

Evolution of Practice in Undergraduate Architecture Education through Institutional Formations

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Abstract

Practice has always had an important place in the basis of architectural education, which exists with the mentoring system. With the influence of studio culture, practice has been relatively more prominent than theory in architecture undergraduate education. While the practical tendency in architectural education, which became theoretical with Bauhaus, takes place in workshops, an architectural education pedagogy is shaped in research-practice intersections with environments such as the Space Syntax Laboratory established at UCL. It can be said that technology plays an active role in the orientation of education. This study investigates the question 'How has the practical approach in architectural education been transformed?' By using the historical research method, it examines the methods and environments of the realization of practice in architectural education. It reveals architectural education within five distinct periods: The ancient period, the Renaissance period, the Modern period, the Post-modern period, and the Contemporary period. The convergences and disconnections between the workplace, competition, studio, and laboratory, which are determined as the environments of practice in architectural education, are analyzed. As a result, it aims to provide a critical analysis of the current opportunities and future practice possibilities that practice offers to architectural education.

Keywords: Architectural education; Architectural practice; Practice and research in architecture; Architectural pedagogy; Technology in architectural education.

1. Introduction

The learning environment of undergraduate architecture education for practical activities is transformed throughout the past, present, and future. These shifts start from apprenticeships in the medieval (Lethaby, 1912) and continue towards a sophisticated blend of theory, technology, and research this transformation, Ecole des Beaux-Arts with its competitions (Middleton, 1982), Bauhaus with its studio culture (Droste, 2002), MIT with Media Labs (Dillon, 2001), and the digital and fabrication laboratories of many universities today make the interaction of institutional and practical environment visible.

The methodology of this article is based on historical research through university institutions and various educational formations in institutions. This paper traces the historical development of practical activities in architectural education, examining key milestones, technological developments, and the involvement of practice in curriculum. It conceptualizes architectural education within five distinct periods: The ancient period, the Renaissance period, the Modern period, the Post-modern period, Contemporary period. As a result, it defines and discusses four practical environments related to periods in architectural education: workplace, competition, studio, and laboratory.

Evaluation of the transformation of practice in architectural education is crucial for educators and practitioners because it informs future directions by highlighting shifting paradigms. The research makes visible what was abandoned throughout the transformation, what was improved, what was reinterpreted and continued in education, and what was reflected in the curriculum from a completely new perspective.

2. Practical Approach in Architecture

The origin of the relationship of architecture with practice is conceptually based on the expression *techne*. In Greek, art and craft are described by one term which is 'techne'. It means all the sets of skills that produce an end product. This concept is at the center of architectural practice, where craftsmanship and technical knowledge come together to create built environments. Each *techne* has a cumulative knowledge, set of rules, and concepts. It is transferred by apprenticeship. For instance, an artisan develops a craft according to ancestors and traditions. These inherited abilities make *techne* collective (Parcell, 2012). It is seen that architecture, which was originally a practice-based and collective profession, has transformed and developed similar features in the process of institutionalization.

2.1. Early Mentoring Systems, Studio Culture and Competitions

The early mentoring systems in architecture were deeply rooted in the apprenticeship model, which was a cornerstone of architectural education for centuries. This model was characterized by hands-on training under the guidance of a master architect. According to Lethaby (1912), medieval European apprenticeships involved young aspirants living with and learning from their masters, gaining practical experience by working on real projects. Schön (1982) elaborates on how this mentorship facilitated the development of tacit knowledge, allowing apprentices to learn not just through instruction but through observation and practice. Cuff (1991) highlights that this system persisted well into the

Renaissance, where prominent architects like Andrea Palladio were trained through rigorous apprenticeship, which was crucial for mastering the intricacies of architectural design and construction.

During the Renaissance, the studio emerged as a distinctive space for architectural training, embodying the apprenticeship system's principles of learning through practice. The integration of academia and practice became prominent when architectural education was institutionalized. The Accademia del Disegno, established in Italy in the 1560s, was the first institution where art and academia converged, inspired by Michelangelo's synthesis of painting, sculpture, and architecture. These three disciplines were unified under the concept of disegno, yet the practical activities of imitating, designing, and making remained distinct. Despite the different practical aspects of these subjects, the training method in the academy was consistent: apprenticeship (Parcell, 2012). The pedagogical approach at the Accademia was bifurcated into two components: the Discorsi, a series of lectures, and the Studio, where young apprentices received hands-on training. The Studio, equipped for drawing, reading, and discussion, was a shared space for both professionals and apprentices. Accademia's studio approach focused on individual instruction by master artists and practitioners. Students often worked closely with a master in an apprenticeship-like environment to learn and develop their artistic techniques (Roccasecca, 2009). This historical development of the mentoring system in architecture underscores its essential role in shaping competent architects through inclusive, practice-oriented education.

