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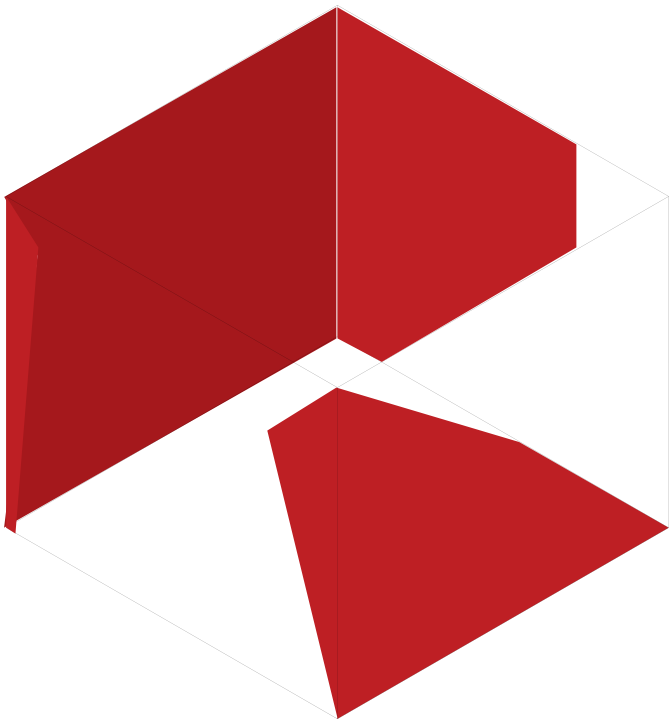

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Design Education, Practice, and Research: on building a field of inquiry

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Abstract: This article reviews how the fields of architecture and design have developed during recent decades and discusses the relations and synergistic interplay between three constituent components: practice, education, and research. Design education has matured both as a field of practice and of inquiry since becoming a fully recognized component of the triadic interplay between these three parts. However, to date, these developments have mainly been discussed in terms of research and creative practice, and have not been discussed in terms of educational practice as an important, mediating factor. We argue that the three components, noted above, have become more equal with one another and more recognized in practice and academia and, further, that a phenomenon of "permeability" of various practices within the "continuum from creative practice to scientific research" has emerged. We further note that a new group of professionals combine the roles of professional practitioners, educators, and field-specific researchers, and argue that these "new practitioners" can contribute to a more robust, self-confident, and dialogue-oriented field of practice and inquiry in architecture and design.

Key Words: Architectural research, design research, design practice, design education, dyadic practice, triadic practice, permeable practice, making disciplines

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Design Education, Practice, and Research: on building a field of inquiry

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Introduction

The role of design has been through many changes, both in academia and in fields of practice. We have observed over the years how the field of design education in Scandinavia has developed and, especially in Norway, has been emerging from a field of education of teachers in creative fields to become a field of inquiry. This article is based on a keynote address we gave at the DRS//Cumulus conference "Design Learning for Tomorrow" in Oslo in May 2013, in which we, with our professional background in architecture, presented our personal view on how architecture and design have been developing from a field of creative practice into a field of inquiry.

We believe in the importance of synergistic relations between contemporary design education, design practice, and design research—not least to inform design research from practice and to inform education from both research and practice. It is also crucial to meet contemporary societal challenges by building design practice on research and the development of knowledge, as well as securing the transfer of knowledge through education. Designers of today, and in the future, will need to be more knowledgeable to be able to navigate in complex knowledge landscapes. We believe that these synergistic relations will generate new, innovative, and robust design practices.

We have been privileged to be able to follow research education in several countries during the last decade. From experience in Scandinavia we came in contact with an even more vocational tradition in Belgium. Our engagement in research education at Sint-Lucas School of Architecture started in 2006. Since then we have had the opportunity to experience there the emergence of a very interesting environment and culture of research, which in a central way also includes teaching and professional practice. We build this article mainly on our own experiences as research educators.

The argument of this article is that design has, over time, matured both as a field of practice and a field of inquiry since design education has become a fully recognized component of the triadic interplay between three parts—practice, research, and education—and especially since these parts have begun to act synergistically in relation to one another. These developments and changed relations have happened in both professional practice and academia. Several authors have discussed these changed relations between academia and creative practice—among them, Michael Biggs and Daniela Büchler, who have in this context observed the emergence of a new community of "practitioner-researchers" (Biggs & Büchler, 2011). We argue that the developments have mainly been discussed in terms of bilateral relations between research and creative, professional practice, and have not been seen as relations among three aspects also including educational practice as an important, mediating component. We have seen how various practices in the field of design have developed over time, the most recent being a "permeable", joined practice of design-education-research, which opens the door to an innovative future for designers. In order to strengthen this development, stronger awareness of this triadic relationship should be shared within a broader community of design practitioners.

