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Design practice reimaged: New fundamentals through a study of co-design and practice based doctoral studies.

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Abstract: Collaborative design is ubiquitous and can provide support for communities and organisations to envisage and deliver more equitable and joyful futures. What often seems to be a simple enough process of engagement can, however, be a complex activity. The issue with co-design is often a fundamental one, design is not easily explained. Designers and academics will often be able to explain what design is and the literature provides definitions that have been honed over many years. It is also relatively easy to find frameworks or models that provide prompts when to carry out an activity or task, these elements are reasonably straight forward to explain. This paper focuses on the searching from the fundamental principles that lie beneath these models, for the hidden epistemological perspectives that are seldom examined or shared. A multidisciplinary group from Lancaster University came together from design research, design practice and linguistics and, through a series of reflective sessions, explored the possibility of identifying and articulating the essence the epistemology of the act of designing. This paper presents the start of this journey and is intended to provoke questions rather than present neat solutions. Provocatively we posit that the epistemological prototype model presented below underpins all design, inside and outside academia and the design profession.

Keywords: Co-design, practice based, doctoral studies, design fundamentals.

1. Introduction: Co-design and PhD programmes

This paper concerns itself with the act of designing, with the practice that many of us in design research take for granted, as we go through life designing everything in our bubble of designerly approach to the world. To draw this (often implicit, or tacit understanding (Polanyi 1966)) and action of practice we are focusing on two specific areas of activity. This contrast will help stretch and reveal the assumptions in contemporary design. Our aim in this paper is not to present a model or way of designing that is 'correct' and argue why people should design like this. Rather we are searching for the fundamental properties of design practice (inside and outside academia)) and are presenting here a prototype model that is intended to stimulate a new dialogue concerning the nature of design when the boundaries of design practice are increasingly blurred and contested. We focus here on the role design practice plays in doctoral design research and in co-design. While these two areas superficially seem quite distant, we argue that the role design practice plays in these are, in fact, two sides of the same coin and that contrasting these distinct contexts while exploring their commonalities provides a vehicle for new understanding and to energise the debate. Of course, good dialogue often needs some structure or support to stimulate participation. To this end the research presented here has been used as the basis for a new model that we propose represents the fundamental DNA of design practice.

Reflecting our epistemological , auto-ethnographic analysis of the nature of design, it's our bold and playful assertion that the proto-type model briefly presented below, encapsulates the fundamental values of all design practice whatever their perspective, level of experience or background, including those outside the design profession. As such we are starting the process of testing this new, non-linear approach in context ranging from designers to 9 year-old children to health professionals to physical activity managers.

2. Defining Design and Design Practice

If anything underscores the appropriateness of the metaphor of the PhD as merely the driving test to ensure you are safe to undertake research, as only the starting point, it's the need of every PhD candidate in design to have to define what they mean by design. While we situate ourselves in the paper in the tradition including Potter (1999), Papanek (1985), Lawson (2006), Julier (2014) and Manzini (2015) in terms of design practice, we are referring to the process of applying design principles and techniques to create solutions that meet specific needs and objectives. It's a systematic approach to problem-solving, which includes identifying and analysing the problem, researching and gathering information, generating and evaluating ideas, creating prototypes, testing and refining solutions, and finally implementing them. It requires creativity, critical thinking, and a willingness to develop and refine ideas until the optimal solution is achieved. This is an iterative process that involves continuous learning, experimentation, and adaptation to changing needs and contexts (Cross 2006, Buchanan 1992).

3. Co-Design

We focus here on co-design because its open and participatory nature is becoming ubiquitous across design. Soon it's quite possible that co-design will simply become design. Until that time, though, co-design represents an active area of design where the role of the designer and the practice of design is contested.

