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A Future Scenario for a Methodological Approach applied to PhD Design Research.
Development of an Analytical Canvas

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Abstract: Within the fruitful discussion about what design research should mean and achieve and the implication for doctoral education, this paper aims to explore the topic regarding the boundaries between project design research and academic design research. There is also a strong movement within the academic milieu in the realm of design, namely within international conferences and research meetings, to discuss methodologies and processes as a paramount contribution to defining scientific research in design. PhD design research in Portuguese universities started slowly in the late 1990s, but is increasingly establishing itself as a worthy degree. This text focuses on an original study depicting the state of the art of the methodological approaches applied in doctoral design research in Portugal. It proposes a Design Research Classification Model and a Design Research Canvas that can be applied to other systematic reviews of design research as a means of synthesising the past to outline the future. It is also a major objective of this work to contribute to a clarification of a methodological framework, which relates practice-based research to academic research.

Keywords: PhD Design, Research Methodology, Project Methodology, Design Research Canvas, Design Education

1. Introduction

In the last decades of the 20th century, design had shifted from a practitioner's field to an academic discipline. As part of that development, those who represented the design field at the universities had been encouraged to build the epistemological and methodological foundations of a discipline that can be recognised and legitimated by other disciplines in the academic community (Findeli,

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2006). Consequently, the design academic community, started to focus on such topics as methodology, research methods, and related issues “in the meta narrative through which a research field takes shape” (Friedman, 2003, p. 507).

At the same time, the doctorate has increasingly become a requirement for design educators as a sign of developed research. It was in 1976 that “The Design Research Department at the Royal College of Art” was converted to a postgraduate teaching department where Master’s and PhD degrees were awarded (Margolin, 2010) but the real boom in PhD studies only started in the new millennium, encouraged by the research activities in the USA and Great Britain (Bürdek, 2012). The first PhD Design Conference at Ohio State University in Columbus (1998/99) was the real starting point of PhD design research courses worldwide. Since that, others conferences followed in La Clusaz, France (2000), Tsukuba, Japan (2003) and Tempe, Arizona (2005), resulting in a growing interest in doctoral education in design accompanied by the establishment in several countries of a large number of new programmes (Margolin, 2010). Because of its rather short history, the ways and means of doctoral design research remain unclear, leading to questions associated with research methodological options, such as: Should academic design research follow the same methodological approaches already established and academically accepted from other sciences? Alternatively, does design research need its own specific methodological approaches? Are there (or should there be) any differences between academic design research methodologies and design practice research methodologies?

On the one hand, applying research methods already established by other scientific disciplines may be seen as an imperative condition to validate design research. On the other hand, the inadequacy of those methods to deal with open, ill structured and ill-defined problems, has been showing the necessity of specific methodologies that contribute to the effective affirmation of design in the academic context (Rodrigues, 2016). At the same time, due to the undeniable fact that design knowledge grows, in part, from design practice, one of the most controversial and debated issues about design research is whether there is a difference between academic design research and project design research, developed within the practice of design. That question, with consequences for the overall academic design field, is especially relevant within the context of doctoral research.

Aiming to give a contribution to the theme, the work here presented seeks to explore the potential need of boundaries between academic design research and design project research through a discussion centred on actual examples of doctoral design research. The study, which is part of a post-doctoral research project, focuses on an original study depicting the state of the art of the methodological approaches applied in doctoral design research in Portugal. The empirical part of the study should lead to an Analytical Research Canvas that can be applied to other systematic reviews of design research as a means of synthesising the past to outline the future. It is also a major objective of this study to focus on the possibility of contributing to a clarification of a methodological framework, which relates project research to academic research.

2. Theoretical context

First of all, it is important to define clearly what is understood, within the context of this paper, as academic design research and design project research. While academic research aims to advance the body of knowledge of the design field and to gather a deeper understanding of the field itself, project research aims to gather the information (about users, stakeholders and context) required within a design project with the view of developing a new artefact, product or service (Muratovski, 2015). Besides their different aims, the two types of research also differ on the validation and

assessment criteria, public and contexts. Unlikely academic research, most of design project research is not undertaken following the standard of a scientific discipline “either because the researcher does not have the necessary qualifications, or (and more often) since time constrains do not permit. Furthermore, that kind of research is not meant to be published or discussed by the design research community” (Findeli et. al., 2008, p. 70).

