'Practicing' design research skills while undertaking a PhD

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KEYWORDS:

Working with industry, Postgraduate design research, PhD pedagogy, design research in industry

ABSTRACT

This paper will track how three design research students utilised their developing research skills in industry and society while undertaking a PhD. Traditionally in design schools, there has been little direct transition between design research methods and design practices and processes. This is changing. As clients, and society in general, demand more evidence-based answers to design decisions, there could be an increase of scientific knowledge and approaches towards design in non-research organisations. The three cases presented in this paper support this notion. While not predicting an industry trend, it can illuminate for academics, industry and PhD students considering this pathway, how other research students have moved in and out of practice while pursuing – and informing – their PhD research. With greater call for design research skills in industry and society, future PhD students could be encouraged to investigate this as a complementary option to their academic research.

INTRODUCTION

A very challenging, yet simultaneously rewarding, research experience was found for the three PhD research students that undertook Design Research in an Organisation (DRO) at the same time as undertaking Design Research in an Institution (DRI) in this study.

'Design research' is an ambiguous term that has a variety of meanings both within and across different domains (Collins et al. 2004). The design research referred to in this paper has been undertaken primarily using social science methods. Two of the researchers utilised it to inform commercial design projects, and the other researcher is conducting research about the capability of a group of people to 'do' design in the context of a technology based education program, and is more action research oriented in nature. There were many overlaps of the research tools used (such as interviews, surveys, observation and spatial studies), however the specific design research methods used by the three researchers varied depending on their research backgrounds and the requirements of the projects in which they were involved. The length and scope of this paper prevents a detailed discussion of the variety of methods employed by the authors at different stages throughout their research. However, some methods will be mentioned throughout the paper as relevant to the discussion in those sections.

After outlining how data was collected for this study and an overview of the results, the paper will present the shared experiences of the researchers engaged in professional research in two sections. The first section reflects on how design research was undertaken in an organization, as this type of research is uncommon in non-research organisations. Indeed, for two of the three researchers, they were the first, and only, researcher at their respective organisation. This section may be of interest for organisations considering including a research component, as it provides a perspective from the researchers themselves on working in such a role. The second section more directly outlines links between undertaking DRO and completing the PhD. This section may be helpful to PhD students considering undertaking an additional research position, as well as to supervisors concerned about the implications of DRO on the PhD.

As will be shown, there are a number of consequences for undertaking DRO while completing the PhD. These are mostly very positive, including greater access to primary data, improved research skills, working in a research management position earlier in one's career, and additional funding for seminars and structures for research practice. However, these benefits came with a considerably increased stress load, and lengthened the duration of the PhD.

I. DESIGN OF THIS STUDY

The researchers in the study are also the authors of this paper. They undertook PhDs in different design disciplines or universities, and did not know each other until they were already established in their professional research roles. It was this similar, yet unique, background experience that was the subject of informal conversations and prompted the writing of this paper.

In this study on undertaking DRO while completing a PhD, there are four environmental factors that differed between the researcher's DRO work and appeared to be highly influential on their experiences. These four factors are: load (full-time or part-time), working in a team or autonomously, organisation size and organisation type (fig.1).

	Load	Team/ autonomous	Organisation size	Organisation type
Researcher 1	Full time	Autonomous	Small <15	Commercial
Researcher 2	Full time	Autonomous	Small <15 with external partners	Not-for-profit
Researcher 3	Part time	Team	Large >500	Commercial

Fig. 1. The different organisational environments in which the researchers undertook design research.

Factors that united the researchers was that their DRO was thematically connected to their PhD, they had already worked on their PhD for at least one year (thus had research education), the PhD involved primary data, an educational background that matched the core work of the organisation they undertook design research in (such as an architectural education in an architecture firm, IT in an IT focused organisation). These could also be considered underlying reasons as to being employed in undertaking design research in

the organisation.

A questionnaire of open ended questions was designed to capture different aspects of the job roles and organisation (6 questions), DRO examples (5 questions for 2 exemplary research projects), research development and growth (5 questions) and personal overview (5 questions). Each questionnaire was answered in seven to eight pages.[1]

II. OVERVIEW OF QUESTIONNAIRE RESPONSES

The questionnaire responses were mapped on the following Venn diagram. The paper focuses on discussing the responses that overlap between researchers (fig.2), as they act as items of consensus. The responses roughly fell into two categories, about how design research was valued and undertaken in an organisation, and secondly, the relationship between DRO and completing the PhD.

