Designing the PhD curriculum in the design disciplines

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Introduction

Graduate, and especially doctoral, education in the design-related disciplines is growing fast internationally. This is the case pedagogically and as a topic of research. The diverse and interdisciplinary nature of the design disciplines and their corresponding professional practices poses considerable challenges with regards to the design of curricula. Added to an already complex scenario of diverse, intersecting and contrasting disciplines and relations to professional practice is a tendency for doctoral design programmes to under-articulate the educational frameworks on which their curricula are based. Such programmes typically do not include, project or promote explicit learning theories or articulate their design and enactment by way of expressed pedagogical practices.

In this chapter we focus on the challenges and potentials in the design of a curriculum for doctoral education in design-related disciplines in increasingly interdisciplinary contexts and where the PhD is located within a wider research project or strategic research area. We do so with reference to the implications for the growth of pedagogies that support doctoral students’ professional development as researchers beyond formal taught courses in the confines of a PhD school and the role of participation in wider research project based inquiry and the role of supervisory support.

The trans-disciplinary nature of doctoral-level design research requires collaborative and distributed forms of teaching and learning, where an integral link between context, social environment and learning is created. The authors offer their approach to a curriculum design for design PhDs at The Oslo School of Architecture and Design (AHO) that is flexible and responsive to the current changes within professional practice and research within products, services, interactions, and systems design. The content of the curricula draws strongly on the portfolio of practice-led design research projects across different institutes in the university. This approach reflects a shared commitment to building a doctoral education for training an engaged and able future community of practitioner-researchers who are capable of thinking and acting across disciplinarily contexts and who are primed to face contemporary global challenges.

The four domains of research in AHO’s design institute—Product Design, Interaction Design, Service Design and Systems-Oriented Design—join together a wide variety of fields such as computing, engineering, visual communication, art, Science and Technology Studies anthropology, and Cultural Studies. Doctoral research at the institute has covered a variety of areas spanning maritime ship bridge design, methods for service innovation, multimodal interfaces and disability, and social media and performativity in urban environments in partnerships with a diversity of designers, artists, businesses, research collaborators and students. The research context from which we draw our views is characterised by the strong presence of practice-based research in design and the growing placement of doctoral studies in design within larger, interdisciplinary research projects and teams, extending to industry placements. In the past decade, the PhD curriculum at our institution has been through what
we see as three main, interlinked phases: 1) architecturally centred with emphasis on the making professions with a lecture and seminar-based pedagogy, 2) increased attention to design in a socio-culturally inflected and task-based pedagogy, and 3) a thematized, interdisciplinary approach with focus on contexts of inquiry and research methods with staged activities. We draw on these legacies from the interdisciplinary PhD school, but focus this chapter on curricular practices for design PhDs within the Design Institute at AHO.

**Considering a curriculum for novice–experts**

In the considerable body of research on the changing character of the design PhD (Dunin-Woyseth and Nilsson, 2012; Michl and Nilsson, 2005; Morrison, 2013; Tonkinwise and Vaughan, 2013; Vaughan and Morrison, 2014), there is an increasing need to identify the unique qualities of researching and supervising in design and the different strategies for achieving this (Allpress et al., 2012). Drawing on a socio-cultural approach to learning, which indicates that learning is developmental through social and cultural processes (Hakkarainen et al., 2004; Lave and Wenger, 1991; Scardamelia and Bereiter, 2006, Vygotsky, 1986), we’ve found that each PhD thesis process and product represents an instance of this transformational and developmental approach.

For many doctoral research projects there is an iterative character between making and reflecting, implicit and explicit practice. Here, practice processes, artifacts and performances can be described and interrogated using a diverse set of research literatures that over time form part of a more coherent apparatus that goes through series of drafts, formulations, presentations, internal reviews and professional peer reviews. Students come to understand their work through seeing other students in progress and at various points of completion and assessment. This provides them with scaffolding for learning. However, close attention to writing, as a generative activity is key. It is a type of writing geared towards critical interpretation, and representing the authorial voice of the designer.

