This article proposes a reflection on Nigel Cross notion of "Designerly ways of Knowing". In the first part of the text we dedicate our attention to the articles published by Cross in 1982 and 2001. The first one, "Designerly Ways of Knowing", was published in Design Studies and the second, "Designerly Ways of Knowing: Design Discipline Versus Design Science", was published in Design Issues. In the second part of the paper we describe a pedagogic proposal for a postgraduate course in Architecture and Urban Planning developed as a joint project between two Brazilian universities. Its curriculum and structure are strongly based on design practice and stem, in a good measure, from the notions advocated by Cross.

1. **Introdução**

This article proposes a reflection on Nigel Cross notion of "Designerly ways of Knowing". Our purpose here is two fold: to highlight some elements that constitute, as a whole, a possible response to what is believed to be the designers knowledge problematic characteristic, the experiential knowledge, which is often tacit; to discuss how this "problematic characteristic" is nowadays being taken into account in pedagogical proposals such as a Brazilian Pedagogic Project we describe here. The first part of this paper is thus dedicated to discuss Cross' vision on experiential knowledge. His underlying assumption is that, as also sustained by authors such as Schön (1983), Scrivener (2000) and Foqué (2010), what designers know about their own problem solving processes remains largely tacit knowledge – they know it the same way a skilled person 'knows' how to perform that skill. (Cross, 2001)

In the first part of this text, we dedicate our attention especially to the articles published by Cross in 1982 and 2001. The first one, "Designerly Ways of Knowing", published in Design Studies, claims the intention to establish the theoretical bases for treating design as a coherent discipline of study. It is here that Cross takes up the argument for a 'third area' of education – design – formerly outlined by Bruce Archer in his 1979 article "Design as Discipline" in the same journal. The second article, published in Design Issues, "Designerly Ways of Knowing: Design Discipline Versus Design Science", outlines a brief review of what he calls "the desire to 'scientize' design", which could be traced back to ideas from the 1920's on.

In the second part we describe a pedagogic proposal for an Architecture and Urban Planning postgraduate course in which elaboration one of the authors took part. One of the premises in this project was based on Cross claiming that, just as the other intellectual cultures in the sciences and the humanities concentrate on the underlying forms of knowledge peculiar to scientist or the artist, so we must concentrate on the “designerly” ways of knowing, thinking and acting. It goes on citing Cross remembering that as Schön and others, many researchers in the design world have realized that design practice does indeed have its own strong and appropriate intellectual culture.

2. **Designerly Ways of Knowing – circumscribing a third culture**

Nigel Cross’ 1982 article refers to a principal outcome of the Royal College of Art's research project on 'Design in general education' which resided in the recognition of a neglected “third area” of education, namely Design (with a capital D). The other two areas are science and humanities. To the author, contrasting design with the sciences and the humanities is a useful, if crude, way of beginning to be more articulate about it. Education, in any of these 'cultures', entails three aspects: the transmission of knowledge about a phenomenon of study, a training in the appropriate methods of enquiry and an initiation into the belief systems and values of the 'culture' Cross goes on proposing that, if we contrast
the sciences, the humanities, and design under each aspect identified above, we may become clearer of what we mean by design, and what is particular to it.

Each culture is dedicated to study, reflect and analyze a category of phenomena. If sciences are devoted to the natural world and the humanities addresses the human experience, in design we are interested in the man-made world. As a consequence, the appropriate methods to investigate relevant events in each culture emerge from this reasoning, leading to the proposition that each field would be more acquainted with a set of methods. In the sciences, for instance, the more suitable investigation procedures involve controlled experiment, classification and analysis. Humanities works better with methods employing analogies, metaphors, criticism and evaluation. Design, in its turn, engages its researchers in activities like modeling, pattern-formation and synthesis.