Like the studio culture of the Accademia in the 16th century, the École des Beaux-Arts, founded in France in the 17th century, also was based on an atelier system. In ateliers consisting of small and shared studios, students worked under the guidance of leading master architects. In the school, ateliers varied according to their own unique approach and style to allow different perspectives. Thanks to this approach, students were able to get involved in real-life projects and thus gain hands-on experience. (Egbert, 1980). Another method of gaining practical experience was competitions. Students had to produce detailed architectural drawings and models for competitions. The process of preparing for and participating in these competitions developed practical skills of students such as drafting, visualization, and model making (Middleton, 1982). The professional nature of these competitions has enabled students to develop high levels of technical proficiency and creativity.

To conclude, the apprenticeship model contributed to establishing the basic principles of studio culture, and studio culture influenced contemporary architectural education by emphasizing the long-term value of applied, experiential learning.

2.2. The Bauhaus Influence: Hands-on Experimentation

The Bauhaus, founded by Walter Gropius in 1919, marked a significant shift in architectural education. The main understanding of Bauhaus depends on the integration of art, craft, and technology. Therefore, the Bauhaus curriculum is structured to dissolve the barriers between fine and applied arts and to encourage students to participate in hands-on workshops where they learn by doing (Hochman, 1997).

The learning method of the studio in Bauhaus was learning by doing. It indicates that the studio was more than just a physical space; it was an environment that encouraged creativity, experimentation, and collaboration among students and faculty. Students engaged in hands-on projects combining art, craft, and technology. This approach fostered a spirit of innovation and practical problem-solving, allowing students to explore new materials and techniques in a collaborative environment. In the studio, students worked alongside masters who were both practicing artists and craftsmen, blurring the lines between teacher and student, theory and practice (Droste, 2002). According to Schön (1982), students' observing their actions, and practices and developing their designs in the light of evaluations and reviews is a learning environment that nurtures reflective learning and creativity.

The communal nature of the studio promoted an interdisciplinary exchange of ideas, essential for the holistic development of a modern architect. As Lava & Marda (2019) note, the Bauhaus studio culture's emphasis on teamwork and real-world application has had a lasting impact, becoming a model for contemporary architectural education worldwide, where the studio remains a dynamic space for experiential learning and creative development.

The Bauhaus philosophy of "learning by doing" influenced many architectural schools worldwide. It introduced innovative teaching methods that encouraged creativity and interdisciplinary collaboration. The emphasis on material experimentation and the integration of art and technology have had a lasting impact on architectural education.

2.3. Postmodernist Influence

Postmodernism in architecture, roughly spanning from the 1960s to the 1980s, emphasized historical references, cultural context, and symbolism, unlike modernism (Aziz Amen, 2017; Aziz Amen & Nia, 2018; Ho et al., 2023). In contrast to the rational and universal understanding of modernism, the wide-ranging and pluralistic environment of postmodernism is reflected in the curricula of architectural education. The education contents of Yale School of Architecture and MIT can be evaluated within this period. During the postmodern period, the Yale School of Architecture became a pivotal institution for the exploration and implementation of postmodernist principles in architectural education (Amen & Kuzovic, 2018; Amen & Nia, 2021; Abdulla & Abdelmonem, 2023; Afolabi & Adedire, 2023)

. Under the deanship of Charles Moore, who served from 1975 to 1984, the school embraced a curriculum that emphasized historical awareness, contextual sensitivity, and eclecticism, which are hallmarks of postmodernism. The studio culture at Yale fostered a critical dialogue about the role of history and symbolism in contemporary architecture, urging students to create buildings that resonated with their surroundings and the cultural narratives of their sites (Stern & Stamp, 2016). This contextual approach can be visible in construction studios. The idea of a construction studio includes real-time projects with clients as a learning tool. The studio is a distinctive and integral component of the curriculum, reflecting the school's commitment to hands-on, practical architectural education. It is designed to immerse students in the real-world processes of building construction, bridging the gap between design theory and practical application (Carpenter, 1997). It is an approach that combines practice with theory as well as with real design problems, clients, and context.