Although it is generally accepted that design projects have a place within academic design research, methodology scholars do not agree on its epistemic function. As stated by Findeli et. al. (2008) “it is one thing to claim that practice is important and necessary for theory building, but it is another, more challenging one, to explain how this contribution of practice is to be contrived and operationalized” (p. 73). Another reason why the issue of what constitutes academic design research is not consensual, comes from the criteria that define what is understood as research in the academic community including research credibility, transparency and replication possibility and, furthermore, some resistance from designers in adopting methodological processes that allegedly constrain the creative process.

Following that, the current design methodological debate is polarised between those who believe that design has such a singularity that it does not fit in any of the research methodologies already existent in the academy, and those who believe that design has to conform to the academic current methodological practices. According to advocates of the former position, the creative process of design practice constitutes in itself a research process and should constitute the core of the doctoral research. For those, the need to translate the tacit knowledge embodied in the project output, into explicit verbal communication as a written thesis, is not always well accepted. Contradicting this, and according to the later perspective, there is no need to endow design research with a “special treatment” by exempting the use of rigorous methodologies practiced and accepted within the international scientific community. Those who support that position argue that the wide range of methodologies, especially within the domain of qualitative research, is enough to satisfy the exigencies of even the most exotic research questions (Findeli & Coste, 2008).

In the last decades, several authors such as Frayling (1993), Cross (2007), Friedman (2008), Findelli et. al (2008), among others, have been contributing to the debate by trying to define the relative position between project research and academic research and by classifying academic design research into organised categories. The diagram in Figure 1 seeks to synthesise the results of those (not always consensual) contributions.