In his 2001 article, Nigel Cross proposes a brief review of some of the historical concerns that have emerged with respect to the relationship between design and science. According to him, the preoccupation regarding the comparison between design and science emerged strongly at two important periods in the modern history of design: in the 1920s, with a search for scientific design products, a demand to producing works of art and design based on objectivity and rationality, that is, on the values of science. In the 1960s, heralded as the “design science decade” by the radical technologist, the concern for scientific design process has its origins in the emergence of new design methods and the application of novel, scientific, and computational methods to the novel and pressing problems of the Second World War. The Conference on Design Methods, held in London in September, 1962, generally is regarded as the event which marked the launch of design methodology as a subject or field of inquiry.

The author remembers two protagonists: Buckminster Fuller who called for a “design science revolution” based on science, technology, and rationalism to overcome human and environmental problems that he believed could not be solved by politics and economics; Herbert Simon, who outlined “the sciences of the artificial,” which would consist in the development of “a science of design” in the universities: “a body of intellectually tough, analytic, partly formalizable, partly empirical, teachable doctrine about the design process.”

According to Cross, in the 1970’s there emerged a backlash against design methodology and a rejection of its underlying values. Derived from the social/cultural climate of the late-1960s—the campus revolutions and radical political movements, the new liberal humanism, and the rejection of conservative values led to what Rittel and Webber characterized, in design and planning, as “wicked” problems, fundamentally unamenable to the techniques of science and engineering which dealt with “tame” problems. The Design Research Society’s 1980 conference on “Design: Science: Method” was a mark in this decade. Cross points out that this event provided an opportunity to air many of the considerations mentioned above. The general feeling from that conference was, perhaps, that it was time to move on from making simplistic comparisons and distinctions between science and design; that perhaps there was not so much for design to learn from science after all, and that perhaps science rather had something to learn from design.

The shaping of Design as Discipline continues in the 1990’s with Donald Schön explicitly challenging the positivist doctrine underlying much of the “design science” movement, and offered instead a constructivist paradigm, point out Cross. Schön criticized Simon’s view of a “science of design” for being based on approaches to solving well-formed problems, whereas professional practice throughout design and technology and elsewhere has to face and deal with “messy, problematic situations.” Schön proposed, instead, to search for “an epistemology of practice implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty, instability, uniqueness, and value conflict,” and which he characterized as “reflective practice.” A synthesis between Simon’s and Schön perspectives would lead to a preliminary conclusion. According to Cross, the study of design could be an interdisciplinary study accessible to all those involved in the creative activity of making the artificial world. Design as a discipline, therefore, can mean design studied on its own terms, and within its own rigorous culture. It can mean a science of design based on the reflective practice of design: design as a discipline, but not design as a science. This discipline seeks to develop domain-independent approaches to theory and research in design. What designers especially know about is the “artificial world” - the human-made world of artifacts. What they especially know how to do is the proposing of additions to and changes to the artificial world. Their knowledge, skills, and values lie in the techniques of the artificial.

In the second part of this article, we describe a pedagogical project for a post-graduate course in Architecture and Urban Planning developed in Brazil. The proposal is very much based on Cross’
3. **Architecture and City: a Brazilian Pedagogical Proposal**

In 2010, a Brazilian team of lecturers and researchers at FAU-Mackenzie, in São Paulo, SP, had elaborated a Pedagogical Project for a joint post-graduation Architecture and Urban Planning course to be delivered at UniRitter, university located in Porto Alegre, RS.

Strongly based on design practice and the “designerly ways of knowing”, it confirmed to some extent Cross’ prevision made in his 2001 article, according to which, if the concerns regarding the relationship between science and design had emerged in the 1920’s closing its cycle in the 1960’s, a new cycle of design-science concerns appears to be reemerging in the 2000s, now, evidently, with a different perspective. Here the focus is on academic research - rather than production of objects - with its requirements of rigor, precision and clarity in textual expression. This was precisely the problem addressed in the pedagogical proposal mentioned above. Although on the one hand the authors had a strong desire to value the design practice role in the educational process, on the other hand it was clear that an academic endeavor was being undertaken, which meant we had to pay a strong attention in what characterizes good practices in academic research in areas of design practice, such as architecture and urban planning.

