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Reading across boundaries: interdisciplinary scholarship in design research

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1 Abstract

This paper promotes the use of scholarly approaches to design research, especially the practice of reading across disciplinary boundaries. By examining three completed projects, the benefits of interdisciplinary scholarship will be demonstrated along with a discussion of how the literature review process can be treated as a qualitative research project in its own right.

2 Introduction

Design research is a comparatively new academic discipline that is still in the process of defining what is distinctive about its focus and its methods (Roth, 1999; Cross, 2007). Many aspects of design are related to other professional practices, including art, technology, management and planning. Similarly, many approaches to design research are related to research practices in other disciplines, especially those that study processes of representation, problem solving, organisation and interpretation. Because of these relationships to other fields, design researchers have much to gain from exposure to the writing of other disciplines whether that writing is describing the subject of research or the research methods used. As in other disciplines, these review activities permit the appraisal of existing work and the development of

that work, but more importantly they can also stimulate the 'research imagination' (Hart, 2003).

This paper promotes the use of scholarly approaches to design research, especially the practice of reading across disciplinary boundaries. Three different research projects are reviewed in which ideas were drawn from a broad range of academic fields, including communication theory, diagram theory, philosophy of art, philosophy of science, linguistics, law, sociology and psychology. Against the background of these three projects, issues relating to the practice of interdisciplinary design scholarship are discussed. In particular, it is suggested here that conducting literature reviews as though they are qualitative research projects in their own right can offer some structure and guidance for the activity of constructing reviews. The paper therefore presents a reflective account of the process of writing an interdisciplinary literature review, with the objective of describing one possible approach to that task.

3   Example projects

The paper now proceeds by briefly outlining three completed research projects that provide examples upon which we can ground our discussion of interdisciplinary scholarship. These projects are here labelled 'Design as communication', 'Interviewing with diagrams' and 'Creativity *vs.* discovery'. These three projects are quite different from each other, and each demanded an approach that was specific to the problem at hand. However, the projects do have some common features because they each originated in a design research question and they each benefited from efforts to read across (sometimes many) disciplinary boundaries. These similarities – especially similarities in methodological approach – are discussed towards the end of the paper.

3.1 'Design as communication'

During the design process, intentions are formed for how products should be interpreted, and once produced, those products are interpreted in ways that may or may not correspond with the original intentions. This is true, not just for industrial design, but also for other design disciplines such as architecture, software, fashion, graphics and

packaging. In each of these design fields, the relationship between the designer and the user has been represented as a communication process, where the designer communicates with the user via the designed product. Unfortunately, despite adopting a similar perspective, researchers in each of these disciplines have tended to develop their ideas in isolation from the work already done in other design disciplines and also in isolation from the work done in other academic disciplines that concern themselves with notions of communication, media, intention and interpretation. In recognition of this, a project was undertaken with the objective of reviewing and extending the relevant arguments (Crilly et al., 2008a) and synthesising existing representations into a single overview (Crilly et al., 2008b).

In addition to the design disciplines mentioned above, literature on communication theory and the (mass) media offered a number of useful arguments and representations. Whilst these areas of study were immediately suggested by the working titles that were being used to describe the project ('design as communication', 'artefacts as media', etc.), the relationship between intention and interpretation is of interest to many other fields. In particular, literary theory concerns itself with the intentions of authors and the interpretations of readers, the philosophy of art concerns itself with the intentions of painters and interpretations of viewers, and legal theory concerns itself with the intentions of producers and the interpretations of consumers. By considering the arguments that these fields put forward, their relevance to design theory could be asserted, and their necessary influence on the representation of design practice could be depicted.

3.2 'Interviewing with diagrams'

Many design researchers use interview techniques to gain insights into the perspectives of the various stakeholders who are involved in design or who are affected by the products of design. These interview techniques are essentially borrowed from the social sciences, but employed in the service of design research rather than other aspects of social enquiry. However, design researchers and their research participants (e.g. designers) are often visually oriented, and therefore in contrast to their social science colleagues design researchers might be more inclined to use abstract visual representations (i.e. diagrams)

during the interview processes. Because the social sciences can be inclined towards more verbal or more figurative materials, they offer less theoretical support for the use of diagram-based interviews than they do for interviews that are entirely verbal or that employ materials such as photographs. In recognition of this, a research project was undertaken with the objective of formalising the use of diagrams in interviews, and framing that technique with respect to relevant theory (Crilly et al., 2006a; Crilly et al., 2006b).

