled of a 'melting-pot' of different cultures each with unique values and beliefs that although different, function together as a whole. Singapore, Australia and the United States are often referred to as 'multi-cultural' societies. Inter-cultural is a term often used to describe someone visiting or living in a society with a culture that is significantly different from his or her own for a short period of time. It relates to interaction between cultures, which can be favourable (such as cultural adaption) or otherwise unfavourable (such as "culture-shock"). Parrish and Linder-VanBerschot (2010), suggest that the growing multicultural nature of education requires that educators develop skills for culturally sensitive and culturally adaptive teaching and learning. This is specifically important for the disciplines of art and design, as they are simultaneously "consumers" and "producers" of culture.

Cultural aspects are especially relevant for the various disciplines within design, both in practice and in education. In the practice of Industrial Design, we understand culture by studying the artefacts made and used by a group of people. Artefacts help us to understand a culture; thus, ID practice is an active creation of culture and meaning. In GD, visual culture proposes the creation and use of meaning, within the visual and; with the exception of environmental graphics and packaging; the two dimensional domain. As such, both GD and ID are both consumers and producers of culture. As stated by Lee (2016): 'Regardless with whether designers consciously intended to create a cultural object or not, all the artefacts they designed will be eventually those which reflect the culture in that time.'

Cross-cultural interactions and exchanges are a way to transfer and educate others on the meanings of images, symbols and behaviors. Cross-cultural design is the outcome of the transfer of knowledge that occurs when different cultures come together to design solutions to complex global problems. Multidisciplinary and cross-cultural interaction are definitive for current art and design education and practice in a globalized world.

ID and GD: a successful 'arranged marriage'

As early as 1922 the Massachusetts-based type designer, calligrapher and book designer William Addisson Dwiggins coined the term "Graphic Design," but it was seldom used before 1945 (Meggs & Purvis, 2016, vi). Industrial design was also considered a "decorative art" in the early 1900's. However, both GD and ID were provided with the foundation of being thought of as serious academic disciplines through schools like the Bauhaus, founded in Weimar, Germany in 1919, and subsequently the Ulm School of Design, founded in Ulm, Germany in 1952. Both the Bauhaus and Ulm School of Design greatly influenced the theory, teaching and practice of Industrial Design and Graphic Design (or Visual Communication, another common name for Graphic Design) (Burdek, 2015, 41). Since the Industrial Revolution, Industrial and Graphic designers have worked together in diverse types of projects, from low to high complexity, for as long as both of these disciplines formally existed. However, they are still sometimes viewed as disparate entities in academia despite the fact that around the world, many design studios and manufacturing companies employ GD and ID practitioners to work together in design and communication departments. While dealing with somewhat different areas of design, one mainly two-dimensional and the other mainly three-dimensional, in industry many of these areas are interdependent. It is common for these two design disciplines to collaborate, and in many cases professionals trained in one of the disciplines work in the other. For example, increasingly practitioners trained in industrial design work in graphic design or web development, and graphic designers create lines of products.

In some contexts, graphic and industrial designers can work as interdisciplinary or multi-disciplinary practitioners. Anecdotally, both authors have personally lived this experience in different times and contexts: an industrial designer working as a graphic designer and product photographer, or a graphic designer working in interior design. GD and ID collaborations are varied and common. The contexts for these collaborations vary from global branding companies (where architecture, products and visuals are all part of a brand experience for the user), to product manufacturers, to local design studios. Examples of projects where the fields function together vary; such as the creation of graphics for an electric product, to the graphic user interface of a ubiquitous app in a smart phone where often industrial designers are the drivers of the initial design to designing products under corporate image guidelines of a brand driven company where graphic design applications are more of a focus.

One key area where both disciplines have a long history of collaboration is packaging. Industrial designers (and/or sometimes packaging engineers) traditionally focus on structural elements, materials and the overall 3D aspects of the package. Graphic designers (and/or sometimes professionals in the field of advertising) traditionally focus on the images, colours, texts and elements that are part of the visual communication. However, these roles are increasingly blurred often with graphic designers leading some of the 3D aspects of the design process, or industrial designers having input in the graphics.

