

探访中国 数字建筑设计 工作坊 DIGITAL WORKSHOP IN CHINA

袁 烽 尼尔·里奇 编著

Edited by Philip F. Yuan and Neil Leach



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在过去的几年中，中国出现了一大批数字建筑设计工作营。它们如雨后春笋般在全国各地涌现，并取得了显著的成果。数字建筑设计工作营的热潮为什么会产生？这些工作营究竟在做些什么？这本书以极富创意的形式为读者呈现了这些数字建筑设计工作营成长壮大的历程，并分析了这一热潮涌现的现实性与必然性。

Over the past few years there has been a significant increase in the number of digital workshops offered in China. They have proliferated all over China and have produced some remarkable results. But why has this phenomenon happened? And what kind of work are they producing? This fresh and original book traces the development of these workshops and analyses why they have become so popular.

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数字新建筑

New Digital Architecture

徐卫国 _ 中国建筑学会数字设计专业委员会主任 & 清华大学建筑学院

Xu Weiguo _ Director of Chinese Digital Architecture Design Association & Tsinghua University

有些场景实在令人难忘,2004 年我与尼尔·里奇合作策展国际青年建筑师作品展(中国国际建筑双年展的一部分),邀请了卡尔·楚·马克·格尔索普、格雷格·林恩、杰西·瑞瑟、哈尼·莱仕德等 13 位建筑师及 7 个著名的建筑教育机构,如英国伦敦建筑联盟学院(以下简称 AA)的设计研究实验室(简称 DRL),美国哈佛大学设计学院(简称 GSD)等参展,展出了当时世界上用数字技术设计出的最好的建筑作品。展场在北京朝阳区 UHN 楼盘工地,我们耗费了巨大的人力和物力布展,结果只有很少的观众前往参观,展馆总是上着锁。之后我们就同一主题,我们又策展了 2006 年,2008 年及 2010 年的青年建筑师及学生作品展;2010 年的展览在北京 798 艺术区时代空间举行,有 600 人参加开幕式并兴奋地观看了来自世界各地包括中国的数字建筑作品。此情此景与 2004 年形成鲜明对比。当然,数字建筑设计水平有了极大的提高是原因之一,但是最主要的还是人们对数字建筑设计的潜力及前景有了认识。时至今日,在中国,越来越多的建筑师、学生、学者以及加工商、施工企业、甚至开发商,试图掌握或了解数字技术并应用于他们的行业;这一日益扩大的数字建筑队伍正在把中国建筑带向超越现代的崭新未来。

数字建筑设计在中国的迅速蔓延归因于学校的教育、媒体的传播、展览展示、设计院的推动、实践项目等等,但“数字建筑设计工作营”的作用不可小看。2008 年策展青年建筑师及学生展时,几个 AA 毕业的年轻人(其中有高岩、徐丰等)建议在展览的同时办“设计工作营”,

Some scenes are unforgettable. In 2004 Neil LEACH and I curated an international exhibition of young architects (as part of the Architecture Biennial Beijing). We invited Karl CHU, Mark GOULTHORPE, Greg LYNN, Jesse REISER, Hani RASHID and 13 other architects, including 7 famous architectural education institutes such as AA DRL, Harvard GSD and so on. The exhibition showed the best architectural projects designed with the help of digital technology in the world. The exhibition was held at UHN construction site in Chaoyang District, Beijing. We invested great efforts and costs for this exhibition, but there were only a few visitors. The exhibition hall was always locked. Subsequently we curated several exhibitions for young architects and students on the same topic in 2006, 2008 and 2010. The exhibition in 2010 was held in 798 Art Space, 600 visitors participated in the opening ceremony and excitedly viewed digital projects designed by architects from all over the world. This scene was in distinctive contrast with 2004. One of the reasons for the success of exhibition was the greatly increased level of digital design. However, the main reason was that more people had developed an understanding of the potential future of digital design. Now in China, more and more architects, students, scholars, manufacturers, constructors, and even developers are trying to find out about digital technology and apply it in their own industries. This increasing popularity in digital design is now having a major impact on the architecture of China.