The insertion of diagrams into the interview process raises a number of theoretical issues that relate to different disciplines. The social sciences have much to contribute to our understanding of interview practice, and to the use of (primarily respondent-generated) visual materials such as photographs. In addition, the fields of graphic design and information design have discussed the preparation and interpretation of abstract and symbolic visual materials (such as diagrams), and such diagrams are themselves the subject of investigation by those interested in visual reasoning and notation. By bringing these literatures together and reflecting on personal experience of employing diagrams in interviews, the following issues were addressed: the unique characteristics of diagrams (in relation to other elicitation stimuli), the specific benefits of employing diagrammatic stimuli in interviews, and the practical and methodological issues that must be addressed when considering the preparation of diagrams and their insertion into the interview process. These issues are of importance beyond design research, and therefore the decision was taken to publish this work back to the qualitative research community for whom it was thought to be relevant.

3.3 'Creativity *vs.* discovery'

Researchers interested in understanding creative design have studied the genesis, development and implementation of new ideas in design projects. The findings from such studies can be divided into those that emphasise the sudden emergence of new ideas (i.e. 'the creative leap'), and those that emphasise how new ideas are gradually built upon those that precede them (i.e. the steady accumulation of design knowledge). The design literature would appear to offer little theoretical support for integrating these two perspectives and therefore they remain as

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separate and competing positions. In recognition of this a research project was undertaken that aimed to integrate these different perspectives by describing a general structure of creative design progress that accounts for both cumulative and disruptive episodes. This description was based on Thomas S. Kuhn's book, *The Structure of Scientific Revolutions*, an historically informed account of scientific progress in which we can find many parallels with observed phenomena in creative design (Crilly, in press).

In contrast to the two previous example projects, this project took a single text (Kuhn's *'Structure*) as its primary focus. However, in making the claim that Kuhn's account of scientific discovery has something to offer the study of creative design, it was necessary to examine the relationship between art, science and design, to place *'Structure* within the context of Kuhn's other work, and to explore the influence that Kuhn has had on disciplines outside the history and philosophy of science. This involved integrating literature from fields such as psychology, science studies, art theory and design research. In doing so, it was argued that creative design can be viewed from a Kuhnian perspective, and that this yields two distinct benefits: firstly, it can sensitise design researchers to the existence of phenomena that are not emphasised by existing accounts; and secondly, it can sensitise designers to the nature and dynamics of creative progress, and thereby aid reflective practice.

4   Literature review as grounded theory

The three projects outlined above are clearly all quite different from each other, as they each focus on different topics (i.e. communication, elicitation and creativity). However, the projects do have some common features, and in particular, they each involved efforts to construct interdisciplinary literature reviews to clarify the topics that they addressed. What follows is an effort to describe the general approach taken in constructing those reviews and in particular, to present the review process as though it were like other qualitative research processes ('grounded theory' in particular). In this sense, the account below is a reflective attempt to distil some structure by which interdisciplinary scholarly design research might be described, and some guidance for how it might be conducted.

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Researchers conducting literature-based studies are primarily working with the knowledge contained in available texts and therefore such researchers may appear to be limited to just discovering, collecting and rearranging that which is already known. However, this might be avoided if researchers can assemble a set of texts that have not previously all been studied from a particular perspective. This might involve efforts to identify themes that are discussed across a number of traditional disciplinary divides, where each discipline has something unique to contribute to our understanding of that theme. In the example projects discussed here, such efforts led to discovering a set of similar but disconnected literatures related to (1) communication theory and design theory, (2) interview stimuli and graphic communication, and (3) the philosophy of science and the psychology of creativity. Therefore although reviewers are certainly reliant on prior published materials, by looking for connections and contrasts between previously unrelated literatures, they can still strive to generate new knowledge. In this sense, the literature review process can be considered as a piece of qualitative research in its own right. In particular, it is suggested here that the practice of developing 'grounded theory' is analogous in many ways to the practice of constructing a literature review.