The place set for this dynamic between design practice and design research in an educational project was the so called "laboratory". It was set up as a strategy for creating opportunities to develop theory and practice simultaneously throughout the course. In the laboratory, the project activities are undertaken within a broad perspective, in a interdisciplinary approach. The laboratory could be understood as a scenario for the greatest part of the architectural teaching, where design students, teachers dedicated to design practice and teachers dedicated to theoretical discussion would interact over the projects being developed by students. In a post-graduate environment, it signifies a complex and challenging experience, once it could not function solely as a professional practice simulator. The laboratory the Brazilian team had in mind meant a place where architectural design and didactic strategies interact in order to satisfy the requirements of academic production and research. There, in the lab, the students would learn, while engaged in design activities, about employing design methods of research and develop specific research abilities. The projects would always have a two-fold goal: to design and to reflect about the process of designing. The laboratories were imagined, as it is possible to infer, making reference to the traditional architectural ateliers and, in part, suggest the idea of academic experimentation through the process of making.

In order to reach this objective, two investigation lines were structured: **1. Design as Research and 2. Research as Design.** The first one holds disciplines related to theory, and provide the bulk of theoretical framework, concentrating disciplines and research aligned with architectural and urban planning criticism, history and historiography. It approaches specifically: a.) Processes and methods in building up academic research; b.) Theoretical framework regarding specifically the architectural project, its forms of representation, its historical strands and modern and contemporary interpretations; c.) Theories, forms and processes of space production of the urban space, with focus in the modern and contemporary modes of urban intervention, its theoretical matrix and new tools.

The second investigation line, Research as Design, holds disciplines related to practice, exercising the application of concepts and theories related to the design process. This line nurtures all forms of speculation regarding the act of design as a mode of building knowledge. It emphasizes: a.) The design practice and its relations with the academic theorization; b.) The value of the architectural repertoire and its mutations in methodological processes in design and teaching; c.) Initiatives of urban requalification and urban design.

The proposed curriculum is organized in a set of three mandatory laboratories and two optional laboratories. Every laboratory articulates the two investigation lines. The disciplines included in the mandatory labs compose a minimum and rigorous nucleus contemplating the relationship between theory and practice. The mandatory labs are: a.) **Lab1** – Scientific Work – Processes and Methods; b.) **Lab2** – Architecture and Urban Planning Design – processes and methods; c.) **Lab 3** – Patrimony, environment and culture.

The optional laboratories are: a.)**Lab4** – Contemporary Dwelling; b.) **Lab5** – Infrastructure, Connections and Connectivity.
4. Final remarks

The Brazilian Proposal, “Architecture and City”, endorses Nigel Cross position in the following considerations: academic research has its tradition constructed by the exact sciences, but Design is not an exact science. In Cross terms, "what designers especially know about is the "artificial world"-the human-made world of artifacts. What they especially know how to do is the proposing of additions to and changes to the artificial world. Their knowledge, skills, and values lie in the techniques of the artificial (not "the sciences of the artificial."). This is one of the arguments that support the option for the 5 Laboratories structuring the pedagogical project described above.

In line with Cross, the Brazilian project seems to recognize that, on one hand, design has its own distinct intellectual culture, which is emphasized in the first investigation line: Design as Research, where the possibilities of building knowledge via design processes may be experimented. On the other hand, shows attention regarding the controversy over the nature of valid design research, particularly in the context of postgraduate education, that, in Brazil means a course strictly dedicated to training academic researchers (Pós-graduação Stricto Sensu in Portuguese language). The careful position adopted in the course structure is revealed in the second line of investigation: Research as Design, where more traditionally academic activities are performed.

It seems valid to suggest that the "Laboratory format" respond to some measure, to Cross and other author's concerns regarding the rigor and quality of research produced in areas of design practice. Articulating activities of design practice with methods of academic research in the same place at the same time, it stimulates the reflection and debate about the knowledge produced in the context of doing, in architecture and urban planning design process. According to Nigel Cross (2002), we are still building the appropriate paradigm for design research, which will be helpful, in the long run, to design practice and design education, and to the broader development of the intellectual culture of our world of design. In our view, the Brazilian pedagogic project is a relevant contribution towards this collective goal.

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References


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