Digital design has developed rapidly in China

当年与清华继续教育学院合作，办了第一个数字建筑设计工作营；2009 年开始，清华建筑学院每年夏天利用暑期时间，举办“参数化非线性建筑设计研习班”，每年有上百人参加学习班，最多的时候有近 400 人报名，但限于条件，只能录取 180 人参加研习班；与此同时，英国 AA 在上海及北京每年都办数字设计工作营，同济与美国南加州大学（简称 USC）合作每年夏天在上海也办同样主题的工作营；近两年，办工作营的单位越来越多，去年同一时间，至少有 8 个单位同时办工作营，犀牛公司、华南理工、华中科大、湖南大学、NCF 参数化设计联盟等也参与到这一行列中来。

数字设计工作营起到数字设计启蒙的作用，由于数字设计需要有软件使用基础，对于多数人来说这是一个屏障，而工作营没有门槛，可培训零基础的学员，因而成为推动数字建筑设计普及的点火器，很多建筑师或学生正是从工作营开始了他们的数字设计道路；另一方面，各个工作营的教师通常来自于国内外业内的不同地方，大家聚在工作营实际上是一次学术交流，有效地促进了最新思想及技术方法的交流及链接，是推动数字设计发展的催化剂，最重要的在于，学员们来自全国乃至世界各地，他们把学到的知识以及思想带到各处，并影响了周边的同事、同学、甚至老师，激发起更多的人对数字设计的兴趣，因此，工作营又像一部播种机，把数字设计的种子播到各处。工作营的教学成果自然也是极具价值的参考资料，袁烽教授作为工作营的组织者、Neil LEACH 教授作为中国数字建筑发展的见证者，有心将这些教学成果收集成书，做了一件大好事，既记录了这一有价值的历史，又为初学者提供学习资料，可敬可佩。

英国建筑评论家查尔斯·詹克斯在 20 世纪 90 年代中预言，在复杂科学的带动下，21 世纪将产生一场非线性建筑运动，在当时看有一点捕风捉影，但在今天来看，他的预言还是正确的，这场以数字技术为核心的建筑设计运动已显端倪，并在以前所未有的速度朝前发展；但詹克斯没有预料到的是，这场数字建筑的革命运动正在中国发生。

2013 年 5 月 7 日于清华园

because of academic education, the influence of the media, exhibitions, the promotion by design institutes, practical projects, and so on. But the importance of the "Digital Design Workshop" deserves special attention. During the Young Architects Exhibition in 2008, some young architects who had graduated from the AA (such as GAO Yan and XU Feng) suggested that a "Design Workshop" be organized at the same time. A year later, we cooperated with the School of Continuing Education in Tsinghua University to organize the first ever digital design workshop. Since 2009, the "Non-linear Parametric Workshop" has been held each summer in the Tsinghua University School of Architecture. Almost one hundred students join the class every year. We have had nearly 400 registered students apply, but because of limited facilities, only 180 students were accepted. At the same time, the AA Visiting School has been held in Shanghai and Beijing every year. Tongji University and USC have cooperated to hold digital design workshops in Shanghai. In recent years, more and more institutes are holding design workshops. Last year, at least 8 institutes held this kind of workshop. McNeel, SCUT, HUST, Hunan University, NCF parametric design association, and so on have also participated in this group. The role of the digital design workshop is to teach people about digital design, although because it requires an understanding of software applications, it is difficult for many people. The workshop does not have an entrance requirement. It even accepts students with no professional background. Therefore, it becomes an engine for promoting digital design. Many architects and students actually start their careers in digital design with these workshops. On the other hand, the teachers of these workshops come from different backgrounds – some from China and some from abroad. Taking part in a workshop is actually an opportunity to learn from each other. It promotes communication and contact with the latest thinking and technology. It is the catalyst for promoting the development of digital design. The most important thing is that students come from not only China but everywhere else in the world. They share what they have learnt elsewhere in the world. They influence their colleagues, classmates and even their teachers.

They encourage more people to learn about digital design. Therefore, the workshop is like a seed spreader that spreads digital design ideas like a virus everywhere in the world. The educational achievements of these workshops is also valuable. Prof. Philip F. YUAN, as a workshop organizer, has gathered these achievements together and done a great work of editing. Prof. Neil LEACH, as a key witness of the development of digital design in China, has recorded the progress and analysed what lies behind this workshop fever. We really appreciate their efforts.

