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基于设计的研究作为知识生产的新模式——以“基于设计的博士项目”为例

Design-based Research as a New Mode of Knowledge Production: PEP as an Example

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摘要：介绍柏林工业大学“基于设计的博士项目（PEP）”，以弥补在建筑和风景园林学科研究领域的不足。为此，提出了“狭义设计”的概念。与可以定义为“规划”的广义设计概念不同，此概念更加关注具体、精准的设计项目。叙述了该项目基于认知理论的发展简史，并涉及基于设计研究的特殊方法和加入该项目的申请流程。

关键词：基于设计的研究；风景园林学；“狭义设计”概念；建筑和风景园林研究方法；PEP 结构

Abstract: This paper introduces the Programme for Design-Based Doctorates (PEP) at the Technische Universität Berlin. It describes the gap that the PEP Programme seeks to fill in the field of research in landscape architecture and architecture. To this end, the Programme proposes a narrow concept of design, focusing on concrete and precise design projects that differ from a broader concept of design, which can be defined as planning. A brief history of the development of design-based research clarifies the epistemological bases for the Programme. Additionally, the special methodology for design-based research projects and the procedure for joining the Programme are also described.

Keywords: design-based research; landscape architecture; definition of “designing in the narrow sense”; architectural and landscape architectural research method; structure of the PEP

1 基于设计的博士项目的设立初衷

笔者所讨论的设计学科为风景园林学和建筑学。其主要涉及将空间作为开放场地和建筑物的相互作用，并以具体而精确的方式改变这些空间。我们将风景园林和建筑设计中的核心领域称为“狭义设计”。

那么，如何在设计学科的核心领域创新？显而易见，在新的设计和实施项目中会产生创新[1]。那么，风景园林学和建筑学在高校研究中又扮演了什么角色？哪些方法对于“狭义设计”领域的研究具有意义？

作为设计学科的风景园林学和建筑学在德国的工业大学中有着悠久的学术传统，尤以柏林工业大学（TU Berlin）为甚。在建筑学和风景园林学中，对高校学位体系的第 3 个阶段（博士阶段）进行的研究加以检验，仅有少数的博士研究项目涉及狭义设计。总体而言，多数建筑学和风景园林学的博士研究关注的领域是为设计过程提供信息的学科，如结构工程、建筑物理、历史、经济、社会或生物等。这些有益于设计过程的科学只能被描述为设计学科“know what”的内容。而对于许多从事风景园林和建筑教学及研究的院系，设计过程本身并不是方法论应用的一部分。这些院系关注其他方向和方法，如技术科学、社会科学和自然科学等。

我们必须认识到：风景园林学和建筑学作为设计学科的自我认知与前文所提及的“know what”的学科大相径庭。“know how”，即设计技能的知识，却少有研究。而将“know what”转化成“know how”的研究更是凤毛麟角。这个事实揭示了上文观察中的一个矛盾：风景园林和建筑学科的创新产生并发展于新的设计和实施项目。可见，高校对于“know what”的研究与通过设计和项目的创新成果背道而驰[2]25。

为解决这个问题，柏林工业大学于2016年设立了基于设计的博士项目（德文Programm entwurfsbasierte Promotion， 英文Program for Design-Based Doctorats，简称PEP）。建立者分别为柏林工业大学的伊格纳西奥·博雷戈（Dr. Ignacio Borrego）教授、拉尔夫·帕塞尔（Ralf Pasel）教授和于根·瓦丁格尔教授以及杜塞尔多夫艺术学院（Kunstakademie Düsseldorf）的多娜泰拉·菲奥雷蒂（Donatella Fioretti）教授、汉堡海港城大学（Hafen City University Hamburg）的马赛厄斯·巴勒施特雷姆（Dr. Matthias Ballestrem）教授。

PEP被认为是“know what”式博士的必要补充，同时是设计学科知识更新的形式。这个项目的目标是以科学的方式为设计类学科，比如风景园林学和建筑学，提供创新性的知识贡献，并清晰流畅地加以描述和展示。个性化成果包括关于设计的独立策划或美学途径、个人独立设计方法或个性化的设计语言。这些成果基于设计师先前的项目并在研究期间积极融合到新设计中来检验。这些研究项目的成果会与其他相关研究进行比较探讨，最终成果在设计师联盟（实践联盟）公开，并通过出版论文执行高校程序，还将予以展览。

