MODELS OF RESILIENT ADAPTIVE PRACTICE

Stephen TRATHEN [1]**and Soumitri VARADARAJAN**[2]
[1]University of Canberra, Canberra, Australia
[2]RMIT University, Melbourne, Australia

ABSTRACT
This paper examines the development of the Australian graduate industrial designer in a period of significant change. It explores the mismatches between current industrial design education approaches, the lived experiences of recent graduates and the changing design employment ecology both globally and locally. It also highlights the instability generated by the lack of consensus on the role, function and parameters of industrial design as a discipline and a profession: instability which both contributes to and is caused by these incongruities.
The research is based upon primary qualitative research which investigated the career trajectories and practices of a group of industrial design graduates qualifying from an Australian University in the period 1996-2006. Participants took part in semi-structured interviews developed from predetermined themes drawn from a review of literature and reflections on my own practice as a design educator. The resultant rich narratives of the graduates' lived experiences provided the opportunity to identify and analyse the application of industrial design and industrial design education to the range of possible employment and professional sectors of practice. A key finding was the resilience and adaptability demonstrated by these graduates as they negotiated multiple forms of design practice.
On the basis of this research, a series of models were developed. This paper details two of the descriptive theoretical models: The Adopter-Adapter-Departer model: which described three categories of industrial design graduates; and the Thematic Map of Australian Industrial Design Practice, which depicted the themes of practice which emerged from the interview data.

Keywords: Design practice, resilience, design education, industrial design

1 INTRODUCTION

Australian undergraduate industrial design education generally maintains its traditional focus on Design for Manufacture (DFM) skills and knowledge. However as the domestic manufacturing base shrinks, fewer and fewer industrial design graduates find employment in the DFM sector. Using the proposition that there is a disconnection between industrial design practice and industrial design education, this research investigated these contradictions. This allowed for the set up a number of proposed theoretical models and descriptors to illustrate, understand and describe this particular situation, to better understand and to later address the disconnect.
As manufacturing's share of national GDP continues to decrease, the contribution of services sectors, such as education, banking and health, has correspondingly increased (Australian Bureau of Statistics 2005). As DFM employment has reduced, practicing industrial designers have forged new applications of their skills and knowledge. Some have found supplementary revenue sources through low volume and bespoke production akin to traditional craft applications. Others have applied their skills in design and re-design to non-traditional fields such as health systems or the banking services sector.
Therefore, do graduates identify as members of the industrial design profession or do they see potential employment roles in terms that are too permeable and open-ended to be adequately reflected by this label? The research explored the experience of recent graduates to understand changes in industrial design practice and how these could inform needed reforms to educative and professional structures. The research is based on the proposition of a widening disconnect between industrial design practice and industrial design education and this research resides within this framed space.
In the past, research concerning industrial design education has focused on an employer-based perspective, and primarily been concerned with discovering their employment needs and priorities (Higgs et al 2005). There has been comparatively little investigation of graduates' perspectives.

Recent graduates are navigating the complexities and tensions in the profession through their lived career trajectories: their perspectives are essential to understanding these changes. A graduate-centred approach yielded perspectives quite different from research conducted through the lens of traditional industrial design employers and professional bodies. Most fundamentally, a graduate-based investigation allowed us to follow real-life applications of design and career paths, whatever the direction taken.

2 APPROACH AND METHODS

In reflecting on these issues, we have noted the significant debates regarding the roles and types of practice of industrial design and the blurring of roles between design disciplines (Trathen and Varadarajan 2009). The changing environment means industrial design is in the midst of 'a major paradigm shift that has resulted from expanding its influence to new subject matter and exploring new ways to think about the modern life' (Kwon 2007 cited in Trathen and Varadarajan 2009)

The foundation of the research was drawn from phenomenological approaches. This approach takes a necessarily individual perspective, and strives to share these perspectives. Therefore qualitative methods, in particular in-depth interviews, were an effective phenomenological method of inquiry.

The investigation is based upon primary qualitative research which investigated the career trajectories and practices of a group of industrial design graduates qualifying from the *(institution name withheld)* in the period 1996-2006. Participants took part in semi-structured interviews developed from predetermined themes drawn from a review of literature and reflections on the practice of design education. The resultant rich narratives of the graduates' lived experiences provided the opportunity to identify and analyse the application of industrial design and industrial design education to the range of possible employment and professional sectors of practice. A key finding was the resilience and adaptability demonstrated by these graduates as they negotiated multiple forms of design practice. On the basis of this research, a series of models were developed. Two are presented here:

- The Adopter-Adapter-Departer model: which described three categories of industrial design graduates
- The Thematic Map of Australian Industrial Design Practice: which described the themes of practice which emerged from the interview data

2.1 The AAD model

Prior to conducting the interviews, post-graduation descriptors were developed to explain and explore the career trajectories of industrial design graduates. These categories were based on the combination of our previous research and experiences. The three categories developed by means of this process were:

Industrial design **Adopters:** Those graduates that take on traditional industrial design practice which has a focus on Design for Manufacture (DFM). This includes roles as an in-house industrial designer, employment by a consultant industrial design firm, and working as sole practitioner for the design and manufacture of mass manufactured products.