Because of the limited format of an article, we decided to build it on two structuring frameworks: on periodization and on use of a metaphor. We shall try to draft a broad time frame spanning from the mid-seventies of the last century to the present time. All systems of periodization are more or less discretionary. Yet, the remarkable can only be perceived and assessed against a certain conception of what is historically dominant (Jameson, 1984, p. 178). We hope our periodization will provide such a conception for understanding

the characteristics of each of the periods of development in design education, practice, and research, and also the interplay among them. In order to emphasize the dynamics of this interplay we shall use the metaphor of a spinning top toy. This type of metaphor maps conventional mental images onto other conventional mental images by virtue of their internal structure (Lakoff, 1987, p. 219). We assume that the proposed spinning top metaphor may be useful while studying the three constitutive components of creative fields like architecture, design, and fine art—practice, education and research—over time. For each period of time they may occupy a different place and a different meaning. The intensity of their "colors" may also change over time.

Our academic main reference for this article is the work of acknowledged American architectural scholar Julia Williams Robinson. She has written that architecture is "an emerging discipline that involves professional practice, research, and teaching." She continues:

> The character and effects of its products—disciplinary knowledge, the forms of disciplinary practices, architectural artifacts—are the responsibility of those within the field. Academics, researchers, and professional practitioners are thus jointly responsible to society and each other (Robinson, 2001, p. 62).

We have closely followed the emergence of such a scholarly culture, but also observed the integration of the different practices by individual practitioners (Dunin-Woyseth & Nilsson, 2011a, 2014). This culture is also leaving various kinds of traces, now in an accelerated velocity and more articulate ways.

We have been able to compare this emerging development with previous and current international trends in research and practice, and also to put it into relation with developments in the Scandinavian countries. From these experiences we have divided the developments into a few periods in order to make the development more comprehensible.

Before the 1990s: Distinct dyadic practices

Architecture and design have a long tradition of close connection and exchange between design education and professional practice. At most schools of architecture and design internationally, professional practitioners form an important part of the faculty and are regularly involved in teaching. This has been the case throughout history and continues to be true (Salama & Wilkinson, 2007, pp. 3-8). But for many years, and until very recently, the relation between professional practice and research has been problematic. Academic, discipline-based research has been regarded as only mildly relevant to professional practice, has been viewed with great skepticism by practitioners, and has played a very limited role in professional practice. At the same time, field-specific design research has not yet been developed (Dunin-Woyseth & Nilsson, 2011b, pp. 82-83).

Until the mid-seventies, research education mainly revolved around PhD projects in which students derived their subject of research from their professional or pedagogical practice. The motivation to take a doctoral degree was most often to conclude a professional career by reflecting on one's professional interests. The supervisors were most often not scholars, but highly esteemed practitioners with very little experience of research (Hjort, 2002, p. 85). The doctoral theses represented a kind of internal discussion based in professional practice, and the attempts to engage in an academic dialogue with other disciplines of research were few. The language used was usually that of informed professional practitioners, not that of broader academic contextualization.

The national authorities put pressure on the schools of architecture in the Nordic countries in the middle of the 1970s to develop a more academic—i.e. research-oriented—profile in their educational programs. For architectural vocational studies, such a demand was a serious challenge because there was no strong tradition for this aspect of the field. The schools of architecture began to look for institutionalized ways to build up such an academically oriented profile, and some disciplines with more theoretically developed foundations, especially the social sciences and humanities, offered models that could influence or simply

be imported into architecture programs. What was considered "normal research" was imitated, with the aim of developing a theoretical foundation rather than discovering what kind of knowledge architects needed or already were developing (Hjort, 2002, p. 85).

Architectural and urban design practice was, compared to established research, mostly regarded as a sort of "applied science," and PhD students were expected to "renounce" their professional backgrounds as designers and architects. In the doctoral theses of the early periods it is difficult to trace any scholarly stance or awareness. Consequently, architectural research lacked any awareness of its own intellectual identity in the "dialogue" between architecture and various other academic disciplines. There were also few examples of the newly acquired doctoral knowledge and insight being applied in professional practice. One could liken the situation to a spinning top toy with three separate fields representing practice, education, and research, each with a distinct color, and the top toy still spinning slowly.