The Architectural Association School of Architecture (AA) is another significant institution in the 19th century that emphasized practice and academic integration. Although the school was founded in 1847, throughout its history it has developed its pedagogy according to the times. One of the significant changes in its pedagogy dates back 1970s. Chairman Alvin Boyarsky updated the units, which are the studios where design education is provided. Each unit operated as an independent studio, led by practicing architects who bring their professional insights directly into the educational environment. This integration allows students to engage with real-world architectural practices. One of the action sequences of this method was competitions. (Ortiz, 2020). Competitions and sectoral cooperation, which are the methods applied by AA in its education, can be given as examples of the pedagogical transformation of practice into architectural education.

The establishment of the MIT Media Lab in 1980 marked a significant development in architectural education at the institution (Dillon, 2001). The Media Lab's focus on digital technology, human-computer interaction, and multimedia design introduced new dimensions to architectural practice. Students and researchers at the Media Lab explored cutting-edge technologies and their applications in architecture, fostering a culture of experimentation and innovation. This interdisciplinary environment enabled students to engage with contemporary issues in architecture through the lens of technology, further enriching their educational experience (Mitchell, 1990). Media Lab is the pioneering format that experimentally combines technology and architecture in architectural education.

The studio culture of the Bauhaus continues the practice-orientated design education that continues even today in architectural education. Competitions are also included in the pedagogy of schools like AA. MIT, on the other hand, opens the doors of laboratory culture on top of studio culture. Postmodernism seems to be a blend period.

2.4. After 2000: Laboratory Culture

Technology has played a crucial role in transforming architectural research and education. Computers already entered design studios in the 1980s (Mitchel & McCullough, 1994). In the following decades, the advent of digital tools and computational methods has revolutionized the way architectural practice is taught and practiced. Technologies such as Building Information Modeling (BIM) (Joannides et al., 2012), virtual reality (VR) (Sirror, 2021), and parametric design (Alalouch, 2018) have become integral to the architectural curriculum. The development of various digital tools brings about a new environment for architectural education, the laboratory. Space Syntax Laboratory at University College London (UCL) which focuses on spatial analysis and its social implications, founded in the 1970s (Hillier & Hanson, 1984), has a history that can be considered one of the pioneers of the laboratory in architecture. It is a prime example of how technology can bridge the gap between research and practice. Although primarily a method in architectural research, space syntax is also integrated into design education. Space Syntax can be a tool in design studios to integrate analytical knowledge into the field of creative design. (Psarra et al., 2018). This kind of advanced computational methods develop an understanding on the functions of architectural spaces and urban contexts in real life. Thus, it supports a research-oriented approach in education with data and evidence-based design approach.

Another active laboratory environment today is based on digital fabrication technologies. The Digital Fabrication Lab at the University of Southern California (USC) School of Architecture is an example that brings architecture education closer to practice by providing students with hands-on experience in digital fabrication technologies. This lab is equipped with advanced tools such as 3D printers, milling machines, CNC machines, molding and casting technologies, and laser cutters allowing students to transform their digital designs into physical models (Lorenzo-Cueva, 2024). Advanced tools such as parametric/generative software are needed for production in these laboratories. Although the integration of design and production technologies into education programs is not fully achieved, it has critical importance (Marco, 2019). One of the examples that has achieved this integration is a course content from USC and Virginia Tech. The course can be given as an example of bringing real-world problems to design education and seeking solutions in a laboratory environment. For the design project, where undergraduate and graduate students from different programs work together, a BIM-supported virtual and collaborative course is planned that enables interdisciplinary collaboration (Forgues & Becerik-Gerber, 2013). In this case, the design laboratory provides an environment to study real or virtual artefacts together.

Space Syntax Laboratory at UCL and the Digital Fabrication Lab at USC can be considered as examples of architecture, urbanism, and technology. The laboratories such as the Pratt Institute Digital Arts and Humanities Research Lab, Robotic Manufacturing Laboratory at the University of Stuttgart, DPL at Architectural Association School of Architecture (AA), and Robotic Fabrication Laboratory at ETH Zurich can also be given as examples for interdisciplinary studies. Laboratories, whose importance, function, and scope are expanding day by day, offer a ground for interaction in a different dimension to the practical action in architectural education. Lab platforms and digital production tools encourage an experimental and hands-on learning experience in design and production techniques.