With the dematerialization of design and the development of new social or digital design disciplines (such as the design of services and user experiences), enhanced by the advent of new technologies and the creation of new modes of communication, marketing and manufacture, this interdependency has become more of a necessary integration. The rising movement of digital makers within a "sharing" economy has made the disciplinary boundaries between industrial and graphic design blur, and in this current climate our practices have merged more than ever.

Opportunities and challenges for multidisciplinary design

While the changes described above are creating a confluence of graphic, industrial and multidisciplinary design processes, new tools also allow that any person, regardless if they have a design background, can digitally manipulate images or 3D print products and sell them online thus creating new challenges for design professionals. As expressed by Massanari (2012): 'things are changing…as numerous scholars have shown, the increasing availability of inexpensive digital design tools is shifting the relationship between producers and consumers.' Massanari (2012) labels this type of individual as a "prosumer" and explains that the shift from consumer led production creates a new more "democratized" form of design practice with 'greater diversity of design artefacts and perspectives.' However, just because one has the tools to make something does not necessarily make the end products "good" or even more functional design solutions. 'Additionally, merely having access to and instrumentally using the tools of graphic design, for example, does not necessarily make one a "graphic designer,"' notes Massanari (2012). As such, more than ever, today's design professionals cannot merely focus on excelling computer skills for drawing or visualisations, but should have strong conceptual and design thinking skills as well as the ability to be an active problem solver with strong communication skills across disciplines and cultures. Furthermore, the evolution of

the workforce and job opportunities put a stronger emphasis in entrepreneurship, and the creation, not only of new visuals or products, but also of new businesses.

Case study: *"inspired by"* Graphic and Industrial Design study tours: an emphasis in cross-culturality, collaboration and entrepreneurship

Experiencing and understanding foreign cultures is a life-changing learning experience that can expand one's view of the world. Through their professional careers, both authors have worked in a diversity of locations from the UK, Italy, Japan, Colombia, the United States, Singapore and China. This has led us to create a series of practice-led short-term overseas tours, as we understand that cross-cultural experiences have a deep impact on students' learning. Pedagogically, study tours have been shown to provide transformative personal learning experiences (Mezirow, 2000). Study tours motivate students to learn more about the world, different cultures and different people. This promotes cultural awareness and respect for others, while developing teamwork-skills and enhancing student-teacher collegiality and engagement. These study tours promote authentic and experiential learning, opening the world for our students.

The "Inspired by" short term overseas study program is an approach to learning that employs experiential learning, cross-cultural, and multidisciplinary methods to foster a global understanding of design and entrepreneurialism as a means to foster innovation. The tours create a variety of opportunities and collaborations to engage students in transformative authentic learning in non-traditional learning environments. Following Lombardi (2007), the design projects as part of the tours focus on real-world, ill-defined complex problems and their solutions, intentionally 'bringing into play multiple disciplines, multiple perspectives, ways of working, habits of mind, and community (Lombardi, 2007, 3).'

The tours we have created offer tertiary students in the arts and design disciplines multi-faceted experiences that can shape a new world-view as well as informing new, interdisciplinary modes of thinking. The tours are to unfamiliar sites, a foreign country or culture that is unknown to the participants, and bring together participants that have often had no previous contact beyond the classroom. The tours are significantly different from other types of tertiary teaching models, such as online, formal face-to-face classroom teaching, or even blended learning, in that they are based on experiential, contextual, and authentic learning (Lombardi, 2007) rather than the formal, incremental learning process that is common in classroom teaching. The

main projects are developed through "project-based" and "creative problem solving" workshops, which are inherently related to creativity and innovation, within the context of art and design education. Creativity, and the potential for innovation, imagination can be enhanced simply by taking students out of their comfort zones and daily routines, and exposing them to new experiences (Lombardi, 2007).