Doctoral design students may begin to understand that there is a dynamic relationship between what they have made, earlier research, and the voicing of their own analysis. It empowers design research to build up new concepts. The acts of new making are now infolded with an explicit twine of research. Over time students come to see how interpretation can be built through dialogue with their peers and supervisors, in spelling out relations between how they know things through making and what they know analytically through critical reflection.

A coherent curriculum needs to identify the elements of knowledge that students will learn. Much of a PhD in design concerns shifts from tacit to explicit knowledge. As Polanyi (1967) stated, in design practice much knowledge is tacit in status and in its development, being sensual and conceptual and embedded in acts of making. Such knowledge is internalized and is the result of a developmental practice that leads to connoisseurship. But it can be difficult to pinpoint elements of knowledge within connoisseurship models of design curricula. Gilbert (2009), drawing on several previous studies (see for example, Ross, 2000), suggested the following knowledge types in curricula:

1. Abstract propositional knowledge – knowledge about facts, theories, and concepts.
2. Abstract procedural knowledge involving conceptual skills and cognitive abilities of analysis and problem solving.
3. Embodied knowledge that is action-oriented and likely to be only partly explicit – acquired by doing and rooted in specific contexts.
4. Tacit knowledge involved in expert practice and professional judgment.
5. Encultured knowledge related to the process of achieving shared understandings, embracing the perspectives and experiences of others.
6. Embedded knowledge residing in systematic routines, technologies and practices or explicit procedures. (p. 58).

In such a view, it is the developmental, reflexive and processual character of coming to know and the ability to work synthetically within and across a variety of concepts, materials and potential designs that are the markings of an approach to deal with what have been called wicked problems (Buchanan, 1992). These are challenges, needs and directions posed within the task at hand and the overall approach to designing. Tackling wicked problems requires a good measure of flexibility and an ability to work toward not simply solutions to problems, though these are needed, but finding and better defining them and ways to meet them. Here context, activity and process are central to understanding how designing (as activity and practice) works—where knowing may be beyond what is immediately being designed, and where artifacts and agency are linked though multiple modes of mediation.

Vaughan and Morrison (2013) attempted to map out the key components of the pedagogies and research practices involved in doing a doctorate in design. They show the rich variations in structure, curriculum formats, teaching approaches, modes of publication, changing professional practices and modes of knowing that exist across different design schools and in different national contexts. They argue that professional design practice itself brings special ways of working, researching, and knowing to doctoral education in design. Thus doctoral education in design has the potential to develop its own identity that is developed from within, but also connects with the wider world through its interdisciplinary linkages with industry and practice.

Our university has seen a variety of doctoral research projects over the past two decades. They have varied in approach from theoretical and technical, to poetic and performative. Projects have taken concepts of myth and secret to design innovative services for the tourism and sports industries, technical specifications of ship-building to design new interfaces for ship bridges; choreography to track dancers’ movements for design visualization uses. Projects have also aligned with a number of different design professions or fields of practice, from architecture and engineering, to communications and service design. For instance, a recent project coming out of the Service Design domain applied co-creation principles to collaboration in the engineering-focused field of shipbuilding. Another project borne out of Interaction Design draws on communication design and cinematography to show how invisible design materials such as RFID and GPS can be made visible for designer’s use.

Research has also been conducted in a variety of contexts ranging from the laboratory and the studio, to the company office and the street; it spans different modes of inquiry including self-reflexive, collaborative, critique, exploration, and experiential. Self-reflexive projects are often found in the Interaction Design domain, where designers work alone, or in small teams gathering data, and then reflect on that data independently to critique a method or
create concepts and approaches that are usable by future design-researchers. One example of this would be the aforementioned project about making invisible technologies visible. In this project, the design researcher photographed thousands of instances of people using handheld technologies and then reflected on and wrote about the pervasiveness of technological usage in a networked city environment. A different, collaborative project involved a design-researcher working closely with information communication technology (ICT) and insurance companies to design better services for their customers. Knowledge, in this setting, is produced in collaboration between designer and company in a research by design approach. These projects each drew on a range of knowledge types, moving, for instance, from tacit and implicit knowledge of how customers interact with technology companies to explicit, embodied knowledge of customer interactions to forward the research project. Anyone who accesses the online portfolio of doctoral research projects at the Centre for Design Research at AHO is bound to see the wide variety of the themes, disciplines, and modes of inquiry covered (www.designresearch.no).