Industrial design **Adapters:** Those graduates that have been required to adapt to changing circumstances and who have successfully modified their practice or developed new forms of practice beyond DFM in response to changed environments.

Industrial design **Departers:** Those graduates that have left the field entirely.

Participants were drawn from all three categories to ensure input was gained from 'people with different vantage points' (Rubin 2005, p. 67). The Adopter-Adapter-Departer model represents the model of 'Adopters', 'Adapters' and 'Departers' in diagrammatic form. In this model, the horizontal (X axis) represents the passage of time from pre-university, through an industrial design education and then post-graduation and the development of each career, including one each of an Adopter, Adapter and Departer. The vertical (Y axis) represents the relative distance from adoptive, or traditional, forms of practice. Dark gray represents Adopter, orange: Adapter and light blue: Departer. The model represents a simplified version of three individuals, represented by three gray ellipses on the left. These three individuals almost merge as they go through their industrial design education with an adoptive DFM focus. Then upon graduation, their practices begin to diverge. Some, the Adopters, continue on with a DFM practice; others, the Adapters, modify their practice and start to move away from traditional DFM approaches; finally the Departers leave the profession completely.

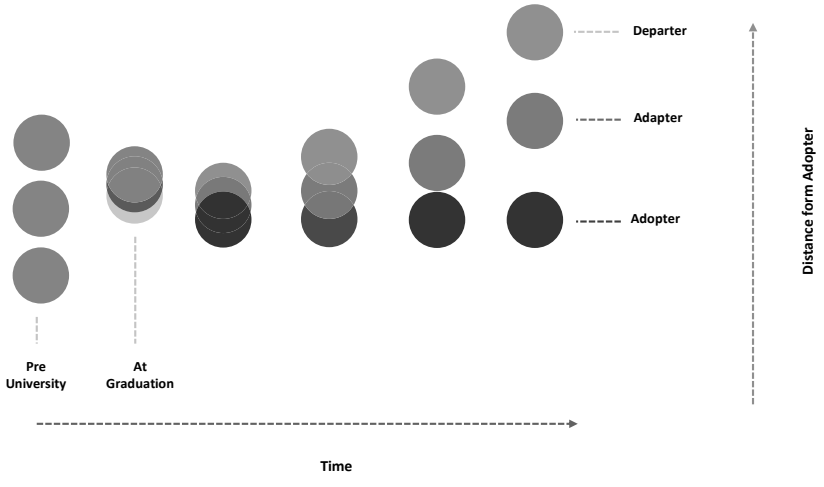

Figure 1. Adopter-Adapter-Departer model

This model is important in visualising the framework for describing the breadth of Australian industrial design practice including the three elements of Adapter-Adopter-Departer model (AAD).
These career trajectories are examined through the use of the AAD model. The significance of the AAD model is that it highlights the real world impact of the mutability of industrial design on individual practitioners, and the career choices they make on their journey. Adopters manage to cope with the uncertainties inherent in the profession of industrial design and maintain their connection to aspects of traditional industrial design. The Adapters manage to cope with the uncertainties inherent in the traditional profession of industrial design by a combination of resilience and career diversification to develop new ways of practice. Departers generally find the mutability of the profession outweighs their desire to stay but hold some connection to 'design'.
The Adopter, Adapter, Departer (AAD) model assumes a similar position as a graduate finishes industrial design in Australia , that of an adopter, armed with the knowledge and skills to participate in the practice of DFM. We were also interested to know where these graduates came from and what their journey into university and industrial design was. Like the criteria for selection of respondents for the interviews there are varied aspects of an individual's initial progress and process into industrial design. This background information was not known before the purposive sampling and selection of the interviewees and is not detailed here.

