DESIGNING IN DESIGN RESEARCH: FROM SOLVING PROBLEMS TO EXPLORING ISSUES

Anne MARCHAND[1], Stuart WALKER[2]
[1]Université de Montréal
[2]Lancaster University

ABSTRACT
This paper discusses the roles and contributions of 'designing in design research'. More precisely, it describes the differentiation between two main spheres where 'designing' is included in the activity of researching: one being more oriented towards the tradition of "applied research" while the other to "fundamental research". Tangible examples of design research projects in the area of design for sustainability, including design works developed by the authors, are introduced in order to illustrate the differences. A summary table is presented that characterizes these two approaches based, among other things, on their specific aims, the role of 'designing' in the process and the nature of their outcomes. The paper suggests that a distinction between these two can contribute to better recognizing the richness of these approaches in the generation of knowledge that addresses a range of significant contemporary issues such as, importantly, sustainability.

Keywords: Design-centred research; practice-based research; research through design; applied research; fundamental research; design for sustainability

1 INTRODUCTION —THE USE OF PRACTICE IN RESEARCH: TERMINOLOGY AND CATEGORIES

Particularly in the last 10 years, the use of practice within design research has gained interest in the academic community and is now integrated in different graduate design programs. However, the terminology denoting the integration of a design component in the research process is abundant and rather confusing. In a paper entitled "The Role and Use of Practice in Research and its Contribution to Knowledge", Niedderer and Roworth (2007) have analysed and categorised existing terminology concerning the different roles of practice within research in design and vice-versa. Their work draws on and documents the contributions of authors such as Frayling (1993), Biggs (2002), Saikaly (2004), and Durling, Friedman & Gutherson (2002), who have contributed to the debate surrounding practice in research. Their study underlines the variety of terminology bridging research and practice. The study points out that many of the terms used, such as practice-led research, practice based-research, and research-informed practice, are not clearly defined and that they have multiple uses and interpretations. Even so, they note that two main orientations can be identified under "research involving practice" (see table 1). The first refers to a type of research where practice is integrated within the research process in order to generate outcomes that will be of direct relevance or contribution to practice. The second refers to interventions or experiments that are conducted principally to inform theory building —although they could eventually lead to changes in the practice area.

Table 1 Creative practice in Research (From a model presented by Niedderer and Roworth, 2007)

Category	Context	Purpose
Research involving practice (practice-based research, studio-based research, practice-centred research, practice-led research, art-based research, design-based research)	Research process based on or rooted in practice, or where practice plays a lead role (objective) in the investigation process	Research outcomes make a direct contribution to, or are of direct relevance for, the advancement of practice
	Interventions/experiments investigate how practice can be enhanced	Practice informs theory building within research to gain new insights, knowledge or understanding

2 PRACTICE IN RESEARCH: BETWEEN TWO RESEARCH TRADITIONS

It is interesting to observe that the two sub-categories identified by Niedderer and Roworth globally correspond to two research traditions: *applied research* and *fundamental or basic research*. Applied research aims at gaining knowledge or understanding to determine the means by which a specific, recognised need may be met or a problem solved (National Science Foundation, 2008). For example, applied researchers may investigate how to improve the energy efficiency of home appliances or modes of transportation. Fundamental or basic research is concerned with gaining more comprehensive knowledge or understanding of a subject or a question and not directly at solving a problem as with applied research (Lawrence Berkeley National Laboratory, 2008). It includes exploratory research which aims at exploring issues and defining problems (Kotler *et al.*, 2005). Similarly, in the context of 'research through designing', two approaches can be outlined: one may be characterised as principally aiming to contribute to solving issues or problems, as with the creation of a tool, a product and/or a service, or a process, whereas the other is concerned with exploring ideas and research issues through the production of conceptual artefacts and/or scenarios that explore, communicate and illustrate theoretical issues. Examples of design research projects in the area of design for sustainability involving the creation of an artefact are briefly presented here in order to demonstrate their distinctiveness and the significance and complementarity of their respective contributions.