Since the 1970s, research based more on practice and so-called "artistic development projects" has been pursued and discussed at universities in Sweden, but these projects were considered parallel to and not on the same level as academic research. In architecture, which has long been influenced by and borrowed methods and theories from other academic disciplines, academics began discussing the idea of developing a field-specific academic identity and epistemological basis more founded on the specific knowledge modes of architecture. The Association for Architectural Research was founded in 1987 in Sweden, and it soon transformed into a pan-Scandinavian effort and started publishing the Nordic Journal of Architectural Research. As the only peer-reviewed journal for architectural research in Scandinavia for many years, it played an important role for these developments.

Until the 1970s, teaching in vocational fields like design, architecture, and others had been almost totally based on a master-apprentice format. Recognized practitioners stepped down, often only occasionally, into teaching at the vocational schools. Research was a marginal phenomenon with regard to both practice and academia. It would be true to say that practice was dominant, a kind of a "monadic" position compared with teaching and research (Salama & Wilkinson, 2007, p. 5). In the mid-1970s research in the design fields began to establish roots in schools of design and architecture. Teaching emerged as a new "specialized practice". The faculty was increasingly polarized between those who still based their teaching on the apprentice-master relationship and those who tried to extend curricula with new ambitions of introducing knowledge based on research to their students. This research was not always considered either relevant by practitioners or academically sophisticated by academics (Caldenby, 2000, pp. 97-100; Hjort, 2002, p. 86). Even if these pedagogical attitudes did not converge successfully, by the 1990s one could observe the emergence of two distinct dyadic profiles among teachers, the practice-based and the research-based. The top began to spin with more speed and with more varied colors.

The 1990s: Dyadic practices in dialogue

The period of the development starting in 1990 was very much about how a doctoral curriculum was defined for PhD students recruited first from architecture and later from other creative practices of designers and artists. The challenge was to legitimize this curriculum as "academic enough", first and foremost with regard to the academia of the established, discipline-based bodies of decision-makers. In this period, attempts were made to formulate frameworks for what practice-embedded issues were legitimate topics for research. A concept of the "making disciplines" was developed at certain Scandinavian schools of architecture. This concept was meant to describe both the academic standards of research derived from creative practices and the practical relevance of the output of this research.

During the 1990s the discussions on post-modernism and post-structuralism were highly influential to the development of architectural practice and theory. The critique of modernism incorporated ideas from many other fields, and the theoretical debate brought influences from disciplines such as sociology, psychology, history, and philosophy in particular. The advanced conceptual developments were at this time in many cases based in disciplines outside of architecture itself, as may be seen in the architectural writing of that time (See e.g. Hays, *1998*; Nesbitt, 1996).

In the nineties the development of research strategies at architecture firms became more palpable and widespread, with the Netherlands as a hotbed and driving force in the international debate. Important in this context were of course Rem Koolhaas and OMA, who presented systematic approaches and research that was closely tied to architectural design practice and also developed in educational contexts. Several architects and offices published books presenting their work as research on working methods as systematic investigations of contemporary societies and urban situations (See e.g. Bunschoten, Hoshino & Binet, 2001; Koolhaas, 1995; Maas, Rijs & Koek, 1998).

In the late 1990s, architectural scholars began criticizing the approach of adopting theoretical frameworks and methodologies "from the outside", first from the social sciences and then from the humanities. In the Scandinavian context, architectural research was criticized for having taken over theories and methods from other disciplines without reflecting on the specific character of the architectural field (Lundequist, 1999, p. 7).

A discussion about the desirability of a more overtly architectural epistemological stance began at several Scandinavian schools of architecture early in the 1990s. The new university laws in Scandinavia, which demanded a more academically professional model of scholarship (including doctoral programs with organized research education) from all institutions of higher education with university status, provided a direct incentive for this discussion (Dunin-Woyseth & Nilsson, 2011b, p. 84).

In March of 1992, a Nordic network for collaboration in research education for design professionals was established. These schools were in the process of building up their doctoral programs based on mandatory research education. There was a strong need to discuss issues at a broader level than national contexts, possible contents, and methods of research education in the fields of *making* knowledge. The network organized a series of Nordic courses in research education, and these courses contributed to the development of doctoral studies focused on establishing the identity of design thinking (Dunin-Woyseth, 2002b).

Since the beginning of the 1990s, research education at several Scandinavian schools of architecture has been focusing on developing field-specific design scholarship. Candidates have been recruited mainly from the making professions, and research subjects have most often come from the PhD students' own practice-related experience. The concept of the making disciplines emerged and gradually consolidated as one of the epistemological premises for design research education. It also developed from the need to legitimize the doctoral level in these professions within the system of research education in traditional academic fields (Dunin-Woyseth, 2002a).