Last century, the American architectural critic Charles JENCKS predicted that, the impact of complicated scientific technologies would lead to a non-linear architectural movement in 21st century. His prediction was regarded as groundless at the time. However, when we read his words now we realize that his prediction was right. This digital design movement with digital technology as its core engine has opened up the future, and is now developing at a rate faster than has ever happened before. What Charles JENCKS did not expect, perhaps, is that this digital design revolution would now be happening also in China.

7 May 2013, Tsinghua University

关于中国数字建筑设计工作营的思考

Rethinking the Digital Workshop in China

袁烽 _ 同济大学建筑与城规学院数字设计研究中心
Philip F. Yuan _ Digital Design Research Center, CAUP, Tongji University

当下，对于中国近代建筑教育体系的研究是不无裨益的。我国近代的建筑学教育的建立，无疑受到西方的影响。早期中国近代建筑教育体系，大致分为尊崇古典主义比例尺度的“布扎学院派体系”和以土木工程技术、空间功能及形体构成等为背景的“包豪斯体系”。这两种体系在相当大程度上影响了中国 20 世纪 50、60、70 年代出生的建筑师的教育及其建筑创作。在这两种建筑教育模式中，无论是师资背景、课程设置、教学体系和培养目标等诸多方面通过我国建筑学专业指导委员会组织评估等活动的相互参照，已经让全国的建筑教育现状逐渐走向趋同。当然，近十年来，以崇尚建造过程的真实性及其诗意特征的“建构体系”也正在深刻影响着我国部分学校的建筑教育。

事实上，从另一层面上讲，我国的大部分建筑教育，一方面还是围绕着西方历史建筑理论的思潮发展而前行；另一方面，我国的建筑教育相对更加重视“解决问题”的能力的培养，也就是更加偏向于对于职业能力的培养。这样看来，我们似乎缺少了从建筑本体角度的自我批判的思考能力。“发现问题”的研究型教学是否微乎其微了？还是我们应该把研究型教学拱手让给国外名校呢？建筑学本体认知与设计方法理论时刻没有停下发展的脚步，很难想象将教学与研究区别对待的现状，可以深刻地推动未来建筑学的发展。

本书的编写，是通过介绍近年来我国（含香港地区和 AA 中国分校）的九个自发组织的数字建筑设计工作营

It is interesting to study the development of modern architectural education in China. The initial introduction of architectural education in China was no doubt influenced greatly by Western education. It was mainly composed of a Beaux-Arts academic system upholding classical logics of scale and size, and a Bauhaus system backed by civil engineering technology, space functions, shape structure, and so on. These two systems influenced the education and architectural products of architects born in the 50s, 60s and 70s. At present, these two modes of architectural education have begun to be integrated gradually into a single system in certain aspects of the instructors' background, course design, educational system and purpose, and other aspects through evaluation activities organized by the committee for architectural professional education in China. However, in the past ten years the "tectonic system" which explores the practical and poetic features of the construction process has been having a significant influence on architectural education in some academic institutions in China.

From another perspective, however, much architectural education in China is now developing in line with the ideas of Western architectural theory on the one hand, and paying more attention to problem solving - namely professional concerns - on other hand. In reference of the above fact, we seem to lack the capacity for self-criticism in terms of our architectural background. Anyhow, the understanding of architecture itself, as well as

的教学实践，详细比较它们的教学思路、教学内容以及教学反馈。这些自下而上、同步发生的教学方式，代表着在校师生和职业建筑师的兴趣，以及其前沿特性所带来的对现有教育体系的反思与影响。

特点与反思

数字化设计意在使用数字工具产生和控制设计形态并生成设计，同时利用相应的数字化软件进行物理环境的模拟和分析，在建造过程中工具的革新，正在从实验室的研究迅速转化成为生产力。建筑数字技术对建筑设计乃至建筑业的影响越来越大。根据近年的发展特点，总结如下：

1. 数字建筑设计工作营正由“软件教学”的教学方式向软件与“设计方法教学”的结合模式转化

数字化软件对于建筑设计的影响不言自明。在实践方案设计中已被广泛应用。基于“算法”思维的数字化设计方法，无疑是未来影响设计方法进程的重要推动力。事实上，未来设计方法与软件功能的有效结合与“工具包”的升级和研发，必将成为强化建筑内在逻辑的几何特征以及性能呈现的重要方法。软件即是成熟的“工具包系统”，不同的“算法”思维可以转化与升级软件的“工具包系统”。