Engaging public sector organisations, communities and individuals to address societal issues should be straight forward enough. Participatory design and collaboration design methods have evolved and

increased in favor as engagement and research methods, since their first introduction in the 1970s. Collaborative design methods (Hippel, 2005; Sanders and Stappers, 2008) recognise that if people want to be involved in addressing societal issues by design, that they have lived experience (Chandler and Munday, 2011; Pérez et al., 2022), enabling them to make a significant contribution in design led projects. Co-design projects are ubiquitous, some have been exemplar projects and are distinctive equitable processes that can impact those who participate far beyond the project, such as Leapfrog (Lancaster University, 2018) and Empowering Design Practices (Open University, 2021), many others have fallen short of what might have been. Co-design therefore receives mixed reactions. Although the quality of the stand-out co-design projects and research is inspiring for participants and provides solid research insights, there are many more projects that shelter under the co-design umbrella that have used light versions of the established and evolving co-design methods. Often the process and outcomes of co-design projects are unbalanced, those that place emphasis on the equitable process neglect the importance of having the best possible outcome, and alternatively projects that are focused on outcome can lose sight of the valuable co-design process. This can result perhaps, in limited impact on those whose futures might be changed by an equitable design process. Insights might still emerge from such projects and filter through the channels to influence researchers, but is that enough?

There is something missing in co-design paradise. Facilitators, researchers and advocates who might have been lived experience participants in previous projects are adopting the 'co-design way', This would seem to be the perfect outcome for those who might feel evangelical about co-design providing the best equitable future for communities whose voices can be seldom heard. There is a problem however, the term "co-design" has the word design in it. Co-design is about designing (Potter, 2002; Simon, 2019), understanding lived experiences, equitable decision making (Manzini, 2015) and political landscapes (Palmas and Busch, 2023) is not enough. A solid understanding of design, by at least one person, in the co-design conspiracy is a prerequisite, someone's lived experience expertise, needs to be design and that expertise needs to be able to be shared or exchanged (Galabo & Cruickshank, 2019). This is a crucial point, how do designers share what has taken them many years to learn, what are the actual processes of designing being used in co-design, rather than the general co-design process and how can these be adapted to accommodate or encourage design practice in non-designers?

Designers and design educators use generic terms and language that can be attributed to lots of tacit knowledge and activities in their world but when designers travel into other worlds, other contexts, the real world (Papanek and Fuller, 1972) and work with non-designers, that language has little meaning or is easily misunderstood. Designers often do not easily explain what design is or how it is done. They invite participants to take part in the activity of designing but do not provide them with the rules to the game, leaving participants without a secure base (Schofield and Beek, 2014) from which to gain the confidence to embrace uncertainty and be playful and open-minded. Schofield and Beek suggest we have four psychological needs that must be met in order to explore and take risk: they are belonging, power, freedom and fun.

Being playful and open-minded means exploring uncertain ground and increased risk, risk of failure. Understanding the rules of the design game, the fundamental prerequisites to do design is essential for providing the participants with scaffolding to do co-design. Not everyone is a good co-design participant, public service workers and private sector workers are often used to predictable processes and to some extent predictable outcomes, thus venturing into risky and uncertain ground can be a difficult step. Designers too can be uncomfortable collaborators, being used to leading the design process from the front they can lack faith in the sharing of power and valuing of expertise (Cruickshank, Coupe & Hennessy, 2016).

Continuing the demystification of the arcane subject of design should regain momentum. The lack of explicit language and easily understood process continues to make collaborative design difficult to access and enact. Making design accessible and equitable is fundamental if the majority are to participate. The literary landscape of co-design is unwieldy and complex and can be confusing and disorientating for students of the subject. There are multiple strands that can be gathered up, leading to co-creation, participation and collaboration, but this is often a time consuming and frustrating tangle of ideas that must be carefully unpicked to find the common themes and nuanced differences. We contest finding a better understanding of the act of designing itself in a co-design context would be a significant contribution to the field of co-design research, this paper documents the start of this endeavor.

4. Practice in the Design PhD

As with co-design, the ‘mystique’ of design practice is equally present in doctoral design education. It is our intention in this paper to draw this practice into the light as a concern that can be discussed, compared and improved in the same way that other methods in research are examined. We are looking to ‘demystify’ and remove the claim of specialness or uniqueness from design practice in PhDs. This draws on Bruce Archer’s seminal paper *Understanding Research* (Archer 1995), where he argues that all research, not just design, has practices and that design is no more unique or different than any other area of research. Still, though, there is a strand of design research that make the case for practice in research to be a mysterious, special activity (Borgdorff 2019, Stolterman 2008, Cross 1982). It is not our purpose here to criticise current doctoral education in design, quite the reverse, we are aiming to contribute to the building rigour, diversity and impact of doctoral research by proposing a model of practice that can be used as a basis for discussion in the examination of the role of practice in research rather than practice being an unexamined ‘black box’ in the research process.

