Bridging Theory and Practice: A Comparative Study of Pedagogical Models in Architectural Education

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Abstract

This research explores how architectural education can be made more practical and relevant to real-world challenges, by identifying strategies that can equip future architects with the skills needed to address pressing social, economic, technological, and environmental issues. It argues that architectural pedagogy should move beyond the idealized, theoretical environment of the studio and engage with the real world and its stakeholders from an early stage in the educational process. The paper examines the introduction and implementation of various practical education models across seven architecture schools within a research project consortium, including higher education institutions in Italy, Norway, Croatia, Montenegro and Bosnia and Herzegovina. The research focuses on how practical education is defined in different cultural contexts and what insights can be gained from diverse approaches—varying in scale, complexity, professional engagement, and time spent outside the studio. Using a comparative methodology that includes workshops, site observations, surveys, and interviews, the paper analyses the outcomes of these educational practices. The research also presents a "Practice Typology Matrix" as a framework for assessing various models of practice involvement in architectural education, highlighting the most effective approaches for different contexts. Through this analysis, the paper identifies best practices and strategies for integrating real-world experience into architectural training.

Keywords: *Practical Learning; Architectural Education; Professional Practice; Practice Typology Matrix*

1. Introduction

The research and discussion on the relationship between theory and professional practice in architectural education is ongoing and will remain highly relevant in the future. Architectural education has consistently been shaped by inputs from real-world environment, responding to social, economic, technological, and environmental challenges. These evolving contexts have affected the pedagogical approaches and redefined how architecture is taught. History of architectural education worldwide has demonstrated that learning occurs both within and beyond the physical boundaries of the academic institution, making the connection with professional practice and real-world issues essential. This engagement ensures that future architects acquire the knowledge, competencies, and skills necessary to respond effectively to contemporary demands. The European Association for Architectural Education (EAAE), in its 2018 Charter on Architectural Education: Principles and Practices of Architectural Education [1], outlines contemporary perspectives in the field and addresses the interrelationship among its three central pillars: design-based teaching, professional practice, and research. A fundamental assertion of the Charter is that architectural education is grounded in a distinctive dialogue between academia and professional practice. It emphasizes that pedagogical approaches must be continually revisited, revised, and even reimagined to foster meaningful progress in the profession. Crucially, the Charter highlights the importance of a reciprocal relationship between academia and practice, stating that architectural education must remain closely linked not only to academic research but also to the evolving body of knowledge generated within professional settings. In line with this, the Directive 2005/36/EC of the European Parliament and of the Council stresses that architectural training must maintain a balance between theoretical and practical components and ensure the acquisition of specific knowledge and skills essential to the profession.

The question that arises is how to achieve a meaningful balance between theory and practice within the ever-evolving context of globalization, which continues to shape and influence architecture. This challenge becomes even more significant when considering the nuances and varied experiences shaped by the long-standing traditions of architecture schools in different geographic contexts, as well as the diverse ways in which this topic is interpreted and addressed across different educational and cultural settings. In order to learn about the different approaches, and educate the educators, the research consortium was formed consisting of seven architecture schools within a research project consortium, including institutions in Italy, Norway, Croatia, Montenegro and Bosnia and Herzegovina around the project Architecture Pop-up Lab Exchange (APLE). The APLE project has been created in 2023 in response to the assessment and critical feedback given by the architecture professionals on the competences of young architects that are seeking employment for the first time. Thus, the project strives to mediate between all the challenges and issues that emerge at the threshold between architecture school and employment. This can be achieved by bringing together the students and academic staff with the professionals through studios, workshops, Pop-up labs, in a common pursuit of improving the transfer of knowledge and fostering practice-oriented teaching and learning. New generations of architects will gain benefits from this initiative in increased competitiveness in the labor market and industry. The positive effects will be reflected in the socio-economic environment through engagement of the public sector.