In the Scandinavian context, the concept of a making discipline is not about a traditional discipline in a strict sense, but rather an attempt to formulate a kind of quality supportive framework for making discourse (Dunin-Woyseth & Michl, 2001). This framework tries to respond to the criteria both of professional relevance and, not least, of a qualified dialogue with the broad community of academia.

The challenge of developing architectural and design scholarship was to comply with the demands of the two worlds: on the one hand to conform to the world of its own profession, and on the other to abide by the rules of the academic world. While the main criterion of viability in the professional world is of relevance to the practice of the professions, viability in academia depends on fulfilling the criteria of research scholarship.

In parallel in Europe, in 1996 TU Delft organized the conference Doctorates in Design and Architecture focusing on the scientific status of design research as the fundamental framework for doctoral research in architecture. The conference presented a widespread, differentiated and specialized field of research areas and topics (Bal et al., 1996a, 1996b, 1996c). The conference combined with a growing awareness of the inadequate research tradition at several universities, and initiatives were taken to establish a tradition of doctoral studies in design research. But it was also noted that both the academic and professional worlds were too conventional in their view of design and too limited by traditional preconceptions of the divisions between science and art, just at a time of increasing awareness of the important role played by design methods and design approaches in dealing with new

challenges and complexities in cities and the built environment.

The Delft conference was followed in 2000 by the international conference Research by Design (Nieuwenhuis & Ouwerkerk, 2000; Ouwerkerk & Rosemann, 2001). It included presentations of both researchers and practitioners, with architects like Ben van Berkel and Wiel Arets making clear and confident contributions, while researchers often seemed uncertain about their legitimacy in relation to the profession as well as to academia. The Research by Design conference was in many ways a milestone in the development of this direction in architectural design research, as it elucidated the issues of scientific research, design, and research by design.

A few years before in UK, Christopher Frayling led a group that in 1997 presented the seminal report *Practice-Based Doctorates in the Creative and Performing Arts and Design.* They argued that the development of research methods in the social sciences, humanities, and traditional science has led to a situation in which a substantial amount of research does not conform to a narrow definition of the traditional "scientific" model of research. It is no longer possible to polarize research efforts as either conforming or not conforming to the "scientific method", which previously was the guarantor of "real research". They concluded that "there is already a continuum from scientific research to creative practice" (Frayling et al., 1997, p. 15).

In the 1990s, an important feature was a growing awareness of the potential of designerly ways of thinking as a prospective, equal-status contributor to knowledge production, not least in relation to the new developments in contemporary society. More critical use of the theoretical and methodological frameworks of the established academic disciplines in architecture-derived research projects resulted in production of doctoral work at the level of more mature interdisciplinary research. New intellectual self-confidence could be observed in numerous doctoral theses of that period. Research and development of new ways of conducting research based on methodologies specific to the field was being encouraged in architecture schools.

Through the nineties the profiles of architecture and design faculties began to be more nuanced than the traditional division between practitioners and theoreticians. The core of teaching design still relied on the master-apprentice relation between teacher-practitioners and students, but those educators who were interested in research no longer appeared to represent an opposite pole in education, as their understanding of research came ever closer to practice amidst increasing attempts to develop field-specific scholarship. The dyadic profiles of teachers were no longer mutually exclusive, but complemented one another to form a full spectrum of education, practice, and research. The toy top spun faster and its colors were still recognizable as different.

The 2000s: Dyadic practices becoming extended

Around the turn of the millennium there was a renewed and intensified discussion about the specific traits of architectural research in relation to practice, and within this discussion came the critique that advanced academic architectural research was too focused on disciplines outside of architecture. A lot of research had its focus on philosophy, sociology, literature, and cultural studies, and it had not succeeded in defining a system of assessment internal to the discipline of architecture. In this context, Alejandro Zaera-Polo wrote: "Often this has resulted in some of the most advanced research in architecture looking like bad movies, bad sociology, or bad literature" (Zaera-Polo, 2005, p. 4).

In this context Zaera-Polo emphasized the importance of exploring architecture-specific knowledge. Contemporary research was, he asserted, directed to fields of knowledge that are either supra-disciplinary (economics, sociology, philosophy) or sub-disciplinary (engineering, construction management). There are great possibilities to instead produce knowledge by combining and articulating both these levels, and this can be done through research that is engaged in the utilization of architectural practice and processes of transforming the built environment.