Murphy and Jacobs (2014) engage with the idea of a ‘hybrid’ PhD candidate that uses practice as well as more ‘traditional’ aspects of PhD research. This research draws on two innovative PhD programmes at a UK University. “Highwire” was a doctoral training centre where 50 PhDs were funded to undertake a project that connected with organisations outside academia and had to combine supervision from two of three disciplinary fields (design, computing or management). The second was a knowledge exchange research project called “Creative Exchange” where 12 PhDs were funded on a 4-year programme. Their PhDs consisted of a series of collaborative projects with small to medium sized companies, academics outside their host institution and other PhD students. Each student had their own overarching design research challenge and used 4 or 5 collaborative projects as test beds for action and reflection on these research questions. While Murphy and Jacobs recognise practice was important for these projects, and call for an ‘agile’ academic design practice as a method or means of undertaking research is regarded as a given rather than something to be considered directly.

There is a lively and active debate across Europe and beyond on the fitness for purpose of the PhD (Sharmini 2020, Mantai 2022). This is mirrored on the European scale with initiatives such as the DoCS4Design project, examining doctoral design research practices, cultures and outputs across 6 case study institutions across Europe. This includes the publication of a glossary of design PhDs and an attempt to map the similarities and differences of PhD programmes. The DoCS4Design project identifies 4 key characteristics for a design PhD:

1. a PhD pursued at an institution where Design is taught and researched
2. a PhD aiming for increased Design Competencies
3. a PhD research project that is about Design

4. a PhD research that leverages a design Background

(Stappers et al 2022)

Again, here we see the act of design as a given, which of course may be argued as a function of the strategic nature of the DoCS4Design project. However, a general characteristic across the more field of research through design literature (Koskinen 2011, Sanders, E. B.-N., & Stappers, P. J. (2014), Brandt, E. (2006) is that designing itself as an act is largely left unexamined. In design PhDs this lack of direct examination of the practice of design has the potential to be problematic. Design PhDs tend towards highly heterogeneous backgrounds (Stappers 2022) and are highly likely to be at the beginning of their academic research careers.

This raises the possibility of researchers adopting practice-led approaches without a clear understanding of the principles that underpin design practice, allowing them to be shaped to amplify their usefulness as a research tool. Further it is quite possible for the practice itself not to have the same peer and supervisory critical review and opportunities for improvement as other methods that are being employed. For example, it is common to undertake peer, comparative coding activities to ensure the resilience and validity of coding practices, but this may not be the case for design practice. In essence the question is how can PhD candidates understand the quality and rigour of their practice without examining that practice itself directly and further what is the epistemic position on the act of designing? To be direct, what if the practice being used is not good but is also not examined in the same way other methods would be?

To summarise, we posit the case for a closer examination of design practice in both co-design and design PhD contexts. To progress this assertion we, a research group at [author institution], sought to reflect on the fundamental underpinnings of the act of designing and develop a prototype model of these underlying processes that could be used as a provocation to help the nature and qualities of designing be more easily discussed. This conference paper is a vehicle for this discussion rather than an articulation of the results of this project.

5. Design Models

Of course, there are a number of widely adopted models that help those who participate in design, to navigate the often, tacit processes learned and perfected by designers. There are complicated and unwieldy examples like the Design Council's Double Diamond (DesignCouncil, 2021) described as a non-linear process that encourages iterative process but is applied very much in a linear manner. Developed by Banathy (1996) and adopted by the Design Council, it strives to provide accessible guidelines to follow. This framework explains what to do but unfortunately not how to do it. This is accompanied by a set of prompts which are ambiguous, in part due to the design language used, for example, 'work together and get inspired by what others are doing' and 'iterate to spot errors early, avoid risk and build confidence.' There are Frameworks that describe in detail, what is happening in the design process and when it is happening which can be useful for mapping and managing projects and controlling costs. The Cyber Physical Systems (CPS methods) for example, uses complex diagrams and niche language (Hehenberger et al., 2016) that are not decipherable by the unfamiliar user. In contrast Sanders and Stappers (2008), fuzzy front-end diagram provides a connection for diverse collaborators enacting co-design. The 'squiggly line' visualisation provides an easily understood timeline, it describes what is happening beautifully but does not provide an explanation of how to do it.