Drawing upon data collected throughout the APLE project through the exchange of experiences between higher education institutions from the European Union and the Western Balkans, this paper ultimately aims to develop a methodological framework incorporating assessment criteria for a range of practical learning models. Data was obtained over the course of two-year project activities, including workshops, site observations, pilot projects, surveys and interviews, in order to evaluate the outcomes and effectiveness of the identified practical education models. The result is a multi-dimensional methodological framework—referred to as the **Practice Typology Matrix**—designed to evaluate diverse approaches to real-world engagement in architectural education.

2. Theoretical Background: Practice of Teaching and Architecture in Practice

The relationship between theoretical knowledge and practical experience in architecture has been the topic of discussion since the time of Vitruvius as early as 30–15 BCE, who emphasized that neither is complete without the other: "The architect should be equipped with knowledge of many branches of study and varied kinds of learning… This knowledge is the child of practice and theory." [2] Thus, the two types of learning—theoretical and practical—have been recognized as essential since Roman times, with the latter involving the direct, hands-on engagement of future architects in construction: "Practice is the continuous and regular exercise of employment where manual work is done with any necessary material according to the design of a drawing." [2] In medieval times, especially during the Middle Ages and Renaissance, professional specialization of the "master builder", who possessed the knowledge in geometry, structure, aesthetics, who were in charge of designing and supervising the construction of cathedrals, castles, public buildings etc [3].

Since Age of Enlightenment, the 18th and 19th century doctrine of École des Beaux-Arts in Paris has significantly influenced the pedagogical doctrines in art and architecture schools, focusing more on historical and theoretical approach to learning, as well as development of drawings and draftsmanship skills [4]. The atelier system which has gradually evolved to studios has been predominant since, in which the assignments and projects are developed by the students under the guidance of a practicing architect (the "patron"). The Beaux-Arts model of learning has laid the foundation for the studio-based learning system applied in architecture schools worldwide.

With the rise of the Industrial Revolution, avant-garde movements like Arts and Crafts, Art Nouveau, and Jugendstil reacted against industrialization by returning to traditional craftsmanship and placing greater value on handmade work. In the 1920s, the Modern Movement in architecture emerged—most notably through the Bauhaus school—which aimed to bring together art, craft, and industrial production in a unified approach to design [5]. At the Bauhaus, each workshop had two masters—one taught practical skills, and the other focused on theory—so students could learn both hands-on work and design ideas.

The evolution of both informal and formal architectural education has shown varying relationships between theoretical and practical learning. Different models have shifted the balance—sometimes emphasizing theory, sometimes practice, or, in Vitruvius' terms, the dynamic interplay between thinking and making. In some cases, one dominated; in others, both were held in balance. Today, new approaches and ongoing research are exploring ways to improve architectural pedagogy in response to the evolving role of architects in society. Traditional teaching methods can be enriched through innovative models and experimental practices that aim to enhance the learning environment and student experience. These efforts seek to make design education more responsive to economic, social, technical, and political changes [6].

When it comes to balancing theoretical and practical learning, some of the most innovative pedagogies include "learning by doing" and "live projects." These methods promote experiential learning by involving students in the hands-on realization of their design concepts [7]. Another widely used approach is "problem-based learning," where students develop their understanding by solving specific problems, often framed as realistic cases or scenarios [8]. Similarly, "project-based learning" is a core component of many architecture curricula, as it engages students in creating a product, performance, or event in response to a broader challenge [9]. To address the gap in practical knowledge, architecture schools are also adopting "practice-based learning" models, where students gain experience in real-world environments, typically within professional or workplace settings [10]. The application of three methodologies - „problem-based learning", "project-based learning", and "practice-based learning" all have a common acronym and reflects a shared goal: to foster a responsible and responsive architectural education. These approaches aim to prepare students to effectively address technological advancements, socio-economic shifts, and the urgent sustainability challenges facing contemporary society [11].

Most innovative models that emphasize the practical component in architectural education incorporate the Kolb Cycle, an experiential learning model developed by David A. Kolb in 1984. The Kolb Cycle consists of four interconnected phases. The first is Concrete Experience (CE), which involves students engaging in direct, hands-on activities. This is followed by Reflective Observation (RO), where students reflect on and analyze their experiences. The third phase, Abstract Conceptualization (AC), allows students to draw conclusions and connect their experiences to theoretical knowledge. Finally, in Active Experimentation (AE), students apply what they have learned to new situations, testing their ideas in practice [12].