In architectural practices like Foreign Office Architects, MVRDV, Chora, and UN Studio, architectural tools and imagination—now complemented by new technology—were increasingly being used to analyze the complexity of contemporary society and explore relations between disparate things in urban contexts. In the post-graduate program for architects at the Berlage Institute in Rotterdam there has been a strong focus on advanced architectural practice in combination with research, and many graduate and doctoral student projects have been encouraged to use architectural design tools and design projects to investigate knowledge fields and disciplines close to architecture and urbanism (See e.g. Dean, 2005).

In the Nordic countries, the network for collaboration continued to professionalize research education, and between 1999 and 2001 the network organized a Scandinavian research education program. It was decided that the next phase of collaboration should be committed to preparing young researchers to meet the demands for new types of research and broader competence (Dunin-Woyseth, 2002b). A new Nordic pilot study course was arranged in 2003 with the intention to introduce doctoral students to the international discussion on new modes of knowledge production.

It was through the now-canonical work "The New Production of Knowledge" by Michael Gibbons et al. that the notion of *transdisciplinarity* became widely spread. The book emphasized that practice contexts are also sites for knowledge production focused on and following specific problems, and where both problems and solutions are formulated beyond any single discipline. This transdisciplinary knowledge production also used methods and tools from practice, not least including design thinking and tools, and the authors called this mode of knowledge production Mode 2 in relation to the traditional, academic Mode 1. The protagonists of transdisciplinary research maintain that in spite of its growing importance and extent, it does not replace the traditional forms of research such as disciplinary research. The founders of the Mode 1 / Mode 2 movement emphasize that in order to master the tasks of Mode 2, one has to get through an apprenticeship in Mode 1. One has first to develop a kind of intellectual identity of Mode 1 in order to be able to acquire multiple cognitive and social identities for practicing research in Mode 2 (Gibbons et al., 1994; Nowotny, 2004).

Transdisciplinarity and Mode 2 have appealed to design scholars as a new "in-practice model" of research that has great similarities with design. This mode opens for various ways in which the design professions could contribute to knowledge production. Bryan Lawson even states that it is possible that architects and designers unknowingly "are just ahead of the game rather than behind it after all" (Lawson, 2002, p. 114).

In the middle of the first decade of the new millennium, the concept of transdisciplinarity also began to be discussed in the international field of architectural theory. The concept of transdisciplinarity was also placed in relation to the call from practice for a stronger discipline of architecture. And here transdisciplinarity offers an understanding of the combination of various disciplines as a means to establishing shared methods or concepts, while simultaneously insisting on the value of distinctly disciplinary identities, tools, techniques and technologies. According to Mark Linder, transdisciplinary work can be seen as navigating a contested field of discourses that has been claimed and structured by different disciplines (Linder, 2005). Transdisciplinary work demonstrates the flexibility of disciplinary identities, and the negotiations between disciplines produce reconfigured modes of practice.

The growing awareness that there already existed a "continuum from scientific research to creative practice" in various fields of inquiry resulted in the acceptance of some PhD theses in which doctoral students integrated their own creative practice into their dissertation projects—in not only illustrative but also explorative and argumentative ways. In Sweden, since the 1990s there have been broad developments of research projects—on both doctoral and senior research levels—that can be considered practice-based or "by design", but the discussions on these issues have a longer history based in the discussions of artistic development since the seventies. The schools of architecture in Scandinavia have been open to integrating different disciplines in their research approaches. In the late 1990s and early 2000s, several doctoral projects started at the schools that had clear elements of using creative practice as a means of inquiry (See e.g. Grillner, 2000; Pedersen, 2004; Sevaldson,

2005; Zimm, 2005; Akner-Koler, 2007; Runberger, 2008), and new approaches and research cultures began to develop.

Two of the founders of the Academy for Practice-Based Research in Architecture and Design (AKAD) in Sweden, Katja Grillner and Lars-Henrik Ståhl, stated that practice-based research in architecture may be related both to more conventional "professional" practices as well as to alternative, "academic" practices (Grillner & Ståhl, 2003, p. 16). AKAD can be said to have particularly emphasized and developed academic practice, meaning experimental practices based in academia and pursued through teaching, exhibitions, and publications. But it did also build strong relations to creative disciplines other than architecture, including literature and creative writing, sound art, film, and visual culture. For AKAD, the specificity of architectural design and the professional practice of architecture seemed to play a less important role. Simultaneously there has been a growing interest in research among architecture firms. Several Scandinavian offices, including White, 3xN, Arkitema, and Sweco, are increasingly using research to support innovation and creative design (Nilsson, 2013a), and are developing research strategies and collaborations with academia that involve both research and teaching. The interest in research competence and methodologies more closely related to design is paving the way for even more fruitful developments.