2. 系列前沿学术论坛与设计工作营研究问题的同步性和一致性

如今，学校教学内容固化与学术前沿的讨论与课程教学内容严重脱节。近几年，数字建筑设计工作营的举办，往往伴随着系列学术讲座与学术论坛，任课教师与一线建筑师的有效对话不但提升了对实践现象的理论总结，还可以通过工作营的教学有效验证学术讨论的意义与影响。

3. 数字化建造作为教学过程与建造逻辑训练的意义

弗兰普顿的建构理论对于数字化实践与建构理论结合的否定，不断被实践证明是片面的。数字化建造理论是面向新数字建造生产所带来的产业革命不可缺少的组成部分。产业生产方式的变革正在到来，随着3D打印产业以及机器人工业的兴起，预制模块化建造方式的逐渐成熟，建构的“诗性”特性与文化附加含义正在被全新的

its design method and theory has never stopped developing. It is therefore difficult to imagine how the present educational system that separates education from research could really benefit the development of architecture in the future.

This article attempts to make a detailed comparison between the different educational concepts, subject matter and feedback in relation to the educational practices in nine digital workshops organized by professors and architects in China - including the HKU and AA Summer School programs.

Rethinking Digital Design

Digital design is the use of digital tools not only to produce and control the design process and to create designs, but also to make physical models and analysis using the relevant digital software. As tools within the construction process are being updated, so too architectural education is now turning rapidly from research to production. The influence of digital technology is becoming greater and greater on architectural design and the building industry as a whole. When considering developments in recent years, we could make the following conclusions:

1. The educational model of digital workshops is turning from "software teaching" to combining software teaching into a "design method education".

The influence of digital software on architectural design is obvious, and is popularly accepted in practical design. The digital design method based on the use of algorithms can be a very important engine in influencing the design method. In fact, in the future the effective combination of design methods and the application of software programs, together with the upgrading and development of "tool kits", will surely have an important impact on enhancing the internal design logic, geometric features and performance-based design presentations.

2. Another factor has been the development of a series of parallel forums and research workshops.

Nowadays, there is a gap between academic

生产方式重新定义。“数字化建造”的产业含义及其与机械加工等产业的逐渐融合，已经推动我们建筑教育行业与时俱进，用全新的逻辑组织建造过程。

4. 基于数字设计方法的自下而上机制在城市空间生成以及环境性能模拟中的重要作用

数字技术在城市尺度的研究已被日益广泛地应用到诸多方面。无论是基于多智能体方法的“智慧城市”研究，还是基于集群智能在城市空间生成机制等领域研究，都淋漓尽致地呈现自下而上的设计方法在城市尺度发挥的作用。城市尺度的环境性能分析及GIS等技术的应用，已经可以着眼于更加准确和量化的角度进行城市研究。

近年来，许多建筑院校与时俱进，纷纷在教学中增加数字技术的课程，以提高同学的综合能力，适应时代的发展。按照常规的教学模式将建筑设计教学分为两个阶段：1-2年级的启蒙和建筑入门阶段；3-5年级的建筑设计应用专业课阶段。对于不同的阶段安排了相应的数字化课程，根据在全国高校建筑学学科专业指导委员会上通过的“促进建筑数字技术教学发展纲要”，建议建筑数字技术基本课程的设置主要有：辅助建筑设计构思的软件学习、绘图软件学习、建筑数字技术概论（常用软件、建筑信息模型、建筑物理环境分析、虚拟现实、协同设计、智能CAD、数字化建筑设计方法等知识的简介）；建议建筑数字技术选修课程有：用于建筑表现的软件学习、VRML等其他虚拟现实软件、设计软件学习。这些年来从实际教学中发现，课程的设置安排和配比的执行往往不能达到预期的效果。对于理论与实践的脱节、技术与应用的错位、设计理念与设计成果的不相符等现象，让我们不得不开始思考，我们的数字建筑教学实践中的问题和误区：

1. 忽略了数字化课程设置中的连贯性和协同性

普遍认为局部相加等于整体。各科目的设置分散独立，如辅助软件、建筑历史理论的学习和建筑物理性能的研究，课程之间缺少一定的协同性，科目之间欠缺衔接与过渡。传统培养模式、教学方法和手段与新技术应用能力的培养要求脱节。这种线性的课程分布严重影响了各方面知识的渗透与合作，导致了理论与实际的分离。

education and avant-garde research. In recent years, digital design workshop have become accompanied increasingly by a series of academic lectures and forums. Effective conversations between instructors and leading architects not only improves theoretical awareness within architectural practice, but also demonstrates the importance and impact of academic discussion within the educational workshop.