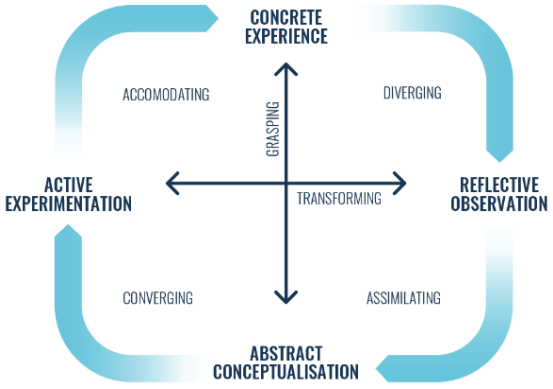

Fig. 1. The Kolb cycle diagram. Source: [13]

Another important topic in the architectural academic world is internship, and architecture schools have completely different approaches. Some research studies have demonstrated extracurricular academic experiences, particularly internships, "contribute to the development of career adaptability and to the transition between the roles of student and professional" [14]. Directive 2013/55/EU of the European Parliament, in alignment with the UIA-UNESCO Charter on Architectural Education, states that architectural education must strike a balance between theoretical knowledge and practical training. It must also ensure the acquisition of essential knowledge, skills, and competences. According to e-FIADE: Exploring the Field of Interaction in Architectural Design Education project [15], the independent nature of different educational environments enhances their productivity, as each generates its own distinct body of knowledge. However, the study identifies two primary fields of interaction within the architecture knowledge triangle (research, education, and professional practice): the final architectural design studio and periods of internships (training or summer practice). In its 2012 guidelines, the UNESCO Institute for Lifelong Learning (UIL) [16] recognizes three types of learning: formal, non-formal, and informal. In the field of architecture, the non-formal learning may be associated with internships in companies, government offices, or research centers. Informal learning can be understood as experiences such as student workshops or volunteering with NGOs, all of which help students build skills, knowledge, and abilities in architecture. Architecture students are encouraged to explore the variety of roles they can assume both within and outside the discipline, preparing them to confront open-ended, complex, dynamic, and interconnected challenges [1].

3. Research objective: Comparative overview of pedagogical practices in architecture schools

This study is based on knowledge and experience exchange among partner higher education institutions (in further text: HEIs) in the Western Balkans and EU countries participating in the research network established through the Erasmus+ project APLE [17]. The aim of the project includes identifying and developing frameworks for introducing, implementing, or upgrading practical learning within the official academic curriculum. The educational innovations focus on supporting the students in engaging with real-world architectural challenges and ensuring their involvement is acknowledged through standardized evaluation criteria. The first stage of the study consisted of an inductive exploration of practical education models across seven architecture schools in diverse cultural contexts, including institutions in Italy, Norway, Croatia, Montenegro, and Bosnia and Herzegovina. The second stage of the research involved defining the general criteria for categorizing various modes of practical learning in the field of architecture.

The common approach among the HEIs participating as EU partners in the APLE project involves the integration of internships into their study programs. However, this integration varies in terms of formal definitions and the degree of alignment with the curriculum. Additionally, architecture schools in Zagreb, Rome, and Trondheim all offer courses and studios that emphasize context-based assignments, collaboration with external stakeholders, and even hands-on, experiential learning. University of Zagreb – Faculty of Architecture shares with Western Balkan partners their long-standing expertise in integrating practice within architectural education through its academic platform. La Sapienza University of Rome – Faculty of Architecture blends academic theory with real-world engagement through design studios, workshops, and professional collaborations. The program also promotes internships and fieldwork, preparing students to respond to contemporary architectural challenges with a grounded and practice-oriented perspective. Norwegian University of Science and Technology, Trondheim, stands out for its research-driven *Studio Beta*, where students engage in live design-build projects and full-scale outdoor interventions. Practical learning is enriched through immersive workshops that merge artistic methods with architectural practice. This model fosters a holistic understanding of space-making through direct, hands-on experimentation and interdisciplinary collaboration.