PEP融入欧洲和国际“基于设计的博士项目”网络，并实现博士候选人和导师的交流。PEP官方语言是德语和英语，联络人是柏林工业大学的拉尔夫·帕塞尔教授和于根·瓦丁格尔教授。

2 “狭义设计”的定义

PEP是为设计学科的博士候选人量身定做的。博士候选人的工作可以被描述为“狭义设计”。

在PEP中，狭义设计被理解为以空间“设计”（Gestalt）为目标的设计过程，这个空间由某些特征定义（如今，Gestalt成为英语语汇。设计理论证明，设计是由多个部分组成并且大于或异于各部分之和）。设计的狭义含义是具体地表现一个整体作为空间的存在，并且呈现复杂的，涉及美学、伦理学、程序性与技术性等各个层面的特点。这些设计不能单单通过语言、数据表示，也就是说那些“know what”的科学的方法和衡量系统是不足的。在设计过程中，这些设计必须通过图表媒介传达或以模型表现，从而使其具有可描述性。狭义设计通常是设计的反复、深入和优化。提纯的过程是作为狭义设计的条件，并可以在预见的设计结果中体现。相反，并未经历这种深化提纯过程的设计成果易被看作只是将设计概念快速地进行可视化表达。因此，PEP是针对风景园林和建筑学科的具体、精准的空间设计。

如今，我们可以观察到entwerfen内涵的缺失。entwerfen狭义和广义定义的模糊是由于英文design的统治性地位。design包括了一系列的行为并且被越发频繁地使用。而实际上，狭义设计必须要区别于广义设计。德语语境中，planen用于描述广义设计，而entwerfen与gestalten①用来定义狭义设计。

广义设计的首要工作包括如分析、组织、协调和总体抽象的规划概念。事实上，这些工作仅指概念层面，而更加深入的设计层面的工作，如定义材料、比例等则并无必要。因为规划（广义设计）是用于投资准备或建立规划原则，为未来的设计方案设立条件。广义设计可以是用于城市设计和风景规划的二维土地规划，或用于交流或协商的组织策略和概念。总体而言，广义设计的内容包括通过文字、量化数据、图解、地图、二维规划和快速的试验性可视化成果②进行呈现。这些广义设计的相关内容不会在PEP中涉及，而是由许多其他的规划学科和“know what”的学科的博士授予机构进行研究。

3 当前认知理论方法为基于设计的研究指明新路径

狭义设计聚焦在设计实践能够挖掘那些其他科学无法完整描述或者被忽略的成果。人们往往从与设计相关科学的单一角度，对设计的空间进行描述。过分强调学科内容，而缺乏对设计过程的了解，从而造成许多设计问题。这是由于其他科学的兴趣和方法的发展与设计偏差较大，从而无法完整描述相对于那些“know what”的单一科学来说更高层面的设计[2]27。甚至基于“know what”的建筑理论和风景园林理论，同样面临科学门类划分问题。

对新知识探索的认知理论讨论范围广泛且门类繁杂，为此只能大略梳理基于设计研究的发展历史。

1972年霍斯特·瑞图奥（Horst Rittel）[3]提出“棘手问题”（Wicked Problems），指一些形式非常复杂的、无法通过第一代解决方法应对的问题。瑞图奥将第一代“问题解决方法”理解为：一个研究假设论点（研究问题）及其科学诠释的实证主义分离。建筑和风景园林设计的问题，是可以被看作棘手问题的，因此无法通过第一代“问题解决方法”来解决。第一代“问题解决方法”要求自然科学或工程科学的研究要细化研究问题。例如，风景园林学的研究通常需要处理防滑路面、植物的生长条件或公园的访问频率等问题。这些研究问题和相应的研究方法可以以瑞图奥的第一代“问题解决方法”来描述。这些基于第一代问题解决方法的知识很有用，但是对于复杂而创新的设计而言还不够。

如何解决建筑和风景园林中的棘手问题？针对棘手问题，瑞图奥提出了第二代解决方法，即通过瓦解假设论点的原因语境与诠释语境之间的这个分离。为了解决棘手问题的复杂性，需要研究者“行动”。在“行动”过程中问题会变得清晰，在“行动”中和“行动”反应中，找到适宜的方法。