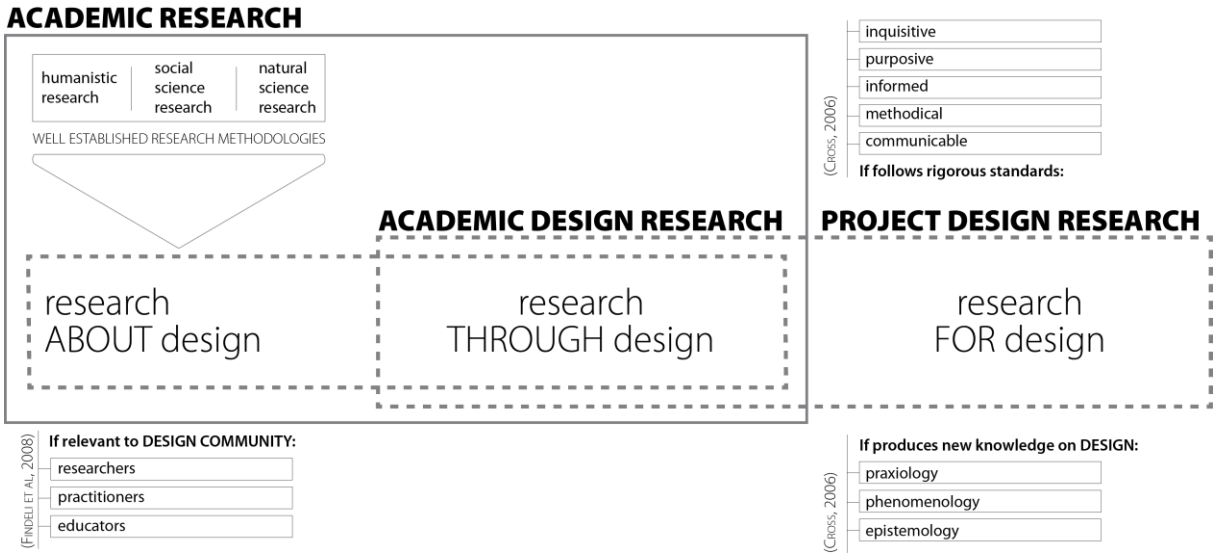

Figure 1. Design Research Classification Model - a synthesising diagram

The model presented is mainly based upon Findelli et al. (2008) design research classification, which considers a three-category research taxonomy: (i) research *about* design (ii) research *through* design and (iii) research *for* design. According to that model, research *about* design is usually carried out by disciplines outside the design field, which include areas among the natural sciences, humanities and social sciences, following scientific standards already well established in the academic community (Findeli et. al., 2008). The concept of research *about* design is somewhat consensual. It is in accordance with and enlarged by Frayling's (1993) definition of research *into* design, which includes research into a variety of theoretical perspectives on design, such as historical, social, ethical, cultural, and so on. That kind of research "is straightforward, because there are countless models – and archives – from which to derive its rules and procedures" (Frayling, 1993, p. 5). The issue of research *about* design is about its relevance for the design field. Being conducted by other disciplines' scientists, its main goal is to contribute to the advancement of such disciplines, and not necessarily to design. Findeli et. al. (2008) argue that it should be the design community which decides if such knowledge is relevant for designers and, if such is the case, how the new knowledge may be implemented in their respective practices.

On the other extreme, and clearly out of the range of the academic realm, is research *for* design which, in our perspective, is the same as design project research. The main outcome of research *for* design is a product, service or process, and even producing some new tacit knowledge, it does not necessarily create new communicable and explicit knowledge, and it does not follow rigorous scientific standards. Frayling (1993), Friedman (2008) and Findelli et. al. (2008) all agree that that kind of research is not considered scientifically acceptable.

Research *through* design is the most controversial concept. In Frayling's (1993) perspective, research *through* design is a "less straightforward" concept, derived from Herbert Read's "teaching through art" and can involve "a studio work and a research report" (p. 5). Friedman (2008) argues that Frayling's definition is unclear and criticises it for having created difficulties "in debates on the notion of the practice-based PhD", also causing "confusion for those who have come to believe that practice is research" (p. 156). Findelli et. al. (2008) state that the idea of research *through* design is embedded in a panoply of research terminology such as "practice based research", "action research in design", "clinical research", among others, all based upon the assumption that design projects should have its place within design research. However, as the authors admit, "we still need to better define what this research *through* design actually consists of, how it is contrived and implemented. (…) interpretations of the idea and principles of research *through* design may diverge and (…) no real consensus has been arrived at yet" (Findelli et al., 2008, p. 72). Trying to achieve a more conciliatory view, those authors propose that research *through* design has "the virtues of both" research *about* design and *for* design. According to that argument, research *through* design encompasses research *about* design if it is relevant for design, as well as research *for* design if it produces original knowledge by means of rigorous academic research standards. A possible clarification of the three above stated criteria is suggested in the work of Cross (2007) and Findelli et al. (2008). In this way, research *about* design can be included in research *through* design if it is relevant for, at least, one of three groups within the design community: researchers, practitioners, educators. Research *for* design can be included in research *through* design if it produces new knowledge for at least one of the three categories of Cross' taxonomy (2007): design epistemology (study of designerly ways of knowing), design praxiology (study of the practices and processes of design), design phenomenology (study of the form and configuration of artefacts). Research *for* design can be included in research *through*

design if it follows five conditions of "good research" (Cross, 2007). Research should be purposive (based on identification of an issue or problem worthy and capable of investigation), inquisitive (seeking to acquire new knowledge), informed (conducted from an awareness of previous, related research), methodical (planned and carried out in a disciplined manner), and communicable (generating and reporting results which are testable and accessible by others).

The work presented here intends to contribute to the reflection about those design research categories, especially on the debate about what constitutes research *through* design and where project research should be positioned with relation to academic research. The discussion is based on the analysis of examples of PhD research in Portugal, focusing on the case of one university. The research question the study aimed to answer was the following: "In respect to the case of the University of Aveiro, how does the Phd design production fit with the proposed Design Research Classification Model?" In order to answer that question, a *corpus* of 32 PhD theses documents were analysed.