Building designerly pedagogies

The curriculum model in the design institute at AHO so far has relied on individual supervision of students and informal communities of practice that bring together PhD students and faculty in small clusters, such as reading groups, hallway meetings, and collaborative mentoring and sharing of resources and ideas across domains. The challenge in this informal approach is that some students fall through the cracks and lose traction on their degree completion, that supervision models differ among each faculty, and that knowledge is only sporadically exchanged. Despite these challenges, the design PhDs have been successful at producing top-quality research individually and with their supervisors and colleagues in ways that have allowed us to reflect on those processes to create the topological model above.

For example, in a recent group of PhD design candidates, the supervisor spent a great deal of time working one-on-one with the PhDs to hone their domain knowledge; referred them to other researchers in the design institute to increase their knowledge of modes of inquiry, such as experimental methods that would be acceptable in academic research on interaction design; encouraged them to see a productive collaboration between their research and teaching, which required them to make their internal domain knowledge and modes of inquiry explicit through guest-teaching or teaching their own courses to undergraduate students; and formed cohorts that share in-progress research among students and with faculty so that academic writing can be critiqued and shared and learned collectively.

Faced with such a configuration, the main challenge is to construct a combinatorial and transformative curriculum that is both general and specific, that is inclusive of diversity while differing and demarcating how those different disciplines are constructed and related. This is an issue of scale and questions whether such a curriculum can be formalized or not given the often-changing landscape of design. While, at AHO, such a curriculum has been formalized at the PhD school, in which explicit academic knowledges are taught across the four institutes in the university (e.g., architecture, design, urban planning and landscape, and form/theory/history). But, there is still a need to apply our model specifically within the design institute and its subdomains where there is a demand to understand the pragmatics and changing texture of design work (new materials, and tools, new means of production,
changing marketing, etc.) and the impact of communication technologies. Attention is needed to new tools and their roles in the conduct and character of both design making and research interpretation and analysis, and this work has different expectations and outcomes in the design domain than it does in the domains of architecture, urban planning, or form/theory/history.

The design curriculum at the PhD level needs to give room for working with the experimental and in designerly ways, but also in shaping what the experiment means in design inquiry. For example, in a research through design PhD curriculum, Krogh et al. (2015) included a variety of designerly experiments (as being either accumulative, comparative, serial, expansive or probing). This needs to be connected also to the application of emerging tools from the creative and technology industries for mapping, documenting, annotating, archiving, and publishing multimodal research.

**Further challenges and implications of a design-specific curriculum for PhDs**

Challenges are also about making space for a peer-to-peer exploration of and interests in processes and formal analysis. There is a need to build a curriculum that has room for presenting work in progress frequently so that the level of activity of producing written research (students in design have a special need for ongoing support) exposes students to lateral levels of analysis in which they see a similar problem or a similar analysis that they can relate to their own study or writing. Institutionally, funding and publication dissemination needs and requirements also have a forceful bearing on the developmental composition and enactment of the design curriculum. Students in a design PhD need collective modelling of these types of high-level research processes in ways that can be made explicit to them through a formal curriculum. Pedagogically, there is need for a meta-view that addresses the complexities that have been revealed by the topological model we’ve presented above. These complexities would make room for the multivariate design domains, types of knowledge, and modes of inquiry that occur regularly, and often implicitly, in design curricula.

**Towards a topological view of the doctoral curriculum**

The interdisciplinary design curriculum is complex and difficult to construct. It needs to contain a focus on design domains, related to variety of academic disciplines (and subsets of them). These disciplines are connected to the types of knowledge that are being accessed and enacted through the modes of inquiry. In Figure 1, we provide a diagram illustrating some of these relational elements.

