METHODS FOR REFLECTION FOR DESIGN-DRIVEN RESEARCH

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This text illustrates the methodology for design-driven research that is developed in the design-based doctorate program [PEP- Programm Entwurfsbasierte Promotion] at the Technical University of Berlin.

The design-based doctorate program [PEP] is organized and executed by Prof. Dr. Ignacio Borrego, Prof. Ralf Pasel, Prof. Jürgen Weidinger (TU Berlin); Prof. Donatella Fioretti (Kunstakademie Düsseldorf) and Prof. Dr. Matthias Ballestrem (HCU Hamburg). It is dedicated to the design disciplines, in particular architecture and landscape architecture. The design-based doctorate creates a direct reference to architectural practice and other design practices, which drives the further development of research methods, especially through the interaction of theory and practice.

Design is a means of acquisition scientific knowledge especially specific to prospective disciplines such as architecture and landscape architecture. The goal is to use this capacity as a research tool. PEP pursues an integrative approach to design, education and research, in which the design process provides a new access to knowledge.

The aim is to examine the interface between architectural design, construction methods and materiality, taking into account their spatial, social and ecological consequences, and to develop and demonstrate suitable, innovative research methods.

In design-based research, the implicit knowledge that is inherent in the creation process of design, which is mostly based on practice, is made explicit.
Design-based research reflects on self-design practice as such and is reflected on the basis of one's own projects and design processes.
Both design-based and the more specific practice-based approaches are suitable to produce knowledge. The materialization implied in a practice-based research introduces a deeper immersion in the design process, but the core of the knowledge production is situated at any design level.

This design-based doctorate is ultimately about iteratively encircling a topic area

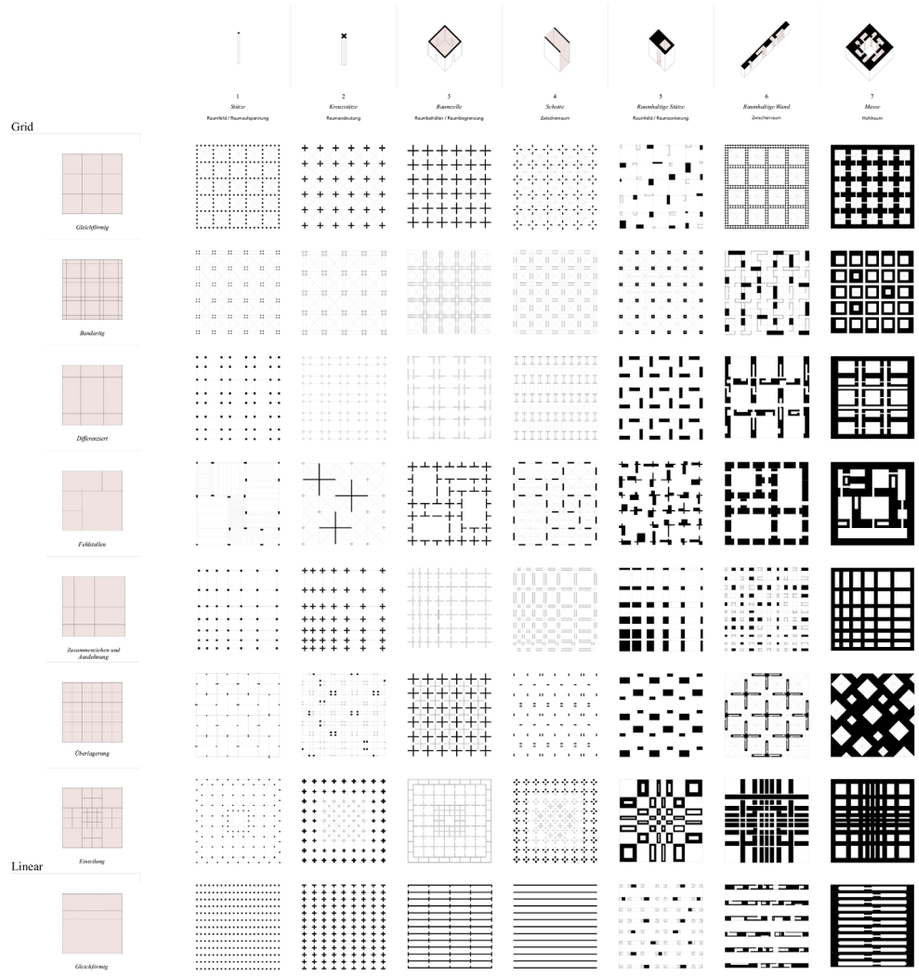

Image title: Taxonomic Association Field
Author: Simon Banakar
PhD title: Robuste Strukturen. Autonomie und Raumbildung horizontaler Raumstrukturen

through continuous design and through the design process to such an extent that a concrete and well-founded discourse result becomes explicit.

The fundamental question of a research work, i.e., the actual doctoral topic, consequently results from precisely this compression process of creative work, which is carried out, tested, simulated and, if necessary, implemented based on the development of new and thematically relevant design projects. It is crucial that the design-based doctorate goes beyond the subjective approach to knowledge and makes a concrete contribution to the respective research field.

