

INTEGRATING PRACTICE WITHIN A PHD: A GENERIC MODEL FOR THE RESEARCHER-DESIGNER

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ABSTRACT

In addition to making a contribution to new knowledge, the key requirements of a Ph.D are for the application of robust research methods within a relevant and prescribed methodology. If a researcher has the necessary skills and knowledge of professional practice, the potential exists for this to be employed as a central component of the research method. As the debate on the use of practice-based methods in the visual and performing arts continues, it is apparent that much of the published material focuses on theoretical positions, with limited use being made of completed theses as case studies. The aim of this paper is to contribute to this discussion by presenting an overview of three Ph.D's in which researcher-designer practice formed a central component of the primary research methods. Whilst creative design activity was essential to the research, it was necessary to integrate this with a range of other data collection techniques to form the three research methodologies. The paper examines the nature of the Ph.D; research methods; and introduces a wider discussion on the motivation for researcher-designer by describing ways in which the methodologies were structured to enable the researcher to undertake design activity that was central to data collection and progress of the project. By identifying common themes within the three distinctive methodologies, a generic strategy is proposed that has the potential to offer guidance to those wishing to move into this evolving area of research activity.

Keywords: Practice, industrial design, case study, Ph.D, creative arts

1 INTRODUCTION

The data collection techniques available to the design-based Ph.D researcher range from quantitative methods, with their origins in scientific investigative enquiry, to qualitative methods that are more typical of the social sciences and humanities. The specific combination of methods will be dependent on the nature of the research questions being addressed and, providing these can robustly answered, numerous options will be available when devising a research methodology (i.e. there is not necessarily a 'right' way to do it, simply a range of options that must result in a robust methodology). When a methodology has been devised that includes professional practice undertaken by the researcher, it is fair to say that alternatives to such a strategy exist: such as engagement with other practitioners through interviews, questionnaires, focus groups or observations. In many respects, such methods of data collection may be more straightforward due to the problems associated in using a single subject (the researcher) to provide data from a creative activity that may well be expressive, emotional, ill defined and with open-ended solutions. However, the context of a Ph.D remains relatively broad and it is helpful to note the fundamental requirements as identified by Archer:

- To demonstrate competence in higher levels of research skills
- To make a substantial contribution to knowledge in a given discipline
- To become qualified to supervise others in the conduct of research programmes
- The critical appraisal by the candidate of prior research
- Close attention to the principles and practice of research methodology
- The conduct of a single major systematic investigation
- The delivery of a substantial contribution to knowledge

With relatively few pre-conditions for Ph.D study, significant opportunities exist for the researcher wishing to employ their design capability and knowledge within the methodology. The key challenge is how to apply this researcher-designer approach as a research method.

2 RESEARCH METHODS

Moore categorises case studies as an approach to research as opposed to a research method, with a capability, “to describe and understand the phenomenon ‘in depth’ and ‘in the round’ (completeness). In this role, case studies serve a useful purpose, since many important issues can be overlooked in a more superficial survey” (Birley and Moreland). Robson identifies two types of case study: individual case studies (a detailed account from one person that can be used to explore possible causes, determinants, factors, processes, experiences etc.) and a set of individual case studies (as individual cases studies but involving the study of a small number of individuals with some features in common). A sole researcher undertaking practice would clearly fall within the domain of an individual case study and the way in which data is collected and analyzed “implies the collection of unstructured data, and qualitative analysis of those data”. [ibid] In focusing on specific methods applied as part of case study research, action research is of relevance when exploring issues relating to practice (Moore, Gomm and Hammersley, Cohen and Manion). Action research has been defined as:

an on-the-spot procedure designed to deal with a concrete problem located in an immediate situation. This means that the step-by-step process is constantly monitored (ideally, that is) over varying periods of time and by a variety of mechanisms (questionnaires, diaries, interviews and case studies, for example) so that the ensuing feedback may be translated into modifications, adjustments, directional changes, redefinitions, as necessary, so as to bring about lasting benefit to the ongoing process itself. (Cohen and Manion)

The cyclical nature of action research has been identified by Birley who sees it as being conducted by a professional into their own activity, the aim of which is to bring about an improvement in practice. The notion of an “action research cycle” is noted by Robson and involves “planning a change; acting and then observing what happens following the change; reflecting on these processes and consequences; and then planning further action and repeating the cycle”. Providing an appropriate data collection process can be put in-place, action research can be considered as being an appropriate research method when exploring issues relating to professional practice. There are similarities between action research and reflective designing, in which the subject or researcher undertakes practice and articulates the process and outcomes. The process of reflective designing is described by Schon:

The designer’s moves tend, happily or unhappily, to produce consequences other than those intended. When this happens, the designer may take account of the unintended changes he has made in the situation by forming new appreciations and understandings and by making new moves. He shapes the situation, in accordance with his initial appreciation of it, the situation ‘talks back’, and he responds to the situation’s back-talk.