3. Empirical study

The presented empirical study consisted in submitting a *corpus* of PhD design theses to the categorisation described in the previous section, in order to understand if and how it fits to the outlined model. The study, which is part of a major research focusing on all design PhD research production in Portugal, was centred at one Portuguese University.

To locate PhD studies for potential inclusion in the analysis, an online search was conducted at the Education and Science Statistic Centre (Direção-Geral de Estatísticas da Educação e Ciência) (http://www.dgeec.mec.pt) for all the PhD theses on the scientific domain of arts, subfield of design. At the time the search was carried out, in October 2016, 94 PhD theses presented between 2000 and 2016 were retrieved, in six different institutions, according to the distribution showed on Figure 2.

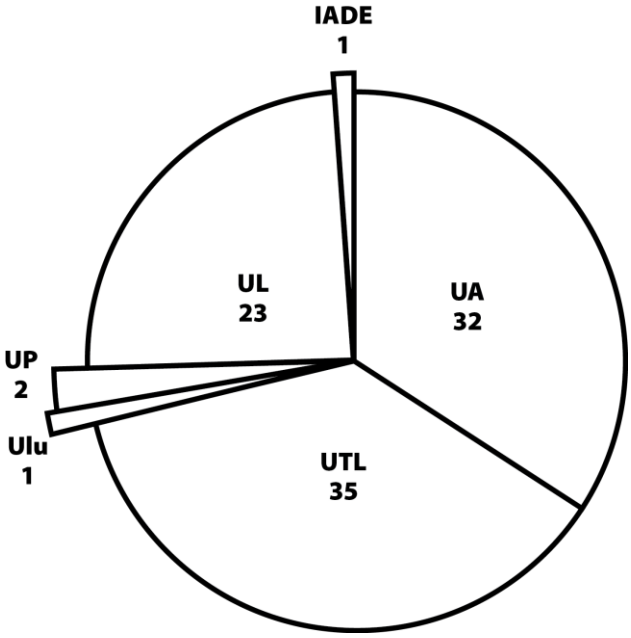

Figure 2. Number of Design PhD theses presented in Portugal by institution (@authors; data source: DGEEC October 2016; UA: Universidade de Aveiro; UTL: Universidade Técnica de Lisboa; ULu: Universidade Lusíada; UP: Universidade do Porto; UL: Universidade de Lisboa; IADE: Instituto de Arte, Design e Empresa;)

Figure 3 shows the temporal evolution of PhD research in Portugal through the number of theses present in each year.