In our case of design-based research in PEP, Doctoral candidates must have already produced a body of work, i.e., a sufficient number of very good designs or very good realized projects. A design-based doctoral project within the framework of PEP consists of two intertwined and interdependent parts, i.e., a design part and a written part. The design components of the design part are not only illustrative, but represent independent research results.

For design-based research, PEP has formulated a procedure that structures the process of extraction of knowledge from design practice, makes it comprehensible and assessable. The doctoral candidates must pass through the following steps, i.e., presentations with specific objectives:

PEP 0: Application presentation.
The applicants present the outline of their proposed doctoral studies.

PEP 1: Design projects, leading interest, outline of the research question and corresponding methodological approach.
The doctoral candidate presents the deepening of the doctoral studies. It should be shown how and which new projects are employed to answer the research question. Criteria for investigating the research question are being elaborated.

PEP 2: Specification of the research question by old and new projects.

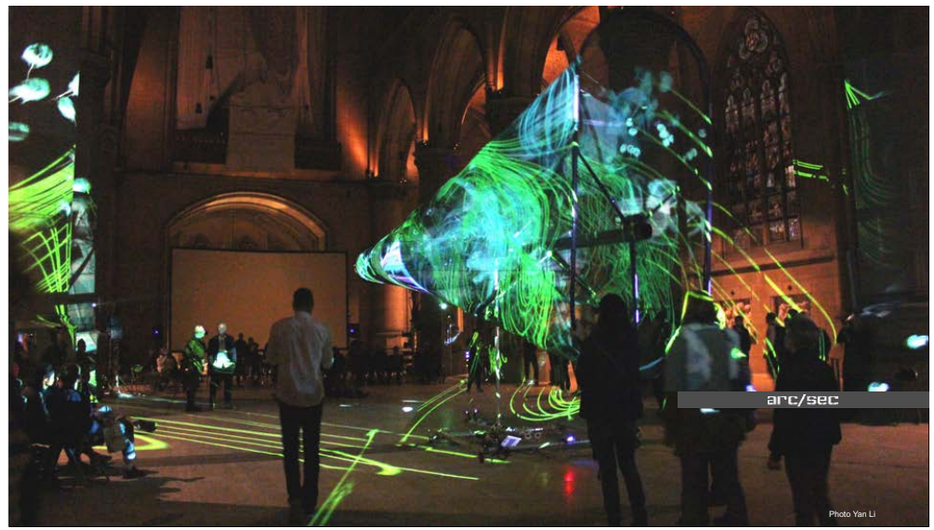

Image title: LightScale II
Author: Uwe Rieger
PhD title: Real Time Reactive Architecture and User Interaction in Tangible Data Environments

New projects contribute to the clarification of the research question. Reflections on the new projects sharpen the argumentation and form the basis for those questions that will be investigated through the next projects.

PEP 3: Clarification of the argumentation by old and new projects and initial comparison of the found results with existing knowledge stocks on the research topic.
New projects contribute to the clarification of the research question. Reflections on the new projects and initial comparisons of the found results with existing knowledge stocks on the research topic sharpen the argumentation and form the basis for future studies.

PEP 4: Further specification of the argumentation by old and new projects and in-depth comparison of the found results with existing knowledge stocks on the research topic, draft of a structured presentation of the entire investigation.

More projects, repeated reflection on the projects and an in-depth comparison with related knowledge stocks to sharpen the candidate's own results. In preparation for PEP 5, a structured presentation of the entire study is to be prepared.

PEP 5: Presentation of the entire study as a milestone presentation.
The milestone presentation has the structure of approx. 75 % of the doctoral studies, including preliminary studies through the candidate's own body of work, working out the topic of the doctorate (research question), examination of the doctoral topic by means of at least three projects developed in the process of the doctoral studies and reflection on the projects until the research question has been clarified and comparison of the results with related positions of the discourse in theory and practice.

PEP 6: Scientific defence including an exhibition.
Furthermore, the combination of the scientific defence with an exhibition is requested, which includes preliminary work and those design results that have made significant contributions to the gain in knowledge. The exhibition must include at least three projects relevant to the topic of the doctoral thesis, which have been developed within the framework of the doctoral studies and which show the design-based development of the work.

With this research-by-design approach, the design projects serve as case studies and sources at the same time, with your own design work being constantly compared to existing references and practices and using methods that go beyond that are suitable for locating the project thematically and in the context of the state of the question.
The other way round, the findings out of design-based research can have an impact on the design practice and, in turn, promote a reciprocal sharpening of architectural creativity.

It is particularly illuminating that this form of knowledge production through research-by-design complements established scientific practices and that expanded knowledge can be achieved through this form of knowledge. The potential of creative and design-based or practice-based research that emerges here impressively shows the extraordinary possibilities that can be combined with this young form of knowledge generation in the future.

Image title: 3D printing on a custom knitted fabric with tuck stitch and drop stitch pattern
Author: Agata Kycia
PhD title: Self-Shaping Textiles: Form Finding of Tensile Surface Structures through 3D Printing on Prestressed Fabric