In 1967, Barney Glaser and Anselm Strauss published *The Discovery of Grounded Theory*, in which they presented a methodology for building theory that was 'grounded' in observation (Glaser & Strauss, 1967). This was to counter what, in their view, was the dominant attitude at the time, which held that all the great theories of sociology had already been discovered. In contrast, grounded theory seeks to develop *new* theories rather than test the validity of *existing* theories (Glaser & Strauss, 1967). Typically, the data is collected by conducting interviews, and the researcher immediately analyses each interview to develop initial categories, interpretations and theories. From this preliminary analysis, further potential interviewees are identified who might prove useful in expanding, modify or refuting the researcher's emerging conceptualisations. By constantly comparing one case to the other and rigorously analysing the emerging data, the researcher may propose a theory that both *explains* the data and is supported *by* the data (Strauss & Corbin, 1998). Grounded theory offers guidance as to how sampling, data collection and data analysis could be integrated to allow the

development of theory that is "derived *from* data and then illustrated by characteristic examples *of* data" (Glaser & Strauss, 1967: 5).

In drawing an analogy between literature review and grounded theory, the extant literature constitutes 'the world' that is under investigation, and the researcher sets out to derive insights about that world's content and structure. Although the number of known textual sources may initially be limited, a practice of 'chain sampling' may develop, in which one text (or informant) points to the next and so on (see Rubin & Rubin, 1995: 67; Strauss & Corbin, 1998: 281; Bryman, 2004: 100). The necessarily large volume of notes and quotations that result from the reading process may be compared to the field notes and interview transcripts that constitute the primary corpus of research data to be analysed. Iterative processes of 'coding' (or thematic tagging) can then be employed in an effort to uncover the connections and contrasts in the data (see Strauss & Corbin, 1998: Ch. 8; Fielding, 2001: 137). As with other forms of qualitative research however, the final synthesis occurs when these notes, quotes, themes and connections are written into continuous prose and supported by supplementary materials such as diagrams. It is often the effort to resolve the tension between these two different forms of representation (the verbal and the visual) that drives the refinement of the synthesised integration of the literature (see McKim, 1980: 132).

Especially in technical, evidence-based fields there is increasing interest in systematic literature review techniques (e.g. Brereton et al., 2007). These approaches involve the careful definition of a suitable search strategy and the systematic identification, appraisal and review of the literature. In contrast with such mechanistic approaches, for the projects outlined in this paper a combination of more organic methods was employed. The technique of 'following the reference trail' (or chain sampling) was often the most effective way of identifying the different literature bases of interest. For example, in the 'design as communication' project, the relevance of fields such as philosophy of art and legal theory was not anticipated at the outset, but keywords identified from the other fields pointed the researchers towards them. In other stages of the work, employing visual representations of the research domains was useful for understanding what disciplines covered what areas, and what areas were left relatively uncovered. For example, in the 'interviewing with diagrams' project, the processes of producing

and presenting diagrams was found to be illustrated within the graphic and information design literature, but the processes of eliciting responses to those diagrams still required illustration. In all projects, using coding processes to explore connections and contrasts within the collected material was helpful in managing and analysing the various textual sources. For example, in the 'creativity *vs.* discovery' project, defining different stages of the process of scientific discovery provided a structure within which to fit the different accounts of creative design. It is in ways such as this that treating the literature review process as a qualitative research project in its own right can provide some methodological guidance for how literature should be identified, analysed and integrated.

Before concluding the paper, it is important to note that the projects outlined here required not just the identification of appropriate literatures, but also the identification of appropriate collaborative partners (see the Acknowledgements section). Collaboration offers a variety of benefits, but with respect to the focus of this paper, the most pertinent benefits were assistance with the location, interpretation and integration of disparate texts. Whilst it is often necessary for a project lead to be responsible for developing an overview of the many texts involved, it is also useful for that researcher to benefit from the knowledge, skills and practices of those who normally reside in the disciplines that are being 'visited'. This can help prevent both the misinterpretation of unfamiliar texts and possible failures in understanding how such texts fit into their disciplinary context. As such, the identification of suitable collaborative partners can help stimulate the research process and keep it on the right track.

5   Conclusions

Although design research is a relatively new academic discipline, it has still produced, and continues to produce, a substantial body of literature that documents various questions, findings, perspectives, and arguments. Whilst there is clearly great benefit to be derived from adding new research findings to this literature base, there is also benefit to be derived from synthesising and consolidating that which already exists. Design research can further benefit from drawing on other related academic disciplines whether that is for understanding the subject of

research or the research methods used. It is suggested here that reading across disciplinary boundaries in this way will profit design research by raising its awareness of relevant contributions in other fields and by raising the awareness of other fields to the contributions of design research. It is hoped that this paper offers some useful suggestions for how such work might be approached, and that it might in turn prompt other suggestions for alternative ways of working.

6   Acknowledgements

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