Though coping with different challenges, the Western Balkan partners have been striving to integrate more community engagement, institutional partnerships, and a strong student association, fostering real-world application of architectural knowledge. The level and modes of implementation of practical learning models in Montenegro and in the three cities of Bosnia and Herzegovina—Sarajevo, Banja Luka, and Mostar—have varied significantly. As the coordinator of the APLE project, the University of Sarajevo - Faculty of Architecture has been implementing a dynamic model of practical education opportunities through initiatives such as *Archipraxis* networking, stakeholder events, guest lectures, and a range of context-based assignments, site visit, study trips and studio projects in connection with institutional partnership. Some of the key strategic goals of this school include the development of *Pop-Up Laboratories*—Core, Virtual, and Temporary Labs—which support experimental learning through modeling, 3D printing, and on-site prototyping. University of Banja Luka – Faculty of Architecture and Civil Engineering emphasizes hands-on experience through stakeholder events, public APLE Pop-up Cafés, and experimental Pop-Up Lab projects like the *Red Studio K67*. With a platform like *APLEMania* for start-up incubation and materials-based studio projects, the school nurtures innovation and entrepreneurship. The Archi(E)scape initiative and a strong culture of workshops further support experiential learning grounded in collaboration with professionals. In the University of Montenegro – Faculty of Architecture Podgorica, practical training is rooted in context-sensitive design and real-world implementation. Students gain field experience through construction site visits, integrated workshops with international collaboration, and stakeholder partnerships. The curriculum promotes learning by doing, encouraging students to test ideas through built interventions and project-based studios. The Faculty of Civil Engineering, Architecture and Geodesy, University of Mostar, has already been implementing an internship program within the first cycle of architecture studies, while the courses and studios are often accompanied by visiting lectures by professionals from industry and the professional sector.

Based on all these variety of different options for students' involvement in practicing architectural design, ranging from guest lectures, design studios inside institutions or outside, to internships taking place at offices or construction sites, assessment criteria were established to categorize practical learning models according to their complexity, scale, available resources, timeframe, and the location of implemented activities. This categorization should help to reach the principal objective of this research, to develop an evaluation matrix based on criteria derived from the APLE project, as well as from prior collaborative initiatives. The matrix will serve as a methodological tool for integrating new models of practical learning into architectural education.

4. Methodology for assessing practical learning models in architecture schools

Development of the matrix adopts a comparative methodology aimed at evaluating the abovementioned diverse models of practical learning across several EU and Western Balkan HEIs. The core objective to develop a robust, context-sensitive evaluation framework—the Practice Typology Matrix— should follow contemporary perspectives on the field and address the interrelationship among its three central pillars: design-based teaching, professional practice, and research. To achieve this, the

study combined primary data collection through workshops, site observations, surveys, and interviews with comparative institutional analysis. This multi-method approach gave a holistic understanding of how practical learning in architecture is defined, implemented, and experienced in different cultural and institutional settings. While this process led to the identification of a core set of comparable properties for each type of activity, further refinement and data preprocessing were essential. This step was critical in allowing the methodology to accommodate and process different types of data, both qualitative and quantitative, coherently and comparably. Specifically, the dataset included both categorical variables (e.g., location or institutional recognition) and numerical variables (e.g., duration or number of stakeholders involved). To enable meaningful comparison and cross-institutional analysis, these variables were standardized and, where necessary, restructured into uniform data formats.

To construct a framework that is broadly applicable and flexible enough to evaluate various practical education models, the methodology combined assessment criteria with attributes defining different models of practical learning. However, not all collected attributes could be used as standalone indicators. Some needed to be synthesized into broader evaluative categories. For instance, characteristics related to professional exposure, stakeholder engagement, and equipment available were aggregated into newly defined criteria that captured multi-dimensional aspects of practice. This feature engineering process allowed for the development of higher-level evaluation axes within the Practice Typology Matrix, ensuring that complex and sometimes loosely structured data could be transformed into coherent inputs for comparative analysis.