In the past, the development of education and doctoral scholarship in architecture and design in the Nordic countries was driven by national university laws, thus prompting the establishment of organized research education in the region. The Bologna-Berlin guidelines of 2003 extended such development to a broader European context. The European guidelines seem to stimulate doctoral research more towards Mode 2 than towards Mode 1 knowledge production, thereby supporting closer interaction between research and practice.

Within the context of these discussions, the Sint-Lucas School of Architecture, together with the Network for Theory, History and Criticism of Architecture (NETHCA), organized an international conference in 2005 called the Unthinkable Doctorate (Belderbos & Verbeke, 2007). This conference was a step forward in the process of formulating the school's vision of research and setting up its Research Education Program.

In September 2003, the Bologna-Berlin policies recognized doctoral studies as the third cycle in European higher education. For the Sint-Lucas School of Architecture, this meant developing their tradition of teaching into a new culture—a culture of research and doctoral scholarship. The idea was to develop experimental, practice-based concepts for this research, rather than to attempt to emulate the discipline-based research that is characteristic of the academic fields (Janssens, 2006, p. 9; Verbeke, 2008, pp. 12-13). The intention of this process was primarily to support younger teachers with no research experience in defining their research interests on the basis of their double practice as professionals and as teachers of architecture.

A preparatory research education program was set up with a series of Research Training Sessions (RTS) with visiting professors responsible for various themes. These sessions were research-educationally successful in building bridges between the participants' everyday experiences as professional practitioners and teachers, and helped in searching for opportunities to make these experiences the basis of their prospective field-specific research.

A new research approach based in practice, namely *research by design*, would be given priority in future developments. This kind of research would more strongly engage the practitioners who have the greatest potential to develop their own field of expertise. The challenge within this mode was how to engage in dialogue with other knowledge producers, whether from academia or elsewhere. A certain apprenticeship in academic research provides various useful generic and transferable skills that may help in establishing and fostering a dialogue with reciprocal respect for each researcher's knowledge field.

Four years after the first conference at the Sint-Lucas came the international conference Communicating (by) Design (Verbeke & Jakimowicz, 2009). It turned out that many of those who had attended the RTS contributed papers and presentations based on their ongoing doctoral research by

design. In May 2013 a third conference was held at Sint-Lucas School of Architecture entitled Knowing (by) Designing (Verbeke & Pak, 2013). Its aim was to explore the developments in research evolved around creative practices, focusing specifically on architecture, design, arts, and music. The proceedings of this series of conferences from 1996 to 2013 can be regarded as documenting the growing awareness among practitioners, teachers, and researchers that field-specific design scholarship should more self-consciously and more courageously seek its own, more field-specific mode.

While the first Delft conference seemed to express the chaotic disparity of the field at the time, the second introduced the term and the concept of *research by design*. The first Brussels conference went further, posing the question: Is it possible to build doctoral scholarship in design in a more field-specific way, for instance by use of design methods? The following Brussels conference accepted as a point of departure that this question had been answered—that yes, it was possible. The next challenge was how to communicate this new scholarship, and to whom and by what means to communicate it. At this time a dialogue with design education had begun and its role in both practice and research was more widely acknowledged. The most recent Brussels conference provided even more radical epistemological grounds for design scholarship and for the need to negotiate these grounds with practice, education, and research, and even to challenge the boundaries between them.

While these conferences served as a European forum in which the variety and dynamics of developments in design scholarship have been given their broad expression, we have also had the opportunity to observe a similar development, as it were in a nutshell, while affiliated with the Sint-Lucas School of Architecture in Brussels and Ghent (2006-13). We have had the privilege of closely following the developments in research and research education, and how these have been considered of relevance and potential for education and practice in architecture and design. We have been able to explore how transdisciplinary approaches could be used in research in the creative professions of architecture and design. We have seen research involve various degrees of transdisciplinarity, using disciplinary, interdisciplinary, and transdisciplinary components in the research design of doctoral projects as well as in the designerly components per se. Some projects tend to apply more academic approaches of interdisciplinarity (practice-disciplinary knowledge-practice), while others adopt a more practice-internal *modus operandi* (practice-to-practice) (Godts, 2009; Janssens, 2009). Yet all can be discussed in the terms of transdisciplinarity, as they include forms of knowledge outside the academic disciplines and their interest is anchored in their creative professions.