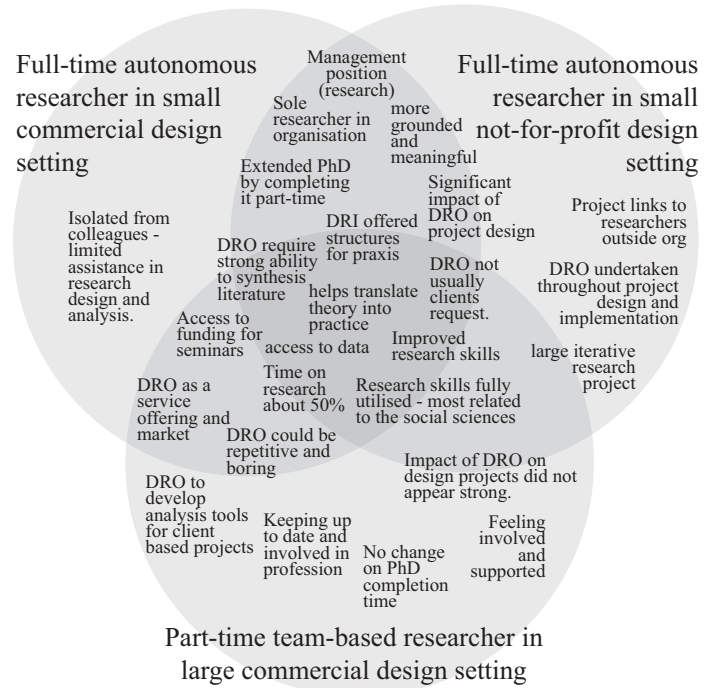[1] The authors can be contacted for a copy of the research questionnaire.

Fig. 2. Venn diagram showing the overlapping questionnaire responses that are described in the paper.

III. REFLECTIONS ON DESIGN RESEARCH IN ORGANISATIONS

There is a growing interest from organisations to include design research as a part of their business strategy (Emmit & Prinis 2008) and firms are becoming increasingly recognised for research extensions. Well known are OMA's research arm AMO, Rafael Vinoly Architects Research Programs, Gehry Technologies and the design firm IDEO which situates research at the core of the business (Suri, 2008). Additionally, there are research and development tax incentives (Australian Government 2009, DiLauro 2009). The value of design research in the field of education is also being increasingly acknowledged (Edelson, 2002). With design research being applied to many different domains and types of organisations, it is difficult to know how it will be used and fit into their unique practice. This section will make some generalisations on what was common about DRO to organisations in which the researchers worked.

A. DRO as a service offering and market distinction

Researchers 1 and 3, at commercial firms, found research to be seen by their organizations as something that added value to their design processes and made the practice *unique among its competitors.*

At the start of a research implementation in an organisation, the research is more overhead than value creating or fee earning (Hall, 2002). The smaller firms overcame this by receiving government funding as an incentive to develop research practices. The larger firm saw the value of research as a long-term business investment that could give them greater market coverage and leverage in future. It would not be easy to introduce research into a practice had it been required *to generate money from day one.*

DRO is more shallow and targeted than university research due to limited time-scales and lack of desire or need to explore phenomena and analyse data. At the end of the day, DRO was designed to help solve the problems of clients. The client was not interested in rich information set contained in the data, nor theories that could be built from the data.

In the larger commercial firm (researcher 1) research projects had significant time frames, budgets and researchers. Most projects had an element of field-work or primary data collection. The awarding of an internal research budget did depend on an assessment of the commercial use of such research, particularly if useable tools for clients could be realised. Publication was also an essential outcome, but as the company had internal publication processes, it did not require peer review.

B. Time on research about 50%

The researchers had previous experience and education in the primary service function of the organisations. Despite being hired primarily for research, they were used to meet the demand and deadlines of more typical design work and other, sometimes high level, office duties such as business strategy, public relations and project management, such that research activities consisted of only about half of their workload.

C. DRO was instigated by company/researcher rather than requested from client

Clients may express an interest in design research, but they rarely request it. Design research is still dependent on the organisation making an effort to offer it to the client. Sometimes they readily embrace the offer but occasionally it is insisted on it as part of delivering a successful design package. The concept of research in project design is a recent phenomenon (Sailer et al, 2008). When it came to clients accepting the research component, all three observed that it required a degree of negotiation. Also, all three researchers initiated research projects, rather than senior management instructing which research projects to pursue.