2.2 Selection of participants and interviews

The selection of participants was an important component of the interview based research method. The participants were selected using purposive, or strategic, sampling techniques (Mason 2002, p. 123; Sarantakos. 2005). In this process, selection was not random but was instead based on careful consideration of desired attributes and the need to gain perspectives of graduates working in local, national and international settings; and to include three areas of practice: private sector, public sector and self-employed. 12 respondents covering the AAD descriptors, participated in in-depth Semi structured interviews of between one to one and half hours. The data form the 12 interviews was analysed using a variety of techniques within a template analysis approach. This template analysis, with its mix of both top down and bottom up processes, recognised that descriptive and interpretive coding are not entirely separate entities. The coding structure themes developed prior to the interviews were initially added to during the first phases of coding and then refined during the iterative analysis process of reflection and refinement, before reaching a point where it could 'serve as a basis for building an account of the findings' (King and Horrocks 2010, p. 166). The interpretive coding phase involved the ongoing iterative process of grouping and interpreting the meanings of the descriptive codes that were revealed to have common attributes and relationships. The final stage of analysis involved the development, definition and refinement of overarching themes.

3 RESULTS AND MODELS

3.1 The Thematic Map of Australian Industrial Design Practice

The themes were developed through both top down testing and application of a priori themes postulated before the analysis began, and by a bottom up process of development based on interview data. Key commonalities emerged from the rich and informative interview data of the graduates lived experiences. The themes, and their relationships, were visualised by means of the *Thematic Map of Australian Industrial Design Practice.* This Map illustrated the depth of skills and knowledge which contemporary industrial design graduates draw upon in their various forms of practice.

Figure 2. Thematic Map of Australian Industrial Design Practice

The overarching themes and interpretive codes which emerged from the analysis process were:

3.2 Theme 1 – Communicator Theme

The communicator theme describes some of the most important elements of design practice. A fundamental part of the designer's role is the ability to communicate across a range of modes, to a range of audiences and across different disciplines with varied levels of access to shared language (Caplan 2006). Industrial designers communicate verbally, but perhaps even more important is their non-verbal communication. Pictures, models, diagrams, sketches and prototypes are all potential communication pathways for designers. The skills to produce such pathways form essential elements in the designers' 'toolkit'.

3.3 Theme 2: Thinking Approach

The Thinking Approach theme comprises a number of discrete interpretive codes identified in the interview data and subsequently brought under the theme heading. As shown in Figure 4.3, the Thinking Approach theme includes the interpretive codes of problem identification, problem solving, design process, design thinking and user centred design; all of which were used in coding the interviews. These interpretive codes were often used to code the same sections of interview due to similarities and crossovers within the text and were therefore readily merged under the theme 'thinking approach'.

3.4 Theme 3: Social Conscience

The role of the Social Conscience theme is reflected in both the literature and the interview data. As shown in Figure 2, the social conscience theme includes the interpretive codes of change practice, make a difference, sustainability, eco environment and social responsibility. Earlier coding iterations of social responsibility, and sub-codes of environmental concerns, eco design, industrial design's ability to contribute positively to society and making a difference to individuals and society, were

amalgamated within this theme. Likewise, instances of respondents describing attempts to change a practice from within the organisation or as a reason to change their own practice were also included in the social conscience theme.

3.5 Theme 4: Facilitator Interpreter

The facilitator interpreter theme reflects the important role played by industrial design practitioners in enhancing collaboration within work teams. Many such teams incorporate individuals from disparate professional backgrounds and the industrial designer often contributes to team cohesion and shared understanding of work goals by bridging such disparities. The same applies to communication with clients and members of the public. Industrial designers have skills in oral and visual communication and representation; skills which are very useful in building shared understandings when limited shared language and terminology makes written communication difficult. The facilitator interpreter theme therefore has strong links to the communicator theme, and, given its centrality to the role of industrial design, to the identity theme as well. Reflecting these relationships, the facilitator interpreter theme is placed in the model between the themes of identity and communicator.

3.6 Theme 5: Mobility

The mobility theme comprises both external and internal influences that influence an industrial designer's career path: the pressures which industrial design graduates experience in relation to gaining, retaining and changing their employment situations. These pressures influence how industrial designers negotiate their individual career journeys and play an important role in developing their practice. Unsurprisingly a time of economic downturn can lead to a reduction industrial design jobs and thus people move away from industrial design during a downturn and may not return. For some, a lost job opportunity will be seen as a small set back, while others will experience the same incident as a major confidence blow. In all cases, perceived lack of opportunity affects the long term career aspirations in industrial design and correspondingly the perceived need to move beyond this field.

3.7 Theme 6: Identity

Identity as a theme relates to how the identity of industrial design is understood or recognised by individuals both inside and outside the field, reflecting the lack of clarity of the definition and scope of industrial design. Analysis of the interview data led to the identification of three sub-categories of interpretive codes, each examining different groups of people's perceptions and understandings of the profession of industrial design. As shown in Figure 2, the identity theme comprises:

Profession identity: What do *people outside* industrial design understand about the profession of industrial design? This category includes the general public and employers.