As the proceedings of the European conferences suggest, the profile of vocational education has evolved to another phase, and our own experiences from Sint-Lucas coincide with this. There is much evidence to suggest that the spectrum of educational practices has become even more nuanced, that practice-based educators have started using teaching as practice experiments, closely related to research experiments, and that research-based teachers are including practice in their increasingly field-specific research. The various epistemological stances and pedagogical attitudes on the spectrum have begun to permeate one another. The polarization seen in previous decades is no longer a given, and the dyadic profiles of teachers have been extending towards the triad of practice, education, and research. The top toy has been spinning with a greater variety and nuance of colors.

The 2010s: From dyadic to triadic identities and exchanges between education, practice, and research

According to our periodization of the development of design as a field of inquiry, the most recent period started just a few years ago in 2010. It coincides with the initiation of a research program under the name of Architecture in the Making: Architecture as a Making Discipline and Material Practice, which was awarded a Strong Research Environment grant for 2011–16 from Formas, the Swedish Research Council. This research environment, in a national collaboration among the four schools of architecture in Sweden, aims to develop theories and methods from the perspective of, and in collaboration with, architectural practice to strengthen architectural research (Nilsson, 2013b). In this program, the training of new researchers recruited from both academia and the creative practices converges with research

collaborations with post-doctoral fellows and other senior researchers as well as with practitioners. Together they develop "permeable practices" of design practitioners and research practitioners in the creative fields. Field-specific scholarship is being developed in this milieu with a stronger self-confidence that promises new, justifiable, field-specific academic independence instead of the earlier tradition of "emulated scholarship."

Research within this environment includes doctoral projects, post-doc projects, and projects for senior researchers. Some of the doctoral projects are industrial PhDs in cooperation with architectural offices or part-time projects for architectural practitioners. Among the post-doc projects, one currently finds international collaboration projects in which architects elaborate theories and methods from practice-based PhDs (e.g. Janssens, 2012), as well as projects run by idea historians on theoretical and technical aspects of the practical use and professional discussion of parametric design tools. Projects are also set up as new collaborations between different departments, including both practitioners and theoreticians from the fields of architecture, the arts, and philosophy. Seminars, symposia, and conferences are arranged around central themes, and material from the projects and events has started to be published in various formats, e.g. as a theme issue of the *Nordic Journal of Architecture* on "Alteration" (Anstey & Gabrielsson, 2012). So within the environment of the research program, researchers with several different perspectives on the field are encouraged to meet, exchange views, and develop frameworks based both in traditional academia and in the emerging approaches of research by design and practice-based investigations. One of the projects within the "making research environment" focuses on the need for adequate assessment of the output of innovative, field-specific design research (Dunin-Woyseth & Nilsson, 2012, 2013a).

While we have argued for field-specific, practice-based research in architecture and design, we have acknowledged that in order to achieve recognition for the results of this research among both practitioners and researchers of architecture (and other scholars), the principles for assessing this kind of research should be discussed in a broader debate between design practice and (design) academia. Research by design is what we recognize as field-specific research, wherein various practices—research and design practices, discursive and making practices, hermeneutic and material practices—are "permeable" and demand specific criticism and assessment better tuned to this "permeability" between modes of practice. These "permeable practices" work over the borders between research and professional practice, making some previous distinctions obsolete and putting scientific inquiries and creative work in new relations. Therefore, we claim that adequate assessment of research results in practice-based, creative fields should build on a double judgment of both practitioners and scholars through negotiations between connoisseurship and criticism (Dunin-Woyseth & Nilsson, 2012; Eisner, 1976). We recognize teaching at the doctoral level, as supervisors or assessors, as one such "permeable practice" between professional and educational practice.

We see "making scholarship" as a broad and inclusive field of inquiry where there is room for traditional research and the most innovative experiments led by research by art or design. We also see in this new landscape of making scholarship a place for hybrid modes of research that could occupy a variety of different positions on the continuum from scientific research to creative practice.

As an example of the current situation of the developments we have sketched, we would like to point to a brief study we conducted at Sint-Lucas. In 2012, seven teachers at Sint-Lucas School of Architecture were awarded the degree of Philosophiae Doctor (PhD), graduating from three different academic institutions: KU Leuven in Belgium, RMIT in Australia, and Chalmers University of Technology in Sweden. When they graduated we asked some of them to reflect on their triadic practice—as professional, teacher, and researcher—which has become one of the results of their doctoral studies (Dunin-Woyseth & Nilsson, 2014).

As mentioned earlier, architectural education has a long tradition of close connection and exchange between teaching and professional practice. During the developments in research training for practicing architects and teachers, the dual practice of being teachers and professionals was complemented by a third aspect—the practice of research—and the

doctoral studies have extended this professional-educational practice of recent Sint-Lucas graduates.