The 15-day study tours of the 'Inspired by' series task Graphic and Industrial Design students to collaborate in the creation of mini retail shops (including point of sale, product and packaging design) for an on-campus design market at the University of Canberra's Open Day. As such the project is meant to foster an understanding of cross-cultural design and entrepreneurship in design. Our most recent tour of Singapore (July 2016) was an example of how we fostered these learning outcomes. Singapore is a very multicultural city, giving students exposure to Chinese, Indian and Malay cultural influences all set in the backdrop of a thriving urban environment. Singapore is quickly becoming a leader of design and production in the Asia-Pacific region. The tour is a mix of cultural activities, workshops and industry visits. The authors have fostered industry collaborations with global leaders in packaging, graphic and product design in Singapore such as Bread Talk, Jones Knowles Ritchie (jkr) and Sealed-air packaging, thus enabling students to engage directly with top industry professionals during the tour. Visits to the National Design Centre, The Peranakan Museum, The Asian Civilisations Museum and other cultural sites around the city provide students with a sound understanding of the culture, symbolism and visual language of the country. And the final week of the tour is an integrated design workshop with our partner institutions in which students work with Singaporean students on related design briefs. On return to Australia, the students design a market for Open Day, which enables students to create products and market stalls that reflect what they have learned about the design culture of Singapore during the tour.

Overall, the tours are a way to connect students that might not otherwise travel abroad; they can increase cross-cultural awareness and intelligence; and thirdly they support learning outcomes and experiences in a global context. The program fosters strong peer-to-peer mentoring opportunities along contact time tutors that is simply not possible on the home campus. Participants are also able to work with local students, tutors and industry experts, providing them with a new perspective of the

design and culture of the country. Our students get to work directly on design briefs with high-achieving students at our partner institutions not only in Graphic and Industrial design but also from a range of design disciplines such as Interior Design and Architecture. This fosters an international peer-to-peer learning experience that is not possible on the home campus. For example, during the workshops included in the program for the recent 2016 tour to Singapore, University of Canberra students worked with 20 students from the Visual Communications, Interior and Product Design cohorts at Nanyang Polytechnic and with 40 Product Design students at Ngee Ann Polytechnic. In addition, they also worked with 20 Chinese product design students from the Hong Kong based, THEi to produce innovative packaging and design solutions for a global audience.

While one of the main purposes of the program is internationalization of their studies, the final outcome has very practical purposes related to professional design work scopes, and mainly related to entrepreneurship and the reality of manufacturing, costing and commercializing a design. On return to Australia, students who participated in the study tour will collaborate in the design and creation of their own design market, including market stalls, products and point of sale, which are displayed at Open Day every year. The market is a means to enable the cross-pollination of Graphic and Industrial design, and this exchange also facilitates rich peer-learning opportunities. Multidisciplinary groups create brands, products, packaging and retail displays. Students understand not only how to design products and create interesting graphic solutions, but also gain an understanding of how to manufacture and sell their products and brands in a University context that simulates the 'real world' of selling products. During the market, students need to explain their products and their experience overseas to the general public and in thus conveying the value and unique characteristics of their product to the consumer. Another direct outcome of this collaboration is that both Graphic and Industrial design students have been motivated to apply to, and have been offered design-related jobs overseas.

Overall, this type of learning experience is extremely beneficial to students in the creative disciplines and it is simply not possible to achieve this breadth of knowledge, cultural immersion and industry engagement on the home campus.

Conclusion

Innovation is a phrase that has become increasingly popular in recent domestic economic policy, not only in Australia but all over the world. Innovation can have

complex meanings and understandings. However, in the context of design, it is something that relates to the creative production of new services, products and experiences. Graphic and Industrial designers are well positioned for the role of "innovators". However, in academia and in industry these two areas have traditionally been viewed as different entities. This paper presents a case for more cross-pollination amongst these discipline areas, particularly as the realms of both GD and ID merge in the creation of apps, services and "user-experiences." Lin (2007) explains that 'designers have noted the importance of associating products with cultural features in order to enhance product value.' This paper provides evidence of the importance, not only introducing cross-disciplinary practice, but also of fostering cross-cultural practice as a cornerstone of any contemporary design program. As more and more "prosumers" are enabled to create their own products, graphics and apps, employability in the creative sector is becoming less and less about simply having the technical skills, but more about having a broad set of thinking and cultural skills. Arming students with the knowledge of how to design across cultural and disciplinary borders is a way to counteract this "anybody can design" trend. Ultimately overseas immersive programs and workshops can create students that have a range of both design and cultural skill that will make them 'work ready' in a rapidly changing global market.

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