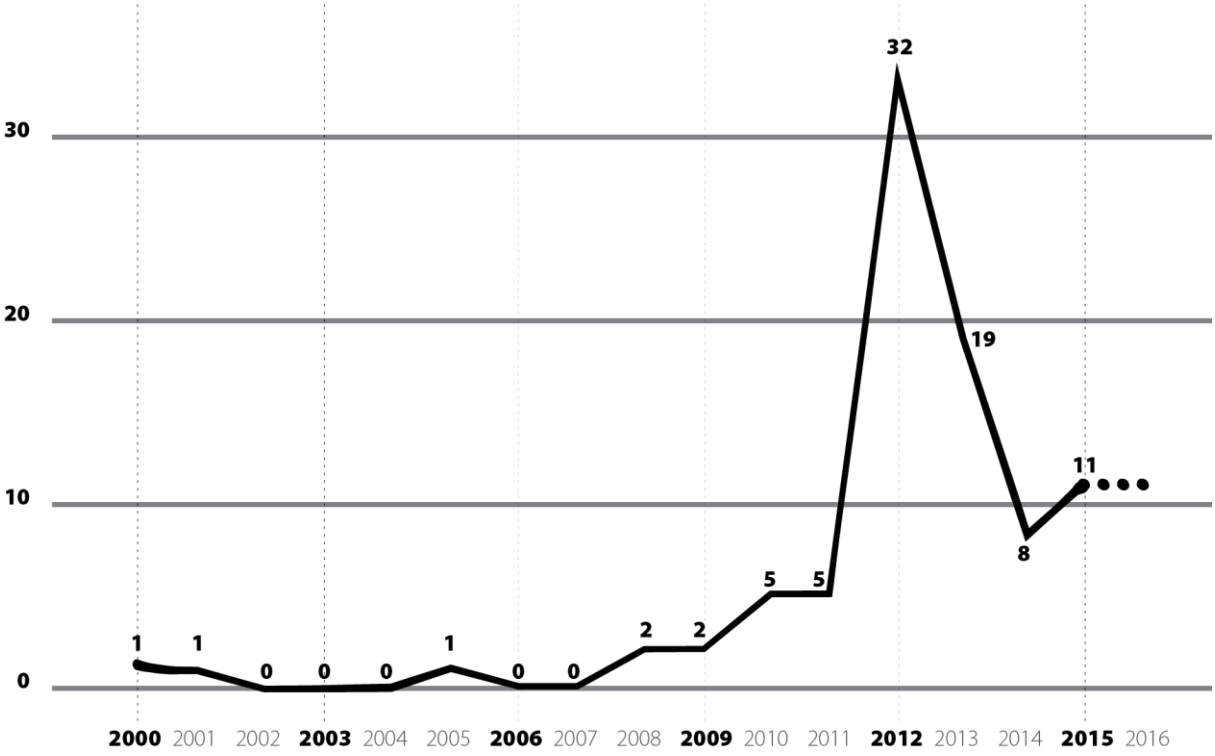

Figure 3. Number of Design PhD theses presented in Portugal by year (@authors; data source: DGEEC October 2016)

It is shown that PhD research hardly advanced in the first decade of the 2000s, with one or no theses per year. PhD research advanced more markedly in the 2010s, with a big expansion in 2012, the year with the biggest design doctoral production. Considering that worldwide PhD design studies boom was in the years 2000, Portugal shows a delay of almost one decade. It is interesting to note that in Portugal, in 2009, a governmental law (DL 207/2009) introduced the PhD as the qualifying exigency to access a teachers' career at Universities and Polytechnics.

The presented study is centred on the case of the University of Aveiro, as the post-doctoral research from which this study is part, is being conducted at that same university. The presence of design at the University of Aveiro as an academic discipline goes back to the academic year of 1995/1996 when the bachelor studies in Design started. In the academic year of 2001/2002, the possibility started of following the studies in design by enrolling in a specialised course in Design, Materials and Product Management with the duration of 1 year, which evolved into a master degree with the same name in 2002/2003. Currently, the University of Aveiro offers 2 Masters: the Master in Design (www.ua.pt/deca/course/152/?p=1) and the Master in Engineering and Product Design (www.ua.pt/deca/pagecourse.aspx?id=329) which replaces the above mentioned Master. The first PhD design thesis was presented at the University of Aveiro in 2000, and the pre-Bologna doctorate was maintained until 2010/2011, when the doctoral programme in Design started. Currently, the programme has the duration of 3 years (www.ua.pt/deca/course/215/?p=2): the first year structured in curricular unities more focused on providing theoretical and methodological knowledge in design and the following years more focused on individual research aiming to defend a PhD thesis and obtaining the degree of Doctor in Design. The average number of study years from the beginning until the public presentation of the thesis is 4,5 years.

3.1 Methods

Aiming at answering the proposed research question, a total of 32 PhD theses documents produced at the University of Aveiro were analysed. The criteria for inclusion in the analysis *corpus* were that the studies had been presented at the University of Aveiro and that the entire document was accessible. In October 2016 the entire design doctoral research production at University of Aveiro consisted of 32 theses, the greater part being available in the University repository. When the documents were not accessible either because of being very recent, or because of being under confidentiality constrains, access was requested directly from the authors by e-email.

For all theses considered on the *corpus*, the title, the abstract and the methodology chapter or section, if existing, were analysed. Also, and because all the files were readable in "pdf" format, the *Find* tool was applied to locate the references to the words "methodology" and "research" with the aim to know the context in which the words were being used, the cited reference authors and the extension of the methodological options justification. Based upon that global analysis of each document, it was verified if and how each thesis fitted into one of the categories of the Design Research Classification Model, presented in Figure 1.