This approach enabled the methodological framework to accommodate variation while preserving analytical clarity. It also ensured that the Practice Typology Matrix could function as both a descriptive and evaluative tool, capable of reflecting the diversity of practice-based learning models while enabling structured comparison across cultural and institutional contexts.

For easier understanding of the framework introduced and its results, the number of attributes needed to be limited to a two-dimensional visualization chart (Figure 2). Throughout the analyses, the main grade of practically-engaged learning models was their scale, or complexity, in terms of engagement in real-world architectural practice. A numerical model for comparative analysis needs to include different features and result in a comparable grade, universally calculated for each model. Thus, in a mathematical sense, each practically-engaged model was represented as a vector, with its magnitude representing the grade or scale of the practical learning model.

The grading system of the Practice Typology Matrix is based on two groups of quantitative attributes representing two numerical axes of a grade vector – Resources, Duration, and Formality as categorical data. The “Resources” value is based on features that include both numerical and categorical data. Numerical data included the budget allocated, the number of different stakeholders involved, and the number of architectural experts and practitioners involved, all of which are strongly correlated [18]. Categorical data included private/public interest, working space conditions, and equipment provided. Since categorical data had somewhat subjective estimations, only numerical values were included in the vector axis, keeping categorical data as additional information for further analyses and estimations. The “Duration” value is based on numerical data of the timespan of the event. This axis could also account for categorical data of the frequency of occurring events. Still, this feature is also kept as additional information since its relevance in terms of the scale of practical learning models is rather low. The third dimension shows “Formality” and in an initial Practice Typology Matrix is based on categorical data of location, obligation, payment, ECTS credits allocation, and legal agreements – all included as votes in a general qualitative info on formality – yes or no.

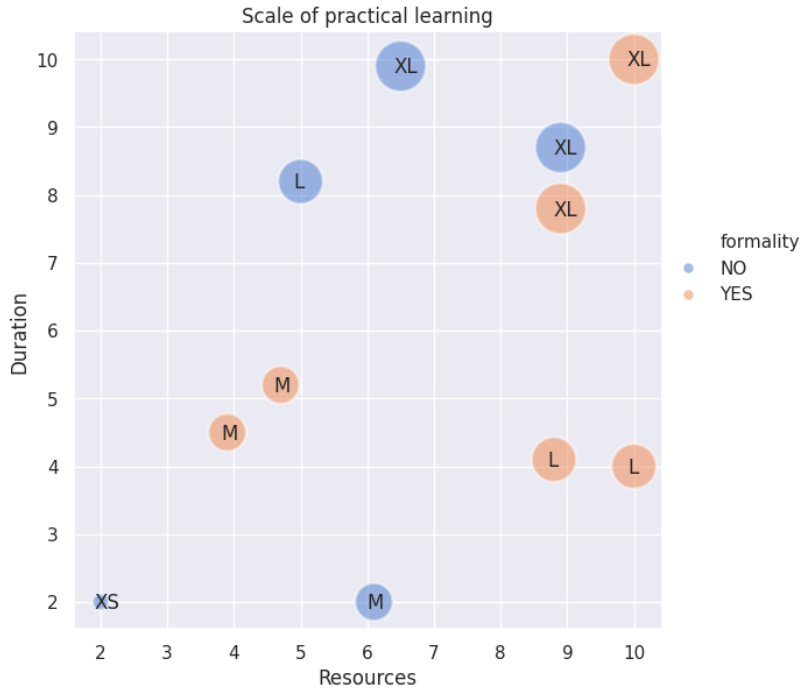

Fig. 2. Diagram illustrating quantitative and qualitative variations of pedagogical models of practical learning in architecture schools. Source: Authors

The classification data collected, consisting of additional information for each practical learning model from different universities, is optionally visualized as the third axis of comparable vectors. This categorical dataset is used as an additional score to further refine the scale of a practical learning model observed.