This we call a sociocultural topological view on PhD design pedagogy. This view allows us to look at the activities, tools, and mediations, and research production involved in design curriculum and pedagogy from a socio-cultural frame on learning. It allows us to see the intricate relations between intersecting, overlapping and divergent components that are central to the dialogical and mediated meaning making of a sociocultural pedagogy for doctoral design research education. The illustration presents components that may be combined in different relations that shift the focus from the concept of the topographical to the topological. In this regard, topological refers to a mapping approach where the focus is on details of three-dimensional modelling and not the tradition of visual perspective and the predominance of an ideal image (Girot et al., 2014). The topological permits views that
reveal more than features and elevations, as is the case with topographical mapping. Adopting a topological mode accentuates spatial relations between places, components, and edges. It seeks to assemble and to communicate their ‘physics’ – the interplay of dynamic features, folds, structural parts and overlays - in a holistic mediation. The complexity of the landscape - learning, pedagogical and research - may be perceived through such a view.

Figure 1: A topological view on sociocultural perspectives on doctoral design education
Adopting such an orientation allows for a curriculum to be realised through actions of stretching, bending, curving, and twisting, rather than separation, stitching or gluing. This allows for *transformational topological learning properties and dynamic elements* to be co-designed. *Learning properties* here refers to the identification and materialisation of qualities of closeness, distinction and divergence. Through these relational properties, the curriculum, learning events and potential for learners’ actions may be co-configured as resources within a transformational pedagogy. A masters or doctoral student in design working on their thesis project needs to be able to make more explicit the degrees of relation in their own mapping or assemblage of a selected mode of inquiry, its relation to identified and emergent types of knowledge and the situatedness of the project with respect to the various (overlapping) domains of design.

Here the acts of stretching, bending, curving, and twisting need to be made more apparent. This is to first identify the actual complexity of the design inquiry and its learning character. Second, it is to engage in processes of enacting selected linkages. For example, a doctorate by Lise Hansen at AHO in interaction design recently drew together exploratory and collaborative software development of a tool for whole body movement tracking (Hansen, 2014). It linked this to conceptual analysis and the elaboration of a wider multimodal socio-semiotic analytical framing, with links to underlying expertise in performance, choreography and graphic design. The overall thesis by compilation drew together practice and analysis in iterative inquiry that included diverse publication, lab-based events and open source scripting as part of a wider move to make explicit movement as material for design.

In such a view, it is the *dynamics* of the topological perspective that also needs to be articulated. This is a dynamics that comes into being through a performative discursive curricular enactment of a number of intersections: of modes of inquiry and types of knowledge, related research concepts and methods and the design notions and techniques. These too need to be charted, related and placed in terms of their proximity, connectedness and continuity. In masters and doctoral thesis work, such as Hansen’s, what is then needed is a complex set of actions that may involve students, co-authors and supervisors in negotiations about what is to be foregrounded and how this is to be achieved, through co-creation and collaborative interpretation.

There is also room for movement in this model between the course design for a PhD school or group and the design of the individual doctorate. Each individual doctoral project will highlight in one way or another selected aspects of this topological map. At the same time it will be developed in relation to a wider doctoral educational programme also framed through such a charting.

Learning goals in a PhD design curriculum that faces such complexity need to

- Build analytical frames specific to design domains;
- Theorize not only through available scholarly research but through the design practices they already use to build new theories and modes;
- Address innovations in how we teach modes of inquiry through methodological experimentation and practice; and
• Teach students to communicate their research through academic writing in a way that honours and is adapted from the strengths of their practice as designers, filmmakers, engineers, dancers, and artists.

We recommend that such curricula make these goals explicit when teaching PhDs in design, which will allow students to move more quickly from novice to expert researchers in design. Even in informal curricula, there is need for communities of design research practice with diverse and intersection membership interests. Such a community should include senior researchers and students, in partnerships of co-authors who draw on, reflect, and learn from each other's research practice. These will be major undertakings to co-create and build rich landscapes for designerly ways of knowing that are equally synthetic and abductive, transformative and transgressive, developmental and novel. This topological model that expresses the ever-changing landscape of design may help schools and institutes build curricula specifically for design PhDs.

References