3.2 Results and discussion

From the analysis of the 32 documents, and with respect to the research question, it was possible to verify that the theses fitting into the *about* design category were very easily identifiable. They usually follow methodological approaches imported from social sciences, frequently quoting authors from those fields on the methodology chapter or sections. The greater part of those works consist of theoretical or historical research.

With respect to all the other theses, and because all the analysed theses had already been presented to a qualified scientific board, it is implicit that they are relevant to the design field and conducted according to academic standards. Consequently, and according to the outlined model, they all have to fit into the category *through* design and none for the category *for* design. That fact raised the question about the interest to include that later category within the discussion of academic research. At the same time, it was possible to verify that almost all of the theses fitting the *through* design category, consisted of what can be generally classified as a design project conducted under an academic context. That means that these latter are works consisting of a solid research conducted, at a certain level, according to academic standards (for example, literature review), then followed by a practical application, and ending with some theoretical reflection. Although a deeper discussion on the methods applied to that kind of work is required, which should be considered in further studies, the relevant fact for the present discussion, clearly confirmed by the theses' analysis, is that the Research Classification Model has to include a space to accommodate that kind of research. That category would be research *through* design.

More important, the analysis revealed one thesis that did not fit into any category, suggesting the need to add another category to the initial model. That was a thesis presented under the Portuguese law DL 230/2009, which introduced the possibility of obtaining a doctorate from the analysis and recognition of the author's work. That possibility emerged from the argument that, especially in arts and design, creatively produced work embodies, totally or partially, new knowledge. According to the law, to obtain the doctorate, the author has to write a dissertation making explicit the individual creative process, his research capacities as well as the work contribution to the scientific domain.

Thus, the first study's result was the identification of the need to add another research category to the Design Research Classification Model, to include the doctoral theses produced from the authors'

work. In response to that, a new Design Research Classification Model proposal is presented in Figure 4.

According to the proposed scheme, project design research, or research *for* design, is clearly placed outside the academic research boundaries. However, it is recognised that design practice produces tacit knowledge that if made explicit and communicable, contributes to the advancement of the design field. As stated by Cross (2007), for works of practice to qualify as research, "there must be a reflection by the practitioner, on the work, and the communication of some re-usable results from that reflection" (p. 126). That leads to the third category introduced inside the boundaries of academic design research, which we call research *from* design. The difference between research *through* design and research *from* design lies in the relation between theory and practice. In the first case, theory precedes practice, practice being an application or an illustration of a previously developed theoretical intentionality. In the second case, practice precedes theory, theory being the confirmation of an implicit and intuitive knowledge embodied in the practice products. According to that proposal, research *from* design arises from tacit knowledge made explicit and communicable, moving from a succession of unique cases to broad explanatory principles through an author's reflection and analysis. While research *for* design aims to generate novelty to the user, academic research aims to generate novelty for the design body of knowledge. Even that novelty may be demonstrated through artefacts, for the purpose of academic research, it should be described in words, contributing to the advancement of design phenomenology field (Friedman, 2003; Muratovski, 2015). Furthermore, if that written piece of work analysis makes explicit the author's individual methods and cognitive process, it can also contribute to the field of design praxiology and epistemology.