在社会科学领域，也会面临棘手问题，且已经建立了不同的第二代“问题解决方法”的“行动”。一个例子是扎根理论（Grounded Theory）③的方法。这个理论通过在数据收集和反射以及数据分类之间不断切换，更准确地将理论的形成与正在研究的现象、对象相对应。行动研究（Action Research）④方法的特点是利益相关者的参与以及调查人员和研究人员之间的合作，以实现共同的变革。相应地，变化的情况与观察、描述和假设交替出现。

另外，最近基于设计研究的比利时理论家约翰·韦贝克（Johan Verbeke）提出了设计扎根理论（Designedly Grounded Theory），并整理了其中各个要素之间的关系。汉斯·约格·罗恩伯格（Hans-Jörg Rheinberger）指出：作为新思想和新理论发展的起因和催化剂，工艺与事物是“认知科学的对象”（Epistemic

Objects）[4]。其他理解基于设计研究的著作，比如赫伯特·亚历山大·西蒙（Herbert Simon）在1969年提出的人工科学（Sciences of the Artificial）的概念；唐纳德·顺恩（Donald Schön）在1983年提出的反省实践（Reflective Practitioner）⑤的概念[5]；海尔格·诺沃特尼（Helga Nowotny），皮特·斯科特（Peter Scott）和米迦勒·吉本斯（Michael Gibbons）在1994年提出的模式2（Mode 2）⑥的知识[6]；以及奈杰尔·克罗斯（Nigel Cross）在2001年提出的设计师认知法（Designerly Ways of Knowing）[7]。这些概念可以作为认知科学的实践转向。在研究语境下的专业实践不仅可以理解为先前理论知识的应用，相对地，还应该被理解为获取知识的工具，有时还应该调整和矫正理论知识。

PEP实现了与实践结合的想法。基于设计的研究通过设计过程获取知识（类似扎根理论中的数据获取）并通过设计结果反映实现的转变（类似行动研究）。PEP阐释了设计是认知科学的研究对象。基于设计的研究涵盖了那些“know what”科学无法提供方法和工具的内容。而这些内容是PEP认知理论的核心。当一个想法在空间上得以实现的时候，我们需要从新的视角来理解，而这个新的视角也是无法回避空间而存在的。

从这个角度来看，建筑和风景园林学需要获得新的支撑，而这种支撑来自外部，就是站在设计学科的外围，批判地审视“know what”的科学。

4 基于其他项目发展的PEP方法性结构

PEP建立在墨尔本皇家理工大学（RMIT）的实践研究研讨会（Practice Research Symposia，简称PRS）的经验和方法基础上。原RMIT的建筑和设计学院副院长马塞洛·斯坦姆（Marcelo Stamm），现任教于美国弗吉尼亚理工大学（Virginia Tech University），是PRS的倡导者，努力将该研究作为“设计语言能力”，以易于理解的方式描述独立发现的内容，从而可以与设计学科进行交流。

如同所有柏林工业大学新录取的博士，PEP在柏林工业大学需要同样正式的注册程序。为使基于设计的研究能够满足高校对博士的要求，PEP的核心团队拟定一个流程：由设计实践把控研究工作的结构，并使之可以理解、评价和描述，实现对博士生的指导。PEP的博士候选人必须展示：他们已经通过一系列的实践项目和设计拥有了设计能力。候选人的研究成果需要通过新的设计展现。这个实践和反映的过程需要重复若干次。PEP在此基础上增加了自己的优先事项和质量保证的补充标准。

PEP与RMIT有重要区别。1）PEP沿袭中欧传统，参与者是免费的，而RMIT是需要缴费的。类似于盎格鲁—撒克逊国家的大学（Anglo-Saxon Universities）⑦，其费用等同于硕士学位的学费。在该体系中，独立的研究人员、导师与财务费用之间存在根本性冲突，由于财务压力使得研究难以进行。2）对候选人的要求更严格，需要他们基于设计有所发现并与现有知识进行比较。根据笔者审阅PRS的博士论文，可以看出其缺乏个体研究与现存知识比较的步骤。因此，候选人对自己博士论文课题的历史发展要有一个宏观的概述。同时，候选人要明确自我立场与其他设计师和研究者最新立场的区别。这可以通过与其他研究者的项目进行比较完成，并且应该考虑其他研究者的言论。