3. Historical Transformation of Periods in Architectural Education in terms of Practical Activity

According to the historical analysis of this research, 5 different periods can be mentioned when the thresholds of institutionalization are followed in the transformation of the relationship between architectural education and practice: Ancient, Renaissance, Modern, Post-modern, and Contemporary. In the period when architectural education was based on the master-apprentice relationship, there was no institution for learning. Education takes place in guilds, which were the professional organizations of those times (Erbil, 2009). It can be said that the profession is acquired based on observation through apprenticeship with a master.

The Renaissance laid the foundation for the studio culture that continues to exist today. First, at the Accademia del Disegno, the mentoring of master artists takes place in the studios, focussing on the imitation and development of classical techniques. The École des Beaux-Arts is one of the first stages where studio culture is institutionalized and competitions are integrated into architectural education. It can be said that competitions, which were included in architectural education in Beaux-Arts, have been a part of architectural education from the Renaissance to the present day with the inclusion of the Architectural Association School of Architecture (AA) in its pedagogical curriculum in the 1970s (Dinçer et al., 2022). However, the learning method maintains its classical understanding. Art education is mainly taught through drawings of existing paintings or the human body.

In the Modern period, design studios which is based on machines, and mass production, have become more independent instead of neo-classical monuments. With Bauhaus, there is a methodological and pedagogical break in the acquisition of practice. The previous method based on imitation evolved into reflective learning (Schön, 1982) centered on the student. Architectural education, which has become increasingly universalized and institutionalized, expands in the postmodern period as a period in which borders are blurred and innovative and mixed methods are used. While the impact of technology in the modern period is on mass production and rationalization, in the post-modern period it enables the emergence of experimental laboratories. Today, the use of laboratories crosses disciplinary boundaries and continues to gain a foothold in university institutions around the world. Computing and software skills are now cultivated in studios and laboratories.

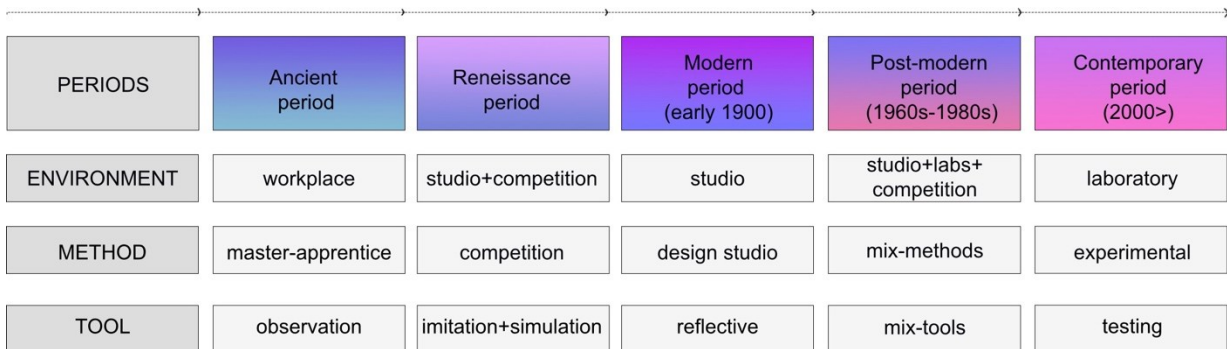


Figure 1. Conceptualization of Architectural Education within Five Distinct Periods (Developed by Author)

4. Results

The interaction of the five periods - Ancient, Renaissance, Modern, Post-modern, and Contemporary - with the practice takes place in four prominent environments: workplace, studio, competition, and laboratory. The ancient period was a period in which practice was gained in professional life, and therefore learning in the workplace environment was prominent. The Renaissance period, on the other hand, is a period that stands out with the competitive environment that has reached the contemporary period. The modern period, although it includes four learning environments, is a period centered on the studio environment. The position of the post-modern period in this transformation is interesting. Although it pioneered the experimental environment offered by technological developments, it is difficult to talk about the existence of a single method that can characterize the period. There are mixed and pluralistic practical activities that fuse the environments of previous periods with laboratories in the light of technology and digitalization, while at the same time bringing the studio culture closer to the contextual framework. In the contemporary period, which includes today, disciplinary boundaries dissolve considerably. In this period, it can

be said that labs working with real-life data and serving contemporary construction techniques are similar to the ancient period, but from a more technical, collaborative, and innovative perspective, closer to workplace learning.