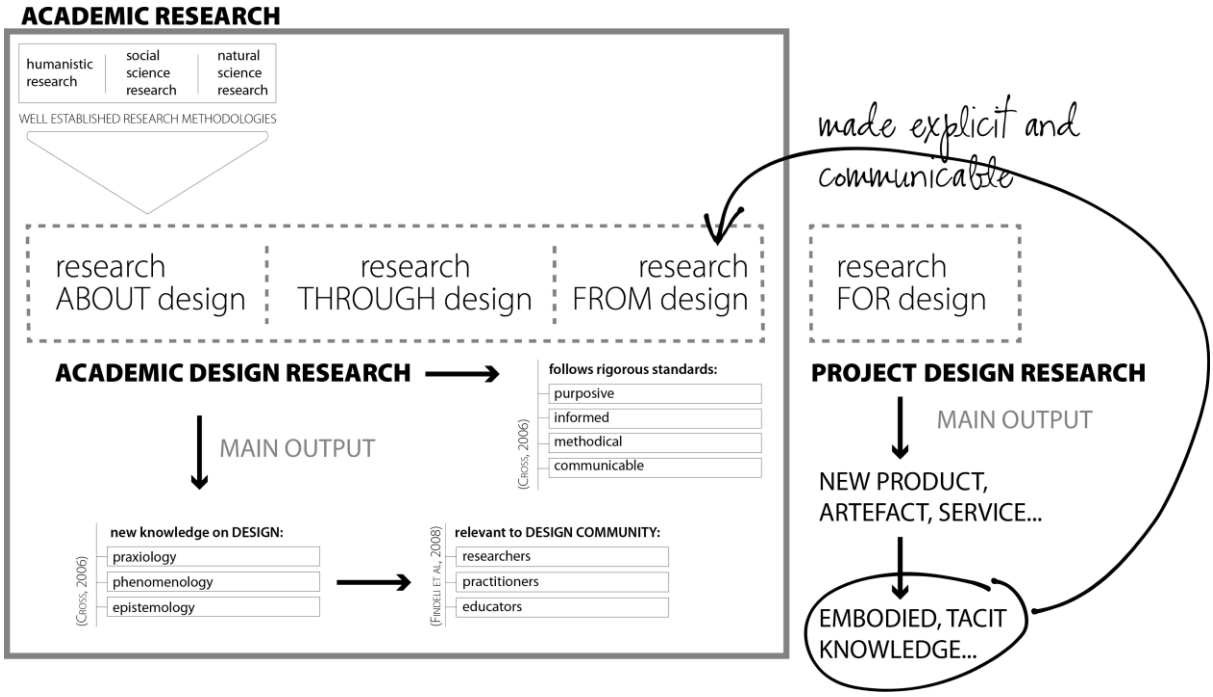

Figure 4. Design Research Classification Model - a new Proposal (@authors)

Another pertinent observation, resulting from the performed analysis, is the fact that rather few theses present a self-positioning in the design research categories presented by Frayling (1993), Cross (2007) or other design research authors. Also, not all the presented theses have a chapter or section specially dedicated to methodological options explanation and justification. When existing, the extent of methodological options explanation can vary from as much as 5 to 200 lines of text.

Also, rather few theses presented an explicit formulation of the research question, which constitutes a good practice of purposive research, and would have facilitated the analysis. Finally, in numerous situations, the word “methodology”, when describing the research, is confused with research methods, research process or researcher procedures.

As the analysis evolved, a reviewing instrument, similar to a reading sheet, was conceived and tested with several documents. The study confirmed the value of such a systematic review tool that can be applied to the entire *corpus* of doctoral research production. The tool, called Design Research Canvas - a template for analysing methodological approaches in PHD design, is expected to provide a guided reading of any PhD design thesis aiming at a clarification of the adopted methodological options (Figure 5).