3. Digital fabrication has also become an important component within the teaching process and architectural training.

Again and again the refusal to link digital practice to architectural theory on the part of Kenneth Frampton has been shown to be detrimental to practical architectural projects. Digital architectural theory is an indispensable component in the revolution of digital architectural design, in the production of a new architectural product. A revolution in industrial production is now happening. With the emergence of 3D printing and robotic fabrication, as well as the development of architectural prefabrication and modularization, a completely new method of production has been developed that redefines the poetic and cultural content of architecture. The gradual coalescence of digital fabrication and new industrial processes is now bringing architectural education up to date and reconfiguring the fabrication process with a completely new logic.

4. The bottom-up digital design process has an important contribution to make to the design of urban space and environmental performance.

There are extensive examples of the application of digital technology at an urban scale. Both research into the “Smart City” based on Multi-Agent Systems and the study of the generation of urban space based on Swarm Intelligence and other logics have demonstrated convincingly the potential of bottom-up design methods at an urban scale. The analysis of environment performance at an urban scale and the application of GIS and other technologies now enable us to study the city with far more precision.

In recent years, many academic institutions have added digital design courses to improve the

2. 课程设置均质，使得教学可操控的灵活性差

课程的整体安排有固定的模式，同学们不能针对自身的需求有重点地选择某方面的内容去了解。这样的课程结构与设置不利于开发同学们的创造性和探索性，而且部分教学内容陈旧，已经不能适应后续建筑设计和实际应用的需求。

3. 实践教学环节和新型建筑数字技术设备应用经验薄弱
设计成果偏重于概念设计阶段的单纯形式生成，追求酷炫的表达，但与实际的建造方式存在一定的矛盾。虽然学习了利用软件对建筑物理性能、受力等方面进行评估和研究，对材料、结构、构造的了解多数都是纸上谈兵，欠缺实验环节。

数字建筑设计工作营的教学

建筑评论家、理论家、教育家杰福·科普尼斯认为目前一些声誉较高的建筑院校可以分为三类：即以苏黎世瑞士联邦理工大学为代表的理性主义的设计方法，以伦敦建筑联盟学院为代表的本体试验教学，以及以哈佛大学和耶鲁大学为代表的本体思想早期实践者。在通常层面上讲，建筑学教育的目的是提供专业与职业方面的训练。然而，建筑学思想前行的推动力，往往是那些不断挑战建筑本体方法或让本体方法更为深刻的学校。而近年来在国内的数字建筑设计工作营的发展领域，让我们看到了一些经典教学模式的延伸和深化：

1. 从数字软件教学到数字设计方法教学模式转化中的“新学院模式”

在众多工作营中，LCD 参数化研究中心的教学实践应该是唯一最具组织形式批判性的。是作为对当下建筑学教育的补充、融合？还是质疑、独立？LCD 参数化研究中心已经建立了具备反思基于建筑师注册制度与建筑学专业指导委员会指导模式的独立教育模式与体系探索。

2. 针对城市建筑原型空间的算法教学研究

不同于以往设计课的建筑类型设计，许多工作营对主题的研究已经超越了建筑本体论，延伸到对社会、自然的研究当中，对于跨学科的研究，特别是对自然界中生物体生长、发展进化、繁衍的模拟，从而进行自下而上的

integrated design ability of students and to keep up to date with recent developments. Traditionally architectural education is composed of two stages: an introduction to architectural design for junior students and an advanced architectural design program for senior students. Different digital courses are arranged for different stages.

According to the Recommendations for Promoting the Development of the Teaching of Digital Architectural Technology issued by the Architectural Professional Education Committee of China, basic digital design courses should cover: instruction in CAD conceptual design software, instruction in drafting software, and introduction to digital design technology (including popular software such as Building Information Modeling, environmental analysis, collaborative design, intelligent CAD, digital architectural design theory). In recent years it has been found that in educational practice the setting and arrangement of these courses and the realization of their configuration does not always achieve the predicted result. Facing the fact that theory is disconnected from practice, that technology and its applications are wrongly positioned, that design concepts do not relate to the designs produced, and so on, we have to reflect on the problems and misunderstandings in digital education:

1. The coherence and connection of the arrangement of digital courses are ignored.
The principle that the whole is made of the sum of the parts is generally believed. The arrangement of various courses - such as supporting software, history and theory, and physical performance - is disconnected and unrelated. There is no connection between these courses, nor any overlap between them. The traditional education model of teaching methods and tools is not connected to their educational application. This linear distribution of these courses has a serious impact on the blending and combination of various forms of knowledge, and results in the disconnection between theory and practice.