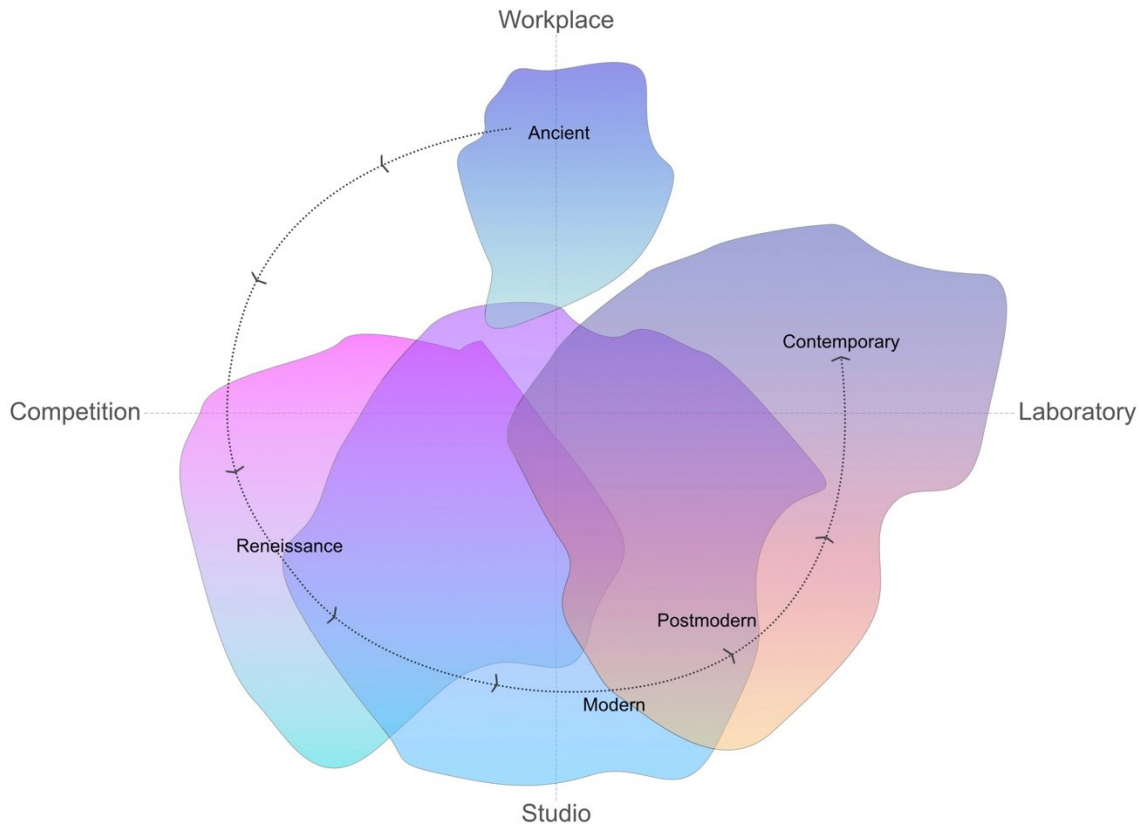


Figure 2. Four Environments of Periods and Their Interactions (Developed by Author).

In the Ancient and Renaissance periods, hands-on practices influenced architectural education. While technology is reflected in design as rationality in the modern period, the periods in which technology is reflected as a laboratory environment are post-modern and contemporary. As can be seen in these two periods, laboratories are not only a physical space but also tools used for research.

5. Discussions and Future Directions

Undergraduate architecture education often incorporates technological developments into its curriculum through content such as CAD programs (Duarte, 2007). However, the future of architectural education is likely to undergo greater integration of advanced technologies such as artificial intelligence, virtual reality, machine learning, and more. These technologies have the potential to revolutionize design processes and provide more efficient and innovative solutions. Such technological advances provide opportunities for testing, prototyping, and experimental studies in architectural practice. It is critical for architectural education to position itself within these changes for a complex and technology-oriented professional future. It seems that technology, which offers innovative areas for architectural research, should be integrated into undergraduate architecture education. It is possible that this can be achieved by reflecting curriculum studies and interdisciplinary cooperation from a technology perspective into the curriculum.

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Conflict of Interests

The Author(s) declare(s) that there is no conflict of interest.

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