As doctoral alumni they have returned to their roles as academic teachers and university faculty. These people have indeed changed the teaching situation at the school. Their new triadic expertise will promote new, adaptable, conscious, and creative architectural practice, and their new research skills have contributed to the teaching of new generations of architecture students at the school.

As practicing architects enrolled in a PhD program, the combination of practice and teaching led to similar kinds of reflection on their development in both endeavors. For some, traditional practice seemed to have exhausted its potential to inspire further creative development and therefore improved teaching competence. For others, explorative design delivered answers that called for a more theoretical discussion. Yet other of the Sint-Lucas teachers were satisfied with this “hybrid practice” in co-operation with other creative fields, but did not have the language or a repertoire of good experiences on which to build a better, more self-aware teaching approach. PhD programs thus offered these teachers new opportunities for personal and professional development as both teachers and practitioners.

We found that their extended profile from the dyadic (professional and teaching) practice has expanded to become a triadic one (professional, teaching, and research) and that each role has enriched the others. We have particularly observed that all of them are interested in continuing their teaching, but in a new way. This teaching promotes more innovative educational approaches, more intellectual curiosity, better communication, and a stronger intellectual self-confidence. For graduates of the program, the addition of research to complement the professional and teaching practices has changed the identity of their professional practices—they say it’s no longer possible to return to a traditional practice. They mention how more traditional practice has transformed into critical practice, transdisciplinary practice, “spatial artistic practice”, etc. Common traits are that research has contributed to more articulated teaching, stronger self-confidence and a broader repertoire of methods. They now see educational situations as laboratories in which themes are explored, as places for disseminating research, and as opportunities to influence the future practice of architecture (Dunin-Woyseth & Nilsson, 2014).

We dare to assume that the last decade’s developments have made architectural research and research education more influenced by field-specific practice, but also promoted a new form of architectural and design practice that is more responsive to its time, with the capacity to be an agent of change in contemporary society and culture.

These thoughts may lead us to conclude that the three components of the creative fields of architecture and design have become more equal with one another, that they are more “present” in the field, and that they are more recognized in practice and academia. The new aspect of this development is the phenomenon of the “permeability” of various practices within the “continuum from creative practice to scientific research”. The spinning top shows more energy in its movement, and its colors are blending together.

Conclusions: A spinning top toy

We started by referring to a statement by the highly-recognized American architecture and design scholar Julia Williams Robinson. She formulated it in 2001 when the international debate on building a viable field of inquiry in architecture and design was in its third decade.

In the decades prior to the mid-1970s, design research was not regarded as relevant to professional practice. Design scholarship of that era consisted largely of mature practitioners reflecting on their life's work. Practitioners were also teachers, but the primarily profession-directed education was not regarded as a contribution to research within the profession. We can see that the spinning top had only one color, that of practice with its own reflection, a kind of monologue in the language of profession.

From the mid-seventies until 1990, in attempts to comply with various national policies, this "internal scholarship" was developed to include a timid, uncritical dialogue with academia, while using references to theories and methods from established academic disciplines. This kind of scholarship developed in a vacuum between weak relevance to the creative professions and often-naïve use of intellectual tools borrowed from academia. The field gained a new and bleak but slowly growing component of research.

The next decade, beginning in the 1990s, brought a stronger intellectual self-confidence to design scholars who attempted to fill this vacuum on the one hand with stronger connections to practice, and on the other with more critical use of the theoretical and methodological tools borrowed from other academically-established fields of inquiry. Attempts were made to develop field-specific modes of research. Teaching was slowly becoming a recognized arena of developing scholarship. Julia Williams Robinson recognized these three constitutive arenas of the field of architecture: professional practice, research, and teaching. She conceived them as more or less separate and thinks that all the various contributors—academics, researchers, and professionals—are jointly responsible for developing the field. At that time, a decade ago, the potential for these aspects of the field to play together was becoming clear. The third color—education—had been added to the spinning top.

In our practice as design research educators, we have noticed that a new group of professionals has emerged in the past decade. They combine all the three aspects—of professional practitioners, of educators, and of field-specific researchers—in one compound skill set. This group of "new practitioners" will not replace academics, researchers, and professional practitioners, but they can together contribute to a more robust, self-confident, and dialogue-oriented field of practice and inquiry in architecture and design. The spinning top has more colors and spins more dynamically in the new decade.

This article presents a diachronic review of how the field of design has developed, and a discussion of the synergistic interplay among its three constituent components: practice, education, and research. We hope it can give design practitioners a broader awareness and stronger confidence about the meaning and potential of the various forms of practice in their work—the professionally specialized practices as well as the "permeable" ones.

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