2. Courses operate on a mono level, and are relatively inflexible.

生成设计。如 AA 上海访校 2008 年的主题设计城市主义, 2009 年的城市原型学, 2012 年的进化城市主义, 汤姆·沃勒比教授将计算城市主义应用到实践中, 通过对形式、类型的研究, 运用捕捉或模拟城市各种实时动态现象信息化手段和研究其推移进化过程。

3. 重视数字化建造和使用机器实现设计

数字技术与建造技术结合得越来越紧密, 数字化技术的出现进一步确立了数字化与建构学是可以相辅相成的搭档。

用建筑的方法和常规的材料去解决非规则建造的问题, 这是一种自下而上的思考方式。研究材料在数字化的方法下发挥潜力的可能性, 对建造和施工提供可用的手段。

同济大学与美国南加州大学联合举办的上海“数字未来”暑期联合工作营, 尝试了基于建造的方法与过程研究, 在建造过程中培养同学们对材料和建造过程的认识, 研究算法逻辑如何从手工实现到数控机器的实现; 华南理工大学建筑学院的数字建筑工作营以“教学/研究/生产”的结合为模式, 运用珠江三角洲丰富的数控资源, 使得教学和研究与生产的结合无缝对接; 湖南大学的 DAL 数字工作营在建立之初邀请了 ZHA_CODE 合作, 以他们的实验性课题为主题进行实际生产的尝试; 香港大学的“数字化实践”工作营在教学过程中常采用小比例的拼装模型进行形态逻辑分析, 从制造“玩具”一样的装置, 转向探索设计建造一体化的实验性项目; 而华中科技大学的先进建筑实验室联合工作营, 则从材料入手, 运用数字化手段对材料性能的研究, 尝试将竹资源转化成工业化和标准化预制建造体系……

4. 通过将数字化理论、软件教学与工作营教学的有机结合, 探索数字发展的新方向

教学中强大的包容性产生于教学中的多样性, 在设计中不仅是对建筑本体的关注, 当下的社会问题已经与其紧密相连。设计的目的不仅是制造一个遮风挡雨的空间, 更重要的是为创造一个更优质的社会生活而发起。

港大工作营的环保概念活动亭棚设计、AA 上海访校的城市主题、华南理工大学的互动装置设计、2012 年清华大学在数字技术的支持下也大力推动体现机械与性能特性的互动装置等, 这些无疑都是在试图解决当今社会的基本矛盾, 畅想着一种新的生活方式。

5. 多教师、多背景、跨学科的复合教学方式成为数字工

Generally, courses are fixed. Students are not encouraged to select their courses according to their own interests. The structure and arrangement of these courses fail to encourage creativity and exploration among the students. Furthermore, some courses are out of date in terms of their content, and fail to meet the shifting requirements of architectural design and practice.

3. Mere practice and experience in the application of new digital technologies are not enough.

There is too much design emphasis paid on simple form-making during the concept design stage, leading to cool, flashy designs. But this emphasis on style conflicts with the actual fabrication method. Although the students have learned how to use the software programs to evaluate and study the physical performance and intentions behind their designs, they have learned their knowledge of materials, structural performance and fabrication only from books, and have no practical experience.

Education in Digital Design Workshops

The architectural critic, theorist and educator, Jeff Kipnis, thinks that, at present, the famous academic institutions could be classified as belonging to three types: rational design approaches represented by ETH Zurich; experiment education represented by AA, England and early practitioner of ontology research represented by Harvard and Yale.

Generally speaking, the purpose of architectural education is to provide professional training. However, the power to promote the development of architectural theory always lies with the academic institution that challenges or advances the basic architectural method. The development of digital design workshops in China in recent years reveals the expansion and development of some classical educational approaches.

1. From Digital Software to Digital Design

Of the many workshops, it is only the education practice of the LCD study center that seems to be critical of the organization of architectural