5 PEP的方法论框架

PEP框架中的博士论文选题涵盖迄今为止在设计实践方面尚未解决的理论问题。这些问题与当下实践领域的讨论相关，同时也对相关学科未来发展具有意义。研究问题的范围涵盖了与设计相关的各个领域。

基于设计的研究目标是对个人作品的评价，从而有助于设计学科的讨论，并产生新的价值。PEP要求观察个人的作品，即观察设计成果和设计操作，通过批判性研究，带着相应标准进行明确而深入的论文写作。另外，作为PEP博士候选人来讲，有必要完成和参与一些实际项目。这些作品可以是设计成果或者是建成项目，其中应该包含了自我探索、自我发展、具有自身特色的个性化设计主线。PEP强调保证实践作品以批判的眼光甚至是设计精英的标准来衡量。设计实践的特殊性和设计水平由PEP的核心专家组裁定。如果设计师缺乏设计能力，而想在设计中发现一些独立的或者新的东西是不可能的。因此，那些刚刚硕士毕业的候选人，只有在能证明异常突出的设计能力的前提下才能被PEP录取。

在博士研究期间将获得的理论知识进行实践性转化，并根据独立的标准进行评判和优化。另外，PEP要求候选人通过与其他设计学科的认知状态进行比较，在讨论中找到自我特有的贡献并且表明与现存认知的不同，以体现自身价值。这个工作步骤不仅需要通过文字反映，还要通过新的设计实践反映。例如，博士研究的课题是公园地形设计的独特方法。这个独特的地形设计方法需要被记录，并且基于现实项目被描述成设计原则。这些独立的设计原则需要与其他作者或设计师提出的地形设计的方法比较，使得地形设计艺术、理论研究及其他相关想法的研究现状可以被归纳学习。研究者独特的地形设计方法和与现存地形设计方法的区别能够更精准地呈现。在地形设计中运用对地形设计新的、独立的精准理解，需要将新形成的设计原则在新的设计项目中应用。这一系列的设计、设计原则的形成，与现有知识的比较和在新设计中的运用应该反复实施，从而得到更加深化、基于设计的、独立的设计方法的理解。

为使这个过程可以被认知和制度化，PEP的候选人须参与6次研讨会。这些研讨会以候选人的研究为主并且要求发表个人观点，同时还有可能与其他候选人和教授进行互动。在研讨会的框架下，所有报告会通过圆桌讨论的形式由设计专家现场指导。这个过程将以交流和互相评判的方式进行。圆桌讨论至少有两位柏林工业大学的教授和其他的专家参与。因此会通过“预审”进行指导。

6次研讨会将对候选人提出如下要求：PEP1：设计者作品的兴趣点；PEP2：设计者作品的主线和博士研究假设论点的来源；PEP3：通过新的设计和对已有发现的描述来对假设论点进行研究；PEP4：比较个人创新发现和现有的知识状态；PEP5：通过对自身设计作品的标准和与现存知识状态的比对进行具体展示；PEP6：学术答辩并进行公开展览。

博士候选人的个人辅导是在每次讨论会之间进行的。在第 5 次 PEP 研讨会后，博士候选人需要递交博士论文。而在第 6 次汇报(相当于最终的学术答辩)后，博士论文需要公开展览，才能最终毕业。

这里描述的方法框架只代表了一个阶段性状态。我们将以此为基础，通过对博士生的指导和与其他基于设计研究的关系网交流沟通中积累经验，从而更加细化和优化 PEP 的方法框架⑧。

注释 (Notes)：

① 译者注：entwerfen 与 gestalten 中文直译均为设计，为动词，对应的名词分别为 Entwurf 和 Gestaltung。区别在于前者强调设计师意图的表达，类似于画草图；而后者则强调对形式的推敲。

② 译者注：例如拼贴、意象图等。

③译者注：扎根理论是一种定性研究的方式，其主要宗旨是在经验资料的基础上建立理论。其创始人为 Barney Glaser 和 Anselm Strauss。

④ 译者注：行动研究是指以某些行动对组织系统的影响为主要对象的研究活动。强调实践者在行动中为解决自身问题而参与进行的，有计划、有步骤、有反思的研究。其创始人为 Kurt Lewin 和 Jacob Moreno。