There are many more design models available to adopt and adapt, too many to explore in this paper. However, Dubberly highlights a range of these in 'How do you design: A compendium of models (Dubberly, 2004), shown in table 1.

Design Models	
Author	Model
Nigel Cross	Four stage design process, 2000
Michael J. French	Engineering design process, 1985
Verein Deutscher Ingenieure	System approach to the design of technical systems and products, 1987
Gerhard Pahl and Wolfgang Beitz	Design process, 1984
RIBA Handbook	Architects plan of work, 1965
George Polya	Problem solving process, 1945
Cal Briggs and Spencer W. Havlick	Scientific problem solving process, 1976
Humberto Maturana	Criteria of validation of scientific explanations, 1987
Buckminster Fuller	Comprehensive anticipatory design science, 1950
Richard Buchanan	Design process and practice, 1997
Bryan Lawson	Creative process, 1980
Jane Dark	Primary Generator, 1978 Design process, 1978
Thomas A. Marcus	Design Process, 1969
Clement Mok and Keith Yamashita	Process of designing solutions, 2003

Table 1. Design models adapted from, *How do you design: A compendium of models* (Dubberly, 2004)

The need to understand what is happening in the design process is essential. Others have explored the front end of design processes and considered the language used to describe it, however, it has been highlighted that the literature does not discuss how the ideation process works or what the fundamental elements might be that are needed to do it (Koen et al., 2001). Knowledge of what is happening in design at a fundamental level is not yet fully formed. There are key pre-requisites needed to think in a designerly way, these requisites are not out of reach for the unfamiliar co-designer, they are however hidden from view. This paper provides an opportunity to get closer to the fundamentals of doing design, by provoking a playful conversation that helps to explore through practice the underlying perspectives and attitudes that underpin design activity and sit mostly unexamined but underpinning many of the models listed above.

We want to explore what it means to design when all the paraphilia (the sticky-notes, the tools and methods) are removed. To explore this, we adopted an autoethnographic approach. This qualitative research method involves an in-depth examination and reflection of personal experiences and observations. In this method, the researcher, who is often the subject of the study, examines their own experiences and cultural context to gain a deeper understanding of the topic being studied (Adams and Jones 2016). As the researcher reflects on their own experiences and seeks to identify patterns, themes, and insights that are relevant to the research question. This process often involves collecting and analyzing personal documents such as journals, letters, and photographs, as well as conducting interviews with family members, friends, and others who are familiar with the researcher's experiences (Chang, Ngunjiri & Hernandez (2013).

In this case we assembled a reflective team of researchers that included;

- A senior design academic with experience of leading large PhD programmes both unfunded and specifically funded to be innovative, in addition to having over 20 PhDs supervised to completion.
- A co-design consultant with experience of over 100 codesign projects in addition to academic research expertise in understanding the process of co-design itself and its effects on participants.
- An academic linguist with experience of language analysis and research on learning as design (building on the 'London Group's' work (Haliday 1961)

Forged in the extraordinary circumstances of COVID, this group has worked together for 2 years in an ongoing informal collaboration working on interventions to lower the barriers society erects to inhibit the development of children in poor neighborhoods. Through this there was a linguistic questioning of 'what actually do we mean by design'. This, sometimes agonistic dialogue, became the spur for a more formal investigation of the epistemological position on the practice of design we held. This took the form of 6, two-hour reflective sessions exploring the possibility of articulating the real nature of design practice. These sessions were the catalyst for many further discussions that drew in a further PhD researcher and a university outreach worker. We used a cyclical OrCam's razor approach describing, distilling, analysing and redescribing the essence of what it means to design in a collaborative context. These sessions were recorded, transcribed and analysed. This analysis forms the basis of the prototype model presented below in Figure 1.

We are ***not offering this as a prescriptive model for adoption***, rather we want to present this prototype without a strong bounding rhetoric to engender a discussion that we hope will highlight both the resonances and discordances with the experiences and epistemological positions of the reader.