D. Significant impact of DRO on project design

DRO was used to provide a more sensitive and nuanced understanding of the context in which the clients were operating. This was achieved by employing research methods that investigated the clients' operations at both the individual user level, and observing the contextual surroundings (such as language and culture) that were found to have a significant influence on subsequent design of the project.

For the commercial firms (researchers 1 and 3), research has been used as data gathering device on current conditions to create a design brief. Examples of this kind of research at an architecture firm include occupancy studies, interviews with heads of departments, and a staff survey to gather information about a client's organisational culture and ways of working.

Designers face many design challenges that are difficult to solve using conventional or standard approaches (Buchanan, 1992). In all three cases research was seen to be a useful tool to open up opportunities for innovation. Indeed, sometimes this was expected of the research.

Researcher 3, at the larger commercial firm, noted an example where it had been used to offer value added solutions to a large development site. Researchers drew for the client the future zeitgeist, by interrogating how people might live, behave and work in the future, thus revealing alternative uses for the site and direct planning.

E. Research skills fully utilised and tended to be related to the social sciences

All three researchers agreed that a wide range of their research skills were utilised whilst working in the firms. The organisations were open to using different research approaches when required by the project. This gave the researchers, who all had some familiarity with research methods due to their PhD training, an opportunity to use methods that they may not have previously in the PhD. Applying theory to practice was found to be meaningful for all three researchers.

The three researchers primarily used social science research methods that involved ways of observing and measuring human behaviour. In addition, all researchers reported a significant use of writing skills and synthesis of previous research into reports as a part of the research work.

F. Repetition and Boredom

Some elements of DRO were seen as very simple and repetitive, and not that insightful. In some cases it can even be a little boring. For example, occupancy studies are a very important tool in workplace consultancy, but research-wise they rarely result in exciting data. DRO is more time and resources constrained compared to DRI, which has the potential to impact the quality of the research undertaken.

All researchers were required to write reports, but they sometimes lacked the luxury to comprehensively think over different ideas and theories. Consequently, the writing was responsive to data gathered, without the time or demand to question the true meaning of the research outcomes in a broad sense.

It was also noted that having many DRO projects running at any one time provides opportunities for change and variety. Different research projects could also span many different time frames, from one day to several years.

IV. Implications of Design Research in an Organisation on a PhD

Practicing research simultaneously with academic research can be rewarding not just professionally by gaining valuable practical experience, but can also have positive and unexpected implications on the PhD research.

A. *Access to Primary Data*

Researchers 1 and 2 used research data collected in the organisation in their PhD. Indeed, it was the main data set in their PhDs. Both felt strongly that DRO substantiated their general arguments, and provided considerable more grounding of the PhD in empirical data. Before taking on their professional research roles, both had even considered

changing their PhD due to the difficulties of collecting data independently.

Researcher 2, at the not-for-profit organisation, had originally designed the PhD to include a phase of Action Research as a fundamental component. However, after many months of unsuccessful searching for a suitable organisation to work with, the researcher had given up on this phase and was in the process of changing the plan and methodology to do without it. Soon after beginning the new approach, the researcher was offered a position with the not-for-profit organisation and was able to revert back to the original plan. Academic research that requires identifying appropriate organisations to work with can be difficult and time consuming.

This was a sentiment shared by researcher 1, who questioned their ability to have been able to collect that amount of data without the organisational involvement, as well as being able to answer the research questions as fully.

The collection of these significant data sets could also be attributed to the communications role both had in their organisations, and they used this to take deliberate steps to ensure the directors of their respective organisations were familiar and comfortable with the nature of their research. As a result, senior management were supportive of their research as they were aware of the benefits it afforded the organisation. Support for research from the top-level executives was essential to enabling the DRO and DRI to intersect.

Researcher 3 also collected a number of data sets that were used in the PhD through contacts made by undertaking DRO. The collection of data was not DRO work, but it would have been more difficult to obtain the data had contacts not been made when undertaking DRO.

B. Improved Research Skills

There is no doubt that DRO improved research skills and used more techniques than in their PhDs alone. These increases were compounded by the necessity of speeding up research implementation and analysis in an organisation, which typically has significantly shorter time frames than DRI. One of the researchers commented that data analysis in the organization often took place within 2-3 days, where they would have spent at least 2-3 weeks in a university setting, and probably 2-3 months during the PhD. This client-focused approach to research also required the researchers to consider different ways of designing the research. One of the researchers reported that the resulting research method should be fairly easy to implement and not too demanding in terms of participation and analysis, while still being reliable, which is different to DRI where complexities over time are allowed. Obviously this approach could also lead to less rigorous research than in DRI.