5. Practice Typology Matrix

The Practice Typology Matrix developed through this research offers a general overview of existing practical learning models organized by the APLE project partner HEIs, as well as a validation of the results aligned on a complexity scale (Figure 3).

This chart synthesizes the key elements introduced as inputs aimed at strengthening the practical dimension of architectural education. It is structured around three shared pillars that serve as common criteria across all practical learning models: formality, resources, and timeframe. The "resources" pillar includes both technical and human contributions, provided and shared by stakeholders from academia and the professional sphere. At the core of the chart is a focus on students, who benefit from enhanced practical components in their education, leading to the development of stronger practical skills, wider set of capacities, and deeper knowledge.

The resulting pedagogical models vary in size and complexity, depending on both qualitative and quantitative inputs for all involved attributes. These include factors such as timeframe (duration and frequency of activities) and technical resources provided by all stakeholders, encompassing space, equipment, and budget. Based on these inputs, the models can be classified along a scale from XS (extra small) to XL (extra large), with intermediate categories of small (S), medium (M), and large (L). For example, XS activities may include visiting lectures by professionals, or site visits. Small (S) activities might consist of context-based assignments that challenge students to apply theoretical knowledge in specific situations. Medium (M) activities can involve collaborative design tasks or case studies with external stakeholders, such as contractors or public institutions, with potential implementation of the project. Large (L) activities encompass more immersive experiences, including Live Studios or hands-on workshops that facilitate active, project-based learning. Finally, XL activities typically involve high-level, in-depth experiences like internships or prototype development, where students engage in real-world projects and contribute to tangible outcomes. Each level of activity corresponds to increasing levels of complexity, time commitment, and resource involvement, allowing for a varied and adaptable approach to practical learning in architectural education.