⑤ 译者注：反省实践是指是在学习的过程中能够对行动进行反思的能力。

⑥ 译者注：模式 2 是来自科学社会学的术语，指的是知识的产生方式。

⑦ 译者注：指英国的大学。

⑧ 更多信息请查看（Further Information）：https://www.pep.tu-berlin.de/。

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（编辑 / 刘玉霞）

1 Reasons for establishing the PEP

This text deals with the design disciplines of landscape architecture and architecture. The main subject of landscape architecture and architecture involves working with spaces as interplays of open space and buildings and changing these spaces in a concrete and precise manner. We define this core area of design in landscape architecture and architecture as "designing in the narrow sense".

How does innovation arise in this core area of the design disciplines? It is obvious that innovation is created mostly through new designs and new, completed projects[1]. So what role, then, does university-based research play in the field of landscape architecture and architecture? What methods are useful for research in the area of "design in the narrow sense"?

The design disciplines of landscape architecture and architecture have a long academic tradition at German universities of technology in general and the Technische Universität Berlin in particular. If one examines the doctoral research that has been undertaken in architecture and landscape architecture in the context of the third cycle of academic training, it turns out that only a few doctoral research projects are awarded in the narrower field of designing. In general, the majority of doctoral research projects in architecture and landscape architecture deal with subject matter related to other sciences which provide information for the design process, such as structural engineering, building physics, history, economics, sociology or botany. This scientific input for the design process can be described as the "know what" for the design disciplines. At numerous university departments involved in the teaching and research of landscape architecture and architecture, the design process itself is not part of the applied methodology. These departments focus on other, e.g. technical-scientific, social-scientific and natural-scientific, orientations and methods.

We must bear in mind that the self-conception of the design disciplines of landscape architecture and architecture differs significantly from that of the aforementioned sciences of the "know what". The "know how", i.e. the knowledge of design skills, is rarely the topic of research. It is even rarer that new contributions to the "know what" are developed on the basis of the "know how" of design knowledge. This fact reveals a contradiction to the observation made above, that innovation in the field of landscape architecture and architecture mostly comes into the world and into the discourse through new designs and implemented projects. In this sense, the academic research conducted in the sciences of the "know what" and the innovative findings that are achieved through designs and projects seem to exist in two separate worlds[2]25.

The PEP at the TU Berlin was founded in 2016 with the aim of eliminating this problem. PEP is an abbreviation of the German name *Programm entwurfsbasierte Promotion*. The English version of the name is Programme for Design-Based Doctorates. The founding members of the Programme are Prof. Dr Ignacio Borrego, Prof. Ralf Pasel and Prof. Jürgen Weidinger from the TU Berlin, Prof. Donatella Fioretti from the Kunstakademie Düsseldorf and Prof. Dr Matthias Ballestrem from the Hafen City University Hamburg (HCU).

The PEP sees itself as an essential complement to the doctoral studies of the "know what" disciplines and as a new form of knowledge generation in the design disciplines. The aim of the Programme is to describe and present the innovative knowledge contributed by the design disciplines in landscape architecture and architecture in a scientific manner, i.e. so that this knowledge is coherent and comprehensible for others. In this Programme, the individual findings of designers are the subject matter of research. Individual findings can range from individual programmatic or aesthetic approaches to design, individual design methods or individual formal design languages. These findings are examined on the basis of the designers' previous projects and during the research with the active integration of the designers' new designs. The results of these research projects are discussed within the discourse and compared with related findings of others. In the end the results are made available to the community of designers ("community of practise") and to the academic discourse in the form of a published dissertation and a public exhibition.

The PEP is integrated into European and international networks for design-based doctoral studies and cultivates exchange between the doctoral candidates and supervisors. The languages used in the PEP are German and English. The spokespersons of the PEP are Prof. Ralf Pasel and Prof. Jürgen Weidinger, both from the TU Berlin.

2 Definition of "designing in the narrow sense"

The PEP was designed for doctoral candidates in the design disciplines whose work can be described as "designing in the narrow sense".