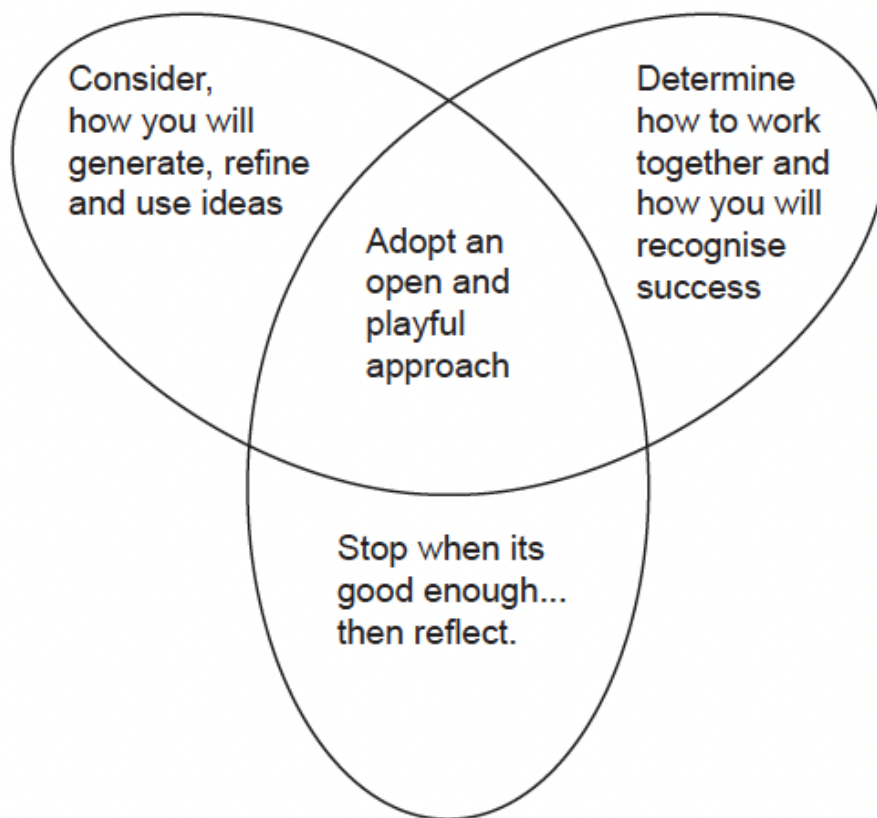


Figure 1. The Designing for Real (DFR) prototype Model

The starting point for the prototype model was that it should not be linear with a start, middle and end. Rather it should have multiple entry points that are equally valid and appropriate. We did though feel the need to have a safe exit point from the model. Many readers will be familiar with the idea of the wicked problem and the notion that they lack a 'stopping rule' (Rittel and Webber 1973, Coyne 2005). We recognise here that design processes are stopped rather than completed. There is also a notion in the frame of the model of moving between the 4 areas all the time passing through and refreshing the notion of playfulness. This was felt to be an essential component, of being open to unexpected, apparently irrelevant or trivial conceptions that are the wellspring of creativity.

There was also a conscious decision to have collaboration and co-working as a fundamental property, banishing the myth of the designer as lone genius. Building on this we wanted to make explicit our assertion that ideas always happen as part of a process. This can be an internal process and can be spread over days and weeks before inspiration comes. Too often designers use processes, techniques and rubrics learnt as a student for their professional lives without even a cursory examination far less any thought of consciously improving these. It's worth remembering that techniques like brainstorming were invented in the 1930s by Alex Osbourne (Osbourne 1942) and did not fall from the sky as a law of nature we happen to exploit.

Finally, we wanted the prototype model to be as accessible as possible to both designers and non-designers. The model has been prototyped with a wide variety of designers and researchers but also children aged 9 and 10 and separately their teachers, with sport and leisure professionals and non-

design academics. This aspiration to share, and have the model used widely, influenced not only the simplicity of the model but also the lexicon. As a test of this accessibility, we have resisted the temptation here to provide an exhaustive description of the function and rationale for the 4 categories. If we have designed the model well, it will resonate with but also help clarify individuals' perspectives on their design practice and offer a framework for discussion that is both novel and comfortable or natural. More interesting, though, will be the strong reactions of those who might find this description quite alien to them. This reaction, we hope will energise the dialogue and in time lead to a more rigorous, and vigorous exploration of the nature of design practice itself.

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