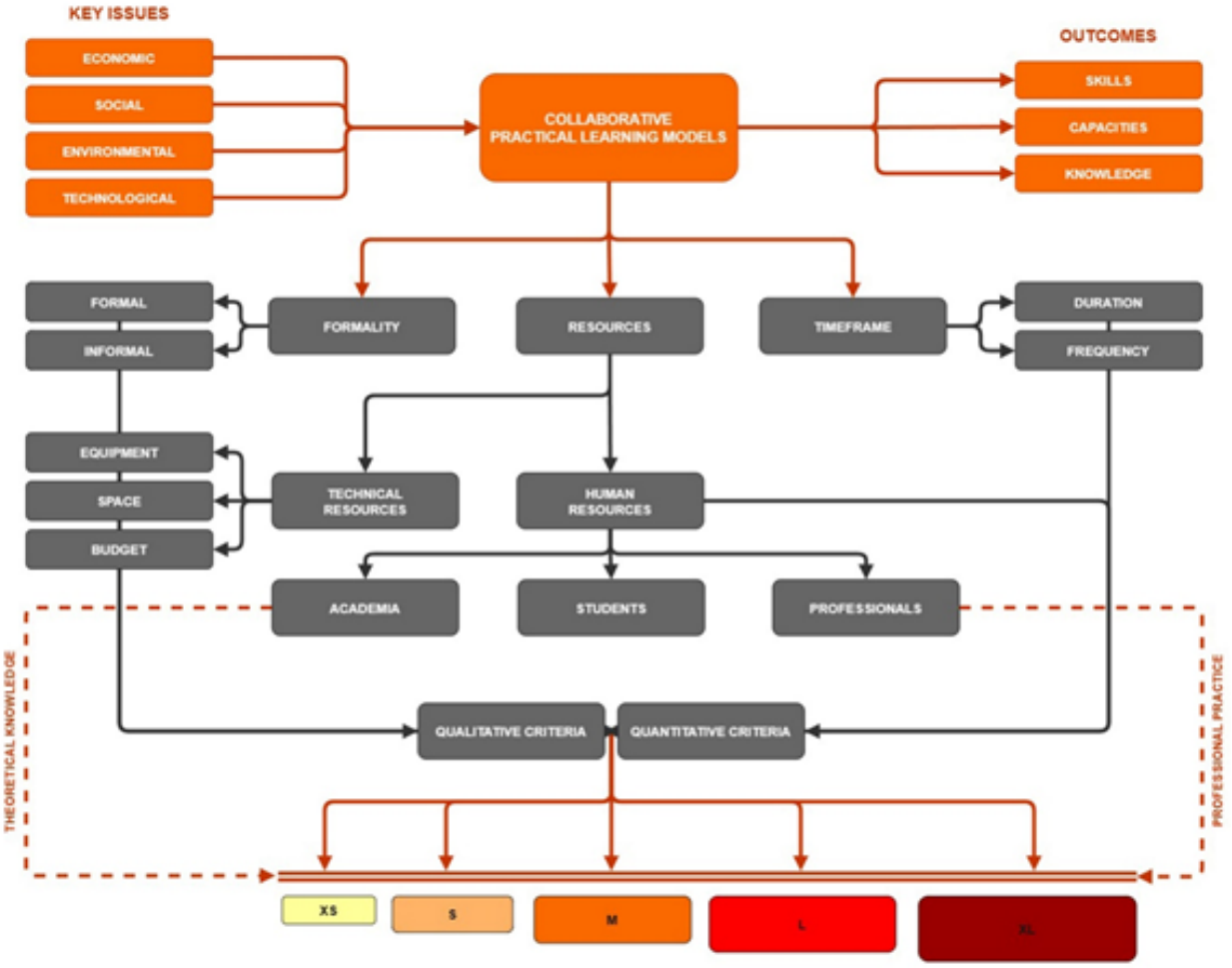

Fig. 3. Practice Typology Matrix. Source: Authors

The Practice Typology Matrix is defined as a methodological tool for evaluating existing practical learning models by positioning newly defined models on the same complexity scale as the existing ones. This was made possible by extracting features of existing models, making them comparable within the limits of the collected datasets. Newly defined practical learning models could now be comparatively analyzed and evaluated efficiently before incorporation in the curricular reform.

Finally, the identification of the best practices and strategies for integrating practical, real-world experience into the architectural training process will lead to actionable insights not only for local implementation but for the improvement of architectural education globally. The comparative methodological framework, here defined as the Practice Typology Matrix, was developed both as a tool for a comprehensive classification and evaluation of these practices and a way to visualize and compare collected data.

6. Conclusion

This research investigates various approaches to strengthening the practical component of architecture education. The study is based on research conducted within a consortium of higher education institutions (HEIs) from Italy, Norway, Croatia, Montenegro, and three HEIs from Bosnia and Herzegovina. One of the primary challenges was identifying how practical education is defined—linguistically, theoretically, and practically—across different cultural contexts. Data was gathered through a combination of workshops, site observations, pilot projects, surveys, and interviews, which provided valuable insights into the diverse approaches to practical learning. These approaches vary in scale, complexity, professional engagement, and the time spent outside the studio, but all share a common focus: advancing practical learning models in architectural education.

Following data collection, the various activities were classified according to predefined criteria, including resources, timeframe, and formality. To highlight the variations in complexity and scale of different approaches across seven architecture schools, a diagram was developed to illustrate both the quantitative and qualitative differences in pedagogical models of practical learning. The findings were then synthesized into a Practice Typology Matrix, a chart that consolidates all the inputs, variables, and outputs, effectively bringing together the diverse approaches to practical learning in architecture education. The Practice Typology Matrix offers significant applicative value and benefits through its comprehensive overview and systematic classification. It encompasses a wide range of activities—both formal and informal—across diverse educational backgrounds, socio-economic settings, and cultural contexts. In addition to distinguishing levels of formality, the Matrix reveals causal relationships between key factors such as available resources, timeframe, and identified challenges. These elements collectively influence the scale, complexity, and ultimately the learning outcomes of the activities undertaken. By using this tool, architecture schools can identify both universal and context-specific attributes and criteria for evaluating and enhancing their pedagogical strategies. This contributes to a more effective integration of professional practice within architectural education.

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