DRO also tended to handle quite large data sets. Greater confidence in conducting research was another related outcome. Training assistants in analysing data and conducting observations was one of those confidence boosters. Language used to discuss the research differs from that used in the PhD, explaining complicated research projects to lay people was seen as an additional skill learnt

due to its requirement in undertaking DRO. They also gained awareness for the applicability of research and a sense of the 'reality out there'.

C. Extending PhD Duration / Management Position (Research)

Undertaking full-time work means that the PhD will not be able to proceed at a full-time rate as well. Researchers 1 and 2 felt that these positions enabled them to carry out work that they were interested in pursuing when they finished their PhD. It must be emphasised that both quickly found themselves in senior roles in the organisation – positions they may choose, or in one case, actually have chosen to continue after completing the PhD. Therefore, while the actual time enrolled in a PhD program may have been longer, they were able to work in a professional research capacity much earlier than planned. Neither position was initially full-time, nor management, but as their research skills were recognised, as well as a growing interest and ability of the researchers in contributing to the organisation, they both moved into management level positions.

On the other hand, the part time work of researcher 3 was not perceived to affect the length of the PhD which continued full time. It was suggested that the time management skills learnt and required in undertaking DRO may have spilled over into have better time management of the DRI.

D. Additional Funding for Seminars

The researchers were able to access additional seminars and conferences than what university funds would have allowed. As professional researchers this was also a privilege within the organisation. One of the researchers recalled how it felt strange to tell colleagues about an absence next week due to an overseas trip to California for a conference funded by the organisation.

As all roles were thematically connected to their PhDs, seminars attended were seen as a bonus and helpful to the PhD. They are also more industry focused than academic, enabling a sense of applicability of their DRI in industry – an important factor in ensuring academic rigour (Guba, 1981).

E. DRO Offered Structures for Praxis

The structures afforded by DRO for integrating theory and practice, or 'praxis', i.e. reflection and action (Freire, 2004), was found by all researchers, and may very well be the essential purpose of DRO. If research in design organisations did not enable reflection and action in order to improve project designs, then it would be difficult to define its raison d'être. DRO helps contextualise research, resulting in more meaningful outcomes to the affected parties, and potentially more accurate results (provided the research is performed with sufficient academic rigour).

This was most notable for researcher 2, the not-for-profit case, where iterative cycles of implementation and analysis were undertaken. But even for researchers 1 and 3 working on commercial projects, that were typically of much shorter duration and distinct projects, they were able to assess the outcome of design decisions by taking some measures of user satisfaction, potentially being able to form a type of design

theory that can be implemented in future projects. A research platform can help support 'reflective learning' (Schön 1983) where designers and professionals use a feedback loop of experience (both artistic and technical) to continually improve their work.

F. Additional Stress

Conducting DRO was very time demanding, and at times, the cause of considerable additional stress. This was the main negative comment from the researchers about DRO.

One of the autonomous working researchers mentioned the loneliness of being the only person with an academic background in the organisation, making it difficult, if not impossible, to discuss and exchange ideas a lot with your immediate colleagues in the practice.

On the other hand, when the research was undertaken in a team environment, it was seen as a break due to the collegiate atmosphere, compared to the PhD experience, which was comparatively seen as more isolating.

CONCLUSION

This paper shows willingness for organisations to include a research component in their businesses. This is quite a departure, especially for design firms, who tend not to have established processes for analysing a problem and often rely on intuition for its solution (van Schaik, 2005). Design research in an organisation can be a very valuable and special tool, because it can help a practice improve their design and better tailor it to suit the needs of a client, which is a very powerful proposition.

The impact of 'practicing' design research on the PhD's was that it enabled access to primary data, improved research skills (greater efficiencies in instrument design and execution as well as exposure to more cases and participants), additional funding and financial support, an awareness of how research and theoretical issues relate to practical problems, and with larger data sets, potentially more accurate results. From the personal perspective of the researchers, it contributed significantly to professional development. It can also be concluded that conducting DRO is time demanding, and not always an easy path to take.

Given the advantages of conducting DRO, it would be of great benefit to candidates if this type of research were better supported in design schools. By way of example, this may include helping researchers identify suitable organisations to work with, possibly through expanding their established industry networks.

The value of combining research and practice has long been recognised and valued, especially in the education (Carr and Kemmis, 1986) and community development sectors (Chambers and Mayoux, 2005). The experiences in this study support this position in the design sectors, and the potential for design research to strengthen the service contribution is worthy of considerable additional investigation at the very least.

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