submitted: 30.06.2023. UDC 72:37(497.11)
accepted: 22.07.2023. *original scientific paper* 7.012:72(497.11)

A COMPARATIVE STUDY ON ARCHITECTURAL EDUCATION IN THE REPUBLIC OF SERBIA

Olivera Dulić[1]

Abstract

Architecture plays a vital role in the development and transformation of societies, serving as a crucial component that requires highly skilled professionals. Architectural education holds immense significance as it plays a pivotal role in equipping students with the essential knowledge, skills, and competencies needed to meet the demands of the architectural profession. The particularity of teaching architecture lies in applying a unique learning model called design studio, which is entirely different from traditional forms of university education in its methodology. The research presented in this paper is a preliminary and exploratory study of teaching architectural design skills at academic institutions in the Republic of Serbia. To make an overview of the current situation in the field, the research uses the methods of document analysis and desk-based curriculum review with the aim of comparative assessment of the established structure of study programs. The research results presented in this paper represent the first step towards a comprehensive investigation of learning and teaching architecture in Serbia. Researchers still do not consider this topic adequately and systematically, although our country has a tradition of educating architects for almost two centuries.

Keywords: *Architectural education, Architectural pedagogy, Design studio, Studio methodology, Curricula comparison*

[1] PhD, Assistant Professor, University of Novi Sad, Faculty of Civil Engineering Subotica, e-mail: olivera@gf.uns.ac.rs

1. INTRODUCTION

The field of architecture is a critical component in the development and transformation of societies, requiring highly skilled professionals. Architectural education equips students with the necessary knowledge, skills, and competencies to meet the profession's demands. This paper presents a comprehensive comparative study on architectural education in the Republic of Serbia, intending to assess the current state and identify areas for improvement.

Boyer and Mitgang [1] state that education in various fields of design (architecture, landscape architecture, interior design, graphic and industrial design) provides a model for cultivating critical, synthetic and creative thinking. As a vital element of this form of teaching appears the *design studio*, which promotes critical and creative problem solving – a concept recognised in the literature as *design thinking* [2]–[7]. Traditionally, the design studio is considered the most crucial component of the educational program in architecture schools. As such, students are expected to understand, present and defend design ideas and acquire new techniques and skills [8].

In the last few decades, universities and schools of architecture have invested significant efforts in improving design education, with the primary intention of enriching the purely artistic vision of architecture through the insertion of scientific knowledge and social responsibility [9]. In support of the turmoil in the development of architectural education, Wang [10] also confirms that a change in how teachers articulate their epistemology and methodology is necessary. It is precisely in this that the research presented here finds its justification and foundation.

The research presented in this paper is exploratory, examining a selection of architecture schools in the Republic of Serbia and comparing them regarding the curricula directed toward teaching architectural design skills. Being a preliminary study, this paper attempts to recognise and highlight patterns and trends in architectural education in our country, particularly the part addressing teaching architectural design skills. Furthermore, this paper presents a first step toward a better understanding the research problem and suggests further research needed in this field.

2. LITERATURE REVIEW

It is essential to establish a solid theoretical framework for local research whose results cannot be easily generalised. In addition to the theoretical framework defining the basic concepts in the field of study, it also provides an overview of related research. Furthermore, it enables discussion of the results, which become significant and valid.

Any discussion of architectural education, whether at a general or specific level, should consider the views expressed in the Charter for Architectural Education prepared by the International Organization of Architects. Therefore, this theoretical background shall find its basis in the general objective of architectural education, as stated in this Charter: "Architectural education develops the capacity in students to be able to conceptualise, design, understand and realise the act of building

within a context of the practice of architecture which balances the tensions between emotion, reason and intuition, and which gives physical form to the needs of society and the individual" [11, p. 6].

There is a growing body of literature on general principles of architectural education. In a seminal paper [12], Farivarsadri analysed the pedagogical dimension of introductory design education. This paper highlights the objectives of this education, the course content and the methods used. Furthermore, it proposes a critical, participatory, and student-centred introductory design education framework. Öztürk and Türkkan [13] emphasise the importance of the design process itself as a methodological tool in architectural education. According to these authors, the process-based approach to architectural education allows the possibility of addressing elusive issues that underlie design practice. In [14], the authors investigated the theoretical aspects of the design studio and provided a theoretical framework grounded in the systematic knowledge of the mutual relationship among design, human environment and social practice. A more recent paper by Soliman [15] proposed appropriate teaching strategies for the architectural design process in design studios. The author offers a theoretical and practical approach to managing design studios in the research.

A significant study by Ghonim [16] applied analytical methodology in analysing the components of architectural competencies and investigated a sample of thirty undergraduate architectural programs worldwide. The methods presented in this paper are pivotal for the subject research. In another study [17], the same author recognises that its components and course structure should be analysed and categorised to analyse an architectural program. Furthermore, Ghonim draws our attention to the fact that the classification of these components may vary according to the perspective and intentions of each study.

A comprehensive study of architectural education in Australasia [18] provided the first detailed overview of architectural schools, curricula and students across Australia, New Zealand and Papua New Guinea. This book describes architectural education's historical, political, and cultural characteristics and outlines methods, patterns, and approaches for studying and teaching architectural discipline. Additionally, this research summarised many findings over the following categories: the curriculum, the design studio concept, methods of assessment and evaluation and the resources used in teaching [18, pp. 172–174]. Based on this very complex and meaningful study, we can see how the learning and teaching of architectural design should be observed and studied in the Republic of Serbia and eventually in the entire territory of the Western Balkans.

The first investigations of trends in architectural education in Arab countries are presented by Salama and