2.1 Example of an approach oriented towards the tradition of applied research

The project "Embedding Sustainability on Do-It-Yourself Products Aiming at Low-Income Families" (Santos *et al.*, 2008) is used here to illustrate the first approach where a research project involves practice and the creation of an artefact in a manner that is oriented towards the tradition of *applied* research. This research project investigates the requirements for do-it-yourself furniture within low-income houses in Brazil, with a focus on furniture that can be used to divide living spaces. It first involved the collection of secondary data in the literature and the collection of primary data among low-income households where furniture is used to divide spaces. After having developed a set of design criteria informed by a rigorous research process, a design solution responding to these has been generated. The resulting viable solution or artefact responds to a 'problem' that has been identified.

Figure 1 DIY shelf to divide living space within low-income houses: visualisation of the product

2.2 Example of an approach oriented towards the tradition of fundamental research

To illustrate the second category, more oriented towards the tradition of fundamental research, two artefacts created by the authors (Marchand, Walker, 2007) within the context of a research program on design and the material cultures of sustainability are here introduced. These exploratory objects (figures 2 and 3), informed by primary and secondary data, represent in the research process a materialised on-going reflection on how we look at things and value them. Both these designs express alternative visual cultures where, notably, the *new* cohabits with the *old*, and both illustrate critiques of dominant commercially oriented or driven aesthetic norms and conventions that value and promote perpetual novelty and tend towards homogeneity. These conceptual designs contribute to the generation of knowledge by providing an object of reflection and communication in the perspective of theory building. Although these concepts could be viable and do respond to sustainable design principles such as localisation, sustainable consumption and the idea of evolving permanence, their main contribution lies in the identification and

exploration of issues. They do not represent finished solutions, nor should they be understood as typical functional products, but as 'conceptual objects' that reflect on directions for more sustainable, meaningful material cultures. In the research process, they serve as catalysts for advancing theoretical ideas and for the presentation of these artefacts for consideration and debate about issues that go beyond their material manifestation as 'response'.

Figure 2 MP3 cassette stereo on white 'canvas'

Figure 3 Red dots on disparate drinking glasses

3 DESIGNING IN DESIGN RESEARCH: OUTLINE OF TWO MAIN APPROACHES

Table 2 Designing in design research: characteristics of two main approaches

Research components	**Practice in research oriented towards applied research**	**Practice in research oriented towards fundamental research**
Principal aim	Responds to problems	Defines, explores and manifests ideas and issues
Outcomes	Viable concepts in short or medium terms	Theoretical explorations (that, potentially, *could* eventually inform viable concepts)
Role of the artefact	Regarded as, and represents, an 'end'	Regarded as a 'means' and a design approach to fundamental knowledge development
Research process	Theory informs creation	Theory informs creation and vice-versa
Interpretation of the artefact	Materialised solution	Materialised reflections and insights

4 CONCLUSIONS

This discussion has introduced two main approaches where the act of designing is comprised within the design research process. The first uses the creation process to materialise a solution for pre-defined problem. Data gathering is oriented towards the generation of a solution. The second integrates the creation as a means of defining, exploring and communicating ideas or issues. Both approaches have important but complementary roles for addressing sustainability - which requires the generation of tangible, viable solutions as well as reflections through design that are beyond the boundaries of short or medium term implementations and economic imperatives. It is crucial that we recognise the importance and value of the latter for two principle reasons. First, its role is critical if we are to address issues that might otherwise be excluded from the debate (Walker, 2008). Second, it particular aims and contribution need to be understood because, if judged from the perspective of practical, viable design, the resulting 'conceptual design objects' could be misinterpreted and regarded as invalid or irrelevant

(Dunne, 2006). In this sense, this discussion suggests that, in order to recognise the richness of these two approaches, a distinction between the two, although not always clear and certainly not a black and white issue, is necessary to better understand, promote and recognise their specific, but interrelated, roles and contributions to the generation of knowledge.

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Corresponding Author Contact Information

[1] Anne MARCHAND
Université de Montréal
École de design industriel, C.P. 6128,
Succ. Centre-Ville
Montréal, Québec, Canada, H3C 3J7
anne.marchand@umontreal.ca
(514) 343-7576
www.design.umontreal.ca

[2] Stuart Walker
ImaginationLancaster
Lancaster University
The Round House
Lancaster, UK, LA1 4YW
s.walker@lancaster.ac.uk
+ 44 (0) 1524 593574
www.imagination.lancaster.ac.uk