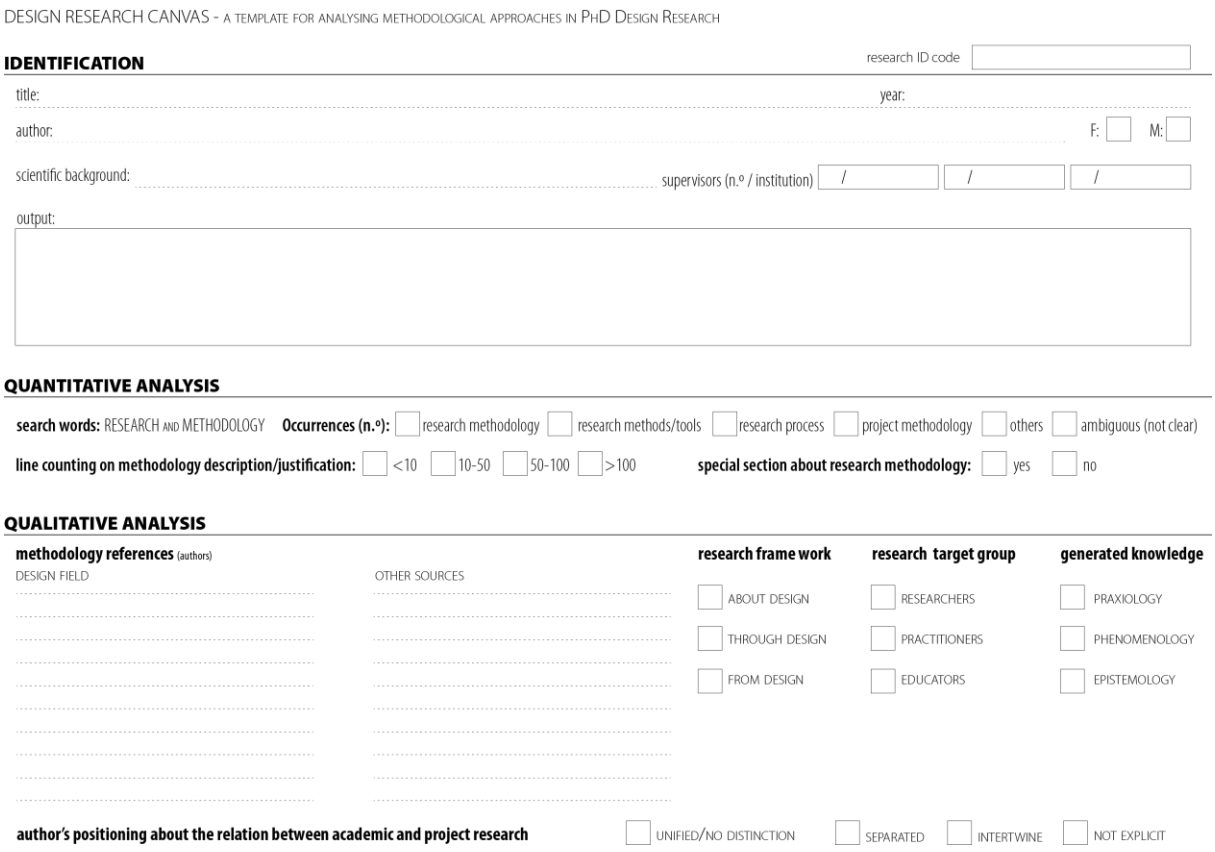

Figure 5. Design Research Canvas - A template for analysing methodological approaches in PHD Design (@authors)

The Canvas is organised in three main sections. The first section involves the document identification as well as author and supervisor’s characterisation. Quantitative Analysis is a section that intends to quantify the relevance and the meaning given by the thesis’ author to the research methodology by counting the number of the occurrences of the words “methodology” and “research” and analysing their meaning through the context in which they are applied. Wether or not the thesis has a special chapter section about the research methodology options and the number of text lines dedicated to its explanation and justification is also verified. Qualitative Analysis is expected to allow the decision if and how the PhD research fits on the Design Research Classification Model proposed in figure 4. It should also clarify the thesis author’s position within the subject through the cited reference authors on methodology and, when possible, through any explicit statement with respect with the existence of boundaries between project and academic research.

4. Conclusion and future work

Design advancement as a well-established academic discipline depends on researchers' methodological choices, particularly within doctoral research projects. In spite of the many contributions from several authors in recent years, the methodological framework of academic design research remains blurry mainly due to an abundance of terminology and meanings not always consensual. This paper intends to contribute to the discussion by presenting a conciliatory Design Research Classification Model, synthesising the positions of different authors and then analysing a corpus of 32 PhD theses to verify if they fit to that model. As the main result, the study reveals the need to add a new category to the model. In addition, a Design Research Canvas, for analysing methodological approaches in PhD design, was developed. Future work should focus on continuing to apply the developed Canvas to all the Portuguese design PhD's production to a systematic review, and again, check that it fits into our new Design Research Classification Model. Further studies should also focus not only on the methodology level but later on, to the methods and techniques level, especially on the through design category.

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