The use of professional practice within a case study can be employed when data is collected through reflective designing/action research. However, the use of such methods is by no means straightforward as a strong argument must be given for the ability to generalise from the practice of an individual (a recent graduate) who may have had little or no experience in a professional environment. There is also a degree of uncertainty when attempting to develop tools to enhance practice as the possibility exists for them to fail to deliver the required benefits. When faced with such difficulties, a more straightforward option may be to employ more conventional data collection techniques and avoid the use of practice. Faced with such difficulties, it is necessary to consider the underlying motivation that leads researchers to engage in researcher-focused practice.

3 MOTIVATION

This paper identifies three PhD's in the field of design where practice was relevant research to the research. It also explores the context of why researchers may be motivated to include practice as part of their methodology. The three scenarios are:

- Researchers enjoy designing - The practicalities of the design-based PhD often fails to recognise the wider needs of the researcher who would typically have bachelors and masters degrees in their field and where the structure of their degree programme(s) would have been practice-based i.e. they have considerable prior history of creative practice; they enjoy creative practice; and they may well miss the fulfilment of creative practice if none was undertaken during a five year Ph.D.
- Students need tutors that can design - Practice-based learning at undergraduate and masters level requires a significant taught input by competent practitioners. It is all too common for academics to loose or fail to develop capability in practice as they move through an academic career that is based on teaching and research. There is a strong case to encourage and facilitate staff PhD's that include researcher-designing.
- Research outcomes need designing - An unexpected outcome from the author's experience of PhD supervision in creative disciplines has been scenario's where professional practice was essential to the progress of the research. "Tools" are a popular outcome from practice-based PhD's and situations arise where the tool itself must be designed to be viable to allow evaluation. It is therefore necessary to consider the use of researcher-designing when practice is not a direct component of the data collection but a means by which the research can progress.

These three contexts will now be explored and the methods and methodologies applied within the Ph.D's discussed.

3.1 Researchers enjoy designing

Title of Ph.D: The development of a curriculum for the study of digital industrial design

Researcher: Noor Al Doy

Supervisor: Dr Mark Evans

The typical route to a Ph.D is via bachelors followed by a masters degree, although it is becoming increasingly common to find candidates that progress directly from undergraduate study. For those taking the bachelors/masters route in creative disciplines, as a student they will have engaged in a high level of practice for between three and six years. For those with a background in creative practice, the transition to Ph.D can be extreme as literature reviews and primary data collection have little in common with creative practice. Having acknowledged the contribution of practice as a research method, if undertaken by a suitably qualified researcher its inclusion can provide variety in the scholarship and continuation of an activity for which they generally have talent and passion. Those that have undertaken a Ph.D are all too aware of the motivational issues experienced during the course of the research and the contribution of creative practice to a Ph.D candidate's motivation should not be underestimated.

During a Ph.D to explore the potential for a method of industrial design practice that was entirely digital, the typical research methods of literature review, interviews and questionnaires were employed, but the evaluation of the draft digital industrial design method was undertaken by the researcher designing a household product. This activity was integrated within a five phase research methodology:

Phase 1: Literature Review – The nature of industrial design practice; tools; education.

Phase 2: Development of method - Questionnaire to establish extent of use; definition of draft digital

- industrial design method; evaluation of method via action research; revisions to method.
- Phase 3: Appraisal of method - Interviews with practitioners to receive feedback
- Phase 4: Development of digital industrial design curriculum – translation of findings into an academic curriculum.
- Phase 5: Validation of the digital industrial design curriculum – Interviews with educators, exposure of students to the curriculum, final appraisal.

As the researcher had bachelors and masters degrees in industrial design, they were already a capable designer. However, it was essential that the design-based action research took place in a context that closely followed commercial practice so modes of practice were cited from relevant literature and use was made of the supervisors experience as a practitioner to ensure that the activity followed the format of a live project. This result in a method format that was both valid and provided a rich source of data.

3.2 Students need tutors that can practice

Title of Ph.D: The integration of rapid prototyping during industrial design practice

Researcher: Mark Evans

Supervisor: Dr Ian Campbell

As designers make the career transition from practitioner to educator, it is all too easy to loose the core competencies of professional practice when the contrasting role of academic takes over. This can be compounded by a requirement from institutions to focus non-teaching activity on research and possibly attain a Ph.D. Such progression may not necessarily be in the best interest of students, where emerging skills and knowledge are developed through the direct demonstration of technique and direct modification of their work by the tutor.