Personal identity: What do *people within* industrial design understand about the profession of industrial design? This category includes industrial design graduates and practitioners.

Australian identity: What do *people outside Australia* understand about the profession of Australian industrial design? This category includes international employers and international industrial designers.

4 DISCUSSION OF MODELS

Taken together, the six themes help us to understand interview participants' lived experiences and how these relate to the evolving ecology of the industrial design profession. The relationships between the themes were conceptualised by means of the illustrative Thematic Map of Australian Industrial Design Practice, which visually highlights the intrinsic links between them.

This is significant as it takes the interpretation of the lived experiences of recent graduates to be able to understand the range and significance of the practices of design graduates. This demonstrates that the graduates reflect and review the professional challenges of their careers post-industrial design qualifications as they negotiate their way forward and develop and demonstrate resilient and adaptive practices. This is richer and more informative, with regard to what is actually happening in the arena of graduates of industrial design. This is in contrast to for example, a research approach that is limited by only exploring design practice through the view of employers and employer representative bodies.

The AAD model components proved to be robust and useful categories to explain the career trajectories for recent industrial design graduates, highlighting the extent to which conventional or traditional forms of industrial design practice have shifted over the past 15 plus years. For example,

Adopters in 'core' industrial design roles deal first-hand with the implications of 'over-specialisation' (e.g. becoming a 'CAD monkey'); *Adapters* demonstrate through their own lived experience the breadth of application of design thinking, in ways separate from traditional understandings of industrial design; while *Departers* show that apparent attrition from the design profession can be re-framed as a positive diffusion of design approaches to the broader community.

5 CONCLUSION

While a time of flux and uncertainty for industrial design, the current situation is also one of great potential. Traditional modes of practice are disappearing; however, the latent capacity of design is largely untapped. Guiding the realisation of that promise offers exciting prospects for design educators, practitioners and society more broadly.

This research is significant to Australian industrial design practice and education as it acts as a mirror, held up to the profession as a whole enabling the self-reflection required to lay the ground work for change. This is an important initial component of a set of explanatory tools developed in considering and aiding the development of future industrial design education and practice in Australia.

The research indicated that despite the disappearance of Australian-based manufacture and its consequences for DFM employment, industrial design curriculums remain largely backward looking. A disproportionate focus on design for manufacture persists, while potential non-traditional applications of design theory remain unexplored. As a profession, as design educators and as individual practitioners, we can continue this status quo and witness the demise of industrial design. Alternatively we can embrace change and help create a future where industrial design, albeit in a different form, can flourish. To do so, we need to address the questions: what are the skills, knowledge and attributes needed by the next generation of designers, and how should educators, professional bodies and other support structures best equip them for these roles?

This research provides a basis to move beyond our current passivity to take a more proactive and informed role in shaping the future of the profession. The project aimed to explore the development of the Australian graduate industrial designer in a period of significant change where there is much discussion about the current and future role of industrial design. The project investigated the narratives of these graduates as developed through semi-structured interviews, providing the opportunity to identify and analyse the application of industrial design and industrial design education to the range of possible employment and professional sectors of practice.

The results from this investigation and analysis build on previous research and contribute to the knowledge base of industrial design practice. The research has implications and benefits for both Australian design practice and design education.

REFERENCES

[1] Australian Bureau of Statistics 2005, '100 years of change in Australian industry', ABS, Canberra, Year Book Australia 2005, viewed 10 February 2012, http://www.abs.gov.au/AUSSTATS/abs@.nsf/lookup/1301.0feature+article212005

[2] Higgs P, Cunningham, S, Hearn, G, Adkins, B Barnett, K 2005, *The ecology of Queensland design*, CIRAC, Queensland University of Technology.

[3] Trathen, S, & Varadarajan, S. 2009, 'Taking on Australian industrial design education: current practice and future directions ' *International conference on engineering and product design education*, University of Brighton, UK.

[4] Kwon, ES 2007, 'Design Education as a living organism: a case study of industrial design curriculum development,' *ConnectEd 2007 International Conference on Design Education*, University of New South Wales, Sydney.

[5] Rubin, HJ 2005, *Qualitative interviewing : the art of hearing data,* Sage Publications, Thousand Oaks, California.

[6] Mason, J 2002, *Qualitative researching,* London , Sage Publications, Thousand Oaks, California.
Sarantakos, S 2005, *Social research,* Palgrave Macmillan, New York.

[7] Caplan, R 2006, C*racking the whip: essays on design and its effects*, Fairchild Publications, New York.

[8] King, N, & Horrocks, C 2010, *Interviews in qualitative research*, Sage, Los Angeles.