In the PEP "designing in the narrow sense" is understood as the design processes that aim for a spatial "Gestalt", which are defined by certain characteristics. (Today, Gestalt is part of the English language, after Gestalt theory proved that a Gestalt is something that is made of many parts and yet is somehow more than or different from the combination of its parts.) Designs in the narrow sense embody a holistic spatial presence and represent a complex and inextricable penetration of aesthetic, ethical, programmatic and technical aspects. These designs cannot be depicted through language or numerical values alone, in other words through the methods and measurement systems of the "know what" sciences. During the design process, these designs must be depicted through the medium of graphical representations or three-dimensional models in order to make them sufficiently describable. Designs in the narrow sense are always the result of a repetitive and progressive deepening and optimisation of the design. This refinement is a condition for designing in the narrow sense and can be seen in the respective design result. Contrastingly, design outcomes that have not received this deepening refinement process are easy to recognise as quickly made visualisations of a conceptual idea. In this sense, the PEP is about the concrete and precise spatial designs of landscape architecture and architecture.

Today in the German language, a loss of clarity in the meaning of the term *entwerfen* (in English to design) can be observed. This blurring of the narrow and broad definitions of *entwerfen* has something to do with the dominance of the English term to design, which comprises a range of different activities and which is being used more and more frequently, because the global language today is English. The narrower definition of design must be differentiated from the broad definition. In the German language, the term *planen* (to plan) is available for describing the broad definition of design, and the terms *entwerfen* and *gestalten* can be used for the narrow definition.

The broad definition of design primarily also covers activities like analysing, organising, moderating and generating abstract planning concepts. Indeed, these activities consist of conceptual stages, but a progressive deepening of the design all the way to the determination of all proportions and materials is not necessary in planning. This is not necessary because planning (= broader sense of design) is about preparatory investigations or planning principles aimed at framing the conditions for future design solutions in a narrower sense. Examples of the broad definition of design are two-dimensional land-use plans for urban design and landscape planning or organisational strategies and concepts for communication and moderation. In general, the content of designs in the broad sense is communicated through texts, quantitative numerical values, diagrams, maps, two-dimensional blueprints and quickly drawn test visualisations. This broad definition of design is not dealt with in the PEP. There are already numerous PhD programmes for these broader planning disciplines and the sciences of the "know what".

3 The current approaches of epistemology that are opening new avenues for design-based research

The focus on the subject area of the narrow definition of design is based on the assumption that practical design experience allows for findings that previously, through the use of methods from other sciences, could not be adequately described or could be overlooked. Designed spaces are generally described from the perspective of the sciences of the "know what" in a one-sided manner. These sciences tend to overemphasise their own discipline, and they lack an understanding of the design process, which is to solve uncountable problems with a suitable spatial composition (= Gestalt). This is due to the fact that interests and methods from other sciences were developed at a distance to designing and therefore are not qualified to adequately describe the higher-level role of Gestalt in relation to the perspective of individual sciences of the "know what"[2]27. Even architectural theory and landscape architectural theory, which are based on the concepts of sciences of the "know what" have the same categorical problem in investigating designed spaces.

The discussion in epistemology surrounding the various points of access to new knowledge is extensive and ramified. This is why the development of the foundations of design-based research will only be described somewhat simplistically in this text.

It was in 1972 that Horst Rittel[3] coined the term wicked problems for issues that are so complex that they cannot be dealt with using problem-solving methods of the first generation. Rittel describes the problem-solving methods of the first generation as the strict positivist separation between the research hypotheses (research question) and the scientific justification of the hypotheses. The problems associated with design in architecture and landscape architecture are wicked problems, so follwing Rittel, so those problems in architecture and landscape and can not be solved by problem-solving methods of the first generation. Problem-solving methods of the first generation, e.g. natural sciences or the engineering sciences request to narrow the research question very closely. For example research in landscape architecture often deals with e.g. slip resistance of paths or growing conditions for plants or visit frequency in parks. Those research questions and the corresponding research methods can be described with Rittel's term of a problem-solving setting of the first generation. This specialist knowledge based on problem solving settings of the first generation can be helpful knowledge for design but is by far not enough to create new and sophisticated design solutions in architecture and landscape architecture.