Having been employed as an in-house and consultant industrial designer, the author took up a full time academic post as a lecturer in industrial design in a research-focused university. Having eventually acknowledged that it was not possible to be awarded a Ph.D for designing a product, research questions were identified and a methodology devised that would facilitate data collection through the design of two (but ultimately four) consumer products. The focus of the study was in the field of professional practice, with the aim of facilitating the integration of a specific technology (rapid prototyping). To undertake this, a four phase research methodology was devised:

- Phase 1: Literature review - Nature of industrial design/rapid prototyping.
- Phase 2: Draft method - practitioner feedback; revised method.
- Phase 3: Comparative evaluation - Product design activity; evaluation of physical models (x3).
- Phase 4: Resolution of modelling issues - Additional case study(s); method defined.
- Phase 5: Validation – Appraisal framework.

The evaluation and appraisal provided an opportunity to reflect on and modify the method through additional case studies by employing the cyclical nature of action research as identified by Cohen and Manion and Birley. Whilst one additional case study had been planned for Phase 4, a total of three were required to resolve the issues identified during Phase 3. These focused on the fact that considerable rigour was needed to produce the 3D computer geometry required for rapid prototyping; rapid prototyping could not make a cost-effective contribution to the production of physical sketch models; and as a remote build system, rapid prototyping removed the ability for the designer to engage in the definition of form through the tactile sculpting of a physical material.

These issues were the subject of further literature review and the identification of potential solutions. The three issues went on to be investigated and resolved to varying degrees of success. Having explored the three issues, the outcomes enabled the final Computer Aided Industrial Design/Rapid Prototyping

(CAID/RP) methodological approach could be defined. The key feature of the CAID/RP method was the capacity to operate almost exclusively in a digital environment whilst still engaging in a degree of tactile interaction with the emerging form. This strategy facilitated the use of rapid prototyping in the production of the three forms of physical model as required during industrial design practice i.e. sketch model, appearance model, appearance prototype.

The final phase of the Ph.D was to validate the CAID/RP method using an appraisal framework. This involved a series of interviews with industrial design practitioners (consultant, in-house, small manufacturer, multi-national organisation). The interviewees received a briefing on the method followed by the completion of a questionnaire that was later normalized using a weighting /rating method (Pugh).

Completion of the Ph.D resulted not only in the development of research capability, but skills and knowledge in CAID; haptic feedback modelling; the finishing of rapid prototype components; and maintenance of sketching capability. All of these were found to be of direct relevance to undergraduate and masters teaching.

3.3 Research outcomes need designing

Title of Ph.D: Enhancing collaboration between industrial designers and engineering designers

Researcher: Eujin Pei

Supervisor: Dr Mark Evans

When undertaking research into practice, it is not uncommon for the outcome of the Ph.D (the new knowledge) to be a tool that has the capacity to enhance practice. As the tool is to be used by designers, there are expectations and requirements in terms of design content i.e. it should be well designed. Whilst it is quite feasible for a researcher to commission a consultancy to undertake the design of such a tool, timescales and costs rarely make this a viable option. It therefore becomes the responsibility of the researcher to engage in professional practice that is neither action research/reflective designing but necessary for the progression of the research output. The methodology employed in the development of a tool to enhance the collaboration between industrial designer and engineering designers followed six phases:

Phase 1: Literature review - Industrial/engineering design, collaboration, design methods.

Phase 2: Practitioner interviews - Interviews/observation to identify barriers to collaboration.

Phase 3: Categorisation of design representations - Interviews; taxonomy.

Phase 4: Draft collaboration tool - Collation of data to produce first embodiment of tool.

Phase 5: Refinement of collaboration tool - Pilot study.

Phase 6: Validation - Practitioner interviews; case study; definition of final tool.

Having explored options for virtual and physical tools, a card-based format was adopted that was portable and accessible. The design of the cards went through three iterations following evaluation, but the researcher's capability as a designer was essential in making these useable, believable and appropriate for the target market.

4 CONCLUSIONS

By integrating common elements of the three methodologies it is possible to identify themes and propose a generic strategy that may be of relevance to researchers who are considering employing the integration of practice within their Ph.D. The six phase methodology has the potential to move the direction of research from conventional literature-based/empirical data collection to one where the developed tool/method is evaluated through researcher-designer case studies. The six phase researcher-designer methodology comprises the following activities:

- Phase 1: Literature review - Areas of study defined; prior knowledge identified; research methods selected
- Phase 2: Empirical studies - Stakeholder feedback
- Phase 3: Draft tool/method - Case study evaluation
- Phase 4: Refined tool/method - Case study evaluation
- Phase 5: Validation - Practitioner/expert feedback
- Phase 6: Final tool/method – Conclusions

Whilst it is acknowledged that the methodology is not prescriptive and would require modification according to the nature of the research questions, it forms the starting point for those wishing to engage in researcher-designing design methods.

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