How to solve wicked problems in architecture and landscape architecture? For dealing with wicked problems, Rittel therefore suggests second-generation methods that are characterised by the removal of the separation between the context of origin and the context of justification of a hypothesis. To tackle the complexity of the wicked problem demands the researcher to act. In process of acting the understanding of the problem becomes clearer and suitable methods can be found in the acting and in the reflection of acting.

Wicked problems are also dealt with in the social sciences, where various second-generation problem-solving methods "of acting" have already become established. One example is the method of *Grounded Theory* (founders: Barney Glaser and Anselm Strauss), which strives to tailor the theory formation perfectly to the researched phenomenon/subject through a continuous alternation between data collection and reflection and categorisation of the data. The method of *Action Research* (founders: Kurt Lewin and Jacob Moreno) is characterised by the incorporation of relevant stakeholders and cooperation between the researchers and the research participants with the aim of bringing about a mutual change. Accordingly, phases of the change of the situation alternate with the phases of observation, description and hypothesis formation.

Additionally, in recent years, the Belgian Johan Verbeke, one of the theorists of design-based research in Europe, put forth the concept of *Designerly Grounded Theory*, which deals with these relationships. Hans-Jörg Rheinberger described artefacts and things that are the reason and catalyst for new ways of thinking and the development of new theories as *Epistemic Objects*[4]. Other milestones on the way to the understanding of design-based research include the concept of the *Sciences of the Artificial* by Herbert Simon 1969, the concept of the *Reflective Practitioner* by Donald Schön 1983[5], the concept of *Mode 2* Knowledge by Helga Nowotny, Peter Scott and Michael Gibbons 1994[6] and the concept of *Designerly Ways of Knowing* by Nigel Cross 2001[7]. Overall, these concepts can be described as a practice turn in epistemology. From the perspective of the practice turn, professional practices in the context of research are not only understood as applications of previously developed theoretical knowledge, but in complete contrast to this, practices are regarded as tools for gaining new knowledge, as an addition and sometimes an adjustment or even correction to the theoretical knowledge.

The PEP subscribes to these ideas of the practice turn. Design-based research gains insights from the process of designing (as with the data collection of the method of grounded theory) and reflects on the achieved change through the design outcomes (as with the method of action research). For the PEP, designs and projects represent epistemic objects. Design-based research is able to cover areas where the instruments and methods offered by the sciences of the "know what" are insufficient. This represents the epistemological core of the PEP. If an idea is embodied as a spatial artefact, we understand new aspects that we would not have been able to recognise through reflection without making this artefact.

From this perspective, new contributions to the science of architecture and landscape architecture should arise that critically examine the contributions of the external sciences of the "know what" (from outside of the design disciplines).

4 The development of methodological structures of the PEP based on the work of other programmes

The PEP builds on the experience gained from and methods developed by the Practice Research Symposia (PRS) of the RMIT Melbourne. Marcelo Stamm, former Deputy Dean of the School of Architecture and Design at RMIT and today at Virginia Tech University USA and one of the pioneers of the PRS, describes this process as an endeavour to achieve a linguistic ability to describe independently identified subject matter in a comprehensible manner so that an exchange with the discourse of the design disciplines can occur. This methodological approach provides a proven and helpful basis for the development of new design-based programmes.

As with all new doctoral studies at the TU Berlin, doctoral research undertaken in the context of the PEP is also subject to the doctoral research guidelines of the TU Berlin, which specify the formal procedures to be followed. In order to make design-based research possible in the context of the doctoral research guidelines, the core committee of the PEP has developed a procedure that makes the acquisition of knowledge from design practice structured, comprehensible and assessable, pioneering a new approach in the supervision of doctoral research. PhD candidates in the PEP must demonstrate that they have developed a mastery of design through a progressive series of projects and designs. The findings in the candidates' own work are reached through the investigation of new design practice. This process of practice and reflection is repeated several times. The PEP has added its own priorities and supplementary criteria of quality assurance to this foundation.

One important difference to the RMIT Programme is the fact that, following Central European traditions, no fees are charged for participation in the PEP. By contrast, the RMIT charges a semester fee. The amount is the same as the tuition fees that are charged for master's degree courses, which are common in Anglo-Saxon universities. We feel that this system poses a fundamental conflict between the independence of the researchers/reviewers and financial duties.

A second important adaptation is the decision to require all candidates to more intensively compare their own design-based findings with the current state of knowledge. In the PRS dissertations that have been read by the author, this step of positioning one's work in relation to existing knowledge comes up short. This is why the PEP requires its doctoral candidates to prepare an introductory overview summarising the history of the development of the individual dissertation topic. Another essential requirement is the identification of the differences between the candidate's own position and the most recent positions of other designers and authors. This comparison can be made with projects from other authors and should also take into consideration texts from other authors.

5 Methodological framework of the PEP

Dissertation topics in the PEP deal with an aspect of design practice that has yet to be covered, are considered in the context of the current discourse of the community of practise and are of importance to the future of the disciplines involved. The field of research questions covers all areas related to design.

The aim of design-based research is to evaluate one's own work in order to contribute new ideas to the discourse of the design disciplines. The PEP requires that the observation of one's own work, i.e. the observation of design outcomes and also design actions, is expressed in words through critical investigations, and thereby made explicit and further developed into a thesis with the corresponding criteria. In addition, it is necessary that the doctoral students have already produced a practical work that comprises several design outcomes or completed projects and is characterised by recurring and developing lines in the work. The PEP places strong emphasis on ensuring that this practical work is characterised by a critical level of design skill, or even design mastery. The special individuality and quality of the design practice are assessed by the core committee of professors of the PEP. Without mature design skill, it is unlikely to find something independent or new through the design process. This is why candidates who have recently finished their master's degree can only be accepted into the PEP if exceptional design skills can be demonstrated.

During the process of doctoral research, further designerly implementations of the thesis are prepared on this basis and then evaluated and optimised based on independently developed criteria. In addition, the PEP requires that the doctoral students position their own contribution in the discourse through comparison with other knowledge of the design disciplines, identify the differences to existing knowledge and, in this way, make their own contribution distinguishable from the current field of knowledge. These steps are taken both through textual reflection of the candidate's own design practice and through practical design reflection through new designs. For example: if the topic of a doctorate research is an individual approach to create topographies in parks, this individual way of topography making has to be recorded and described by design principles on the bases on hitherto existing individual projects. These individual design principles have to be compared with design principles of topography making of other authors and other designers. Therefore the state of the art of topography making, in theoretical studies as well as in related projects of others, has to be scanned and studied. By this, the individual peculiarity of the researcher's way of designing topography and the difference to the existing ways of making topography can be distinguished and formulated more precisely. Using this new and more precise understanding about the individual approach in designing topography the researcher needs to apply the newly formulated design principles in new design projects successfully. This sequence of designing, formulation of design principles, comparing them with the body of knowledge and to exert them in new designs should be repeated several times to get a deepened and design based understanding of the individual design approach.

In order to guide and structure this process, the candidates are invited to take part in six symposia. The symposia support the individual work of the candidates, challenge them to get to the heart of their own subject matter and offer the opportunity to exchange ideas and experience with other candidates and professors. All presentations in the context of the symposia are attended and evaluated by a panel of design experts. Comments and interim evaluations are written. The panel consists of at least two professors from the TU Berlin and additional external experts. In this manner, the current state of the work is evaluated through a "peer review" process.

The candidates must fulfil the following requirements for the six symposia: PEP 1: Interests in the work of the designer; PEP 2: Lines in the work of the designer and derivation of the hypothesis of the doctoral research; PEP 3: Investigation of the hypothesis through the creation of new designs and the description of findings; PEP 4: Comparison of one's own findings with existing related fields of knowledge; PEP 5: Concretisation of the findings through criteria from the candidate's own design work and from the comparison with related fields of knowledge; PEP 6: Defence of the doctoral thesis and exhibition.

Individual supervision of the doctoral candidates' work is provided between the symposia. After the doctoral students have participated in 5 PEP symposia, the written dissertation is submitted. In the context of the 6th presentation, which corresponds to the defence of the doctoral thesis, the doctoral students make the designs and artefacts produced in the process of the doctoral research publicly accessible through an exhibition.

The methodological framework described here represents an intermediate stage. We assume that the experience to be gained over the coming years in the supervision of doctoral students and the exchange with other networks for design-based research will lead to the refinement and optimisation of the PEP's methodological framework.

(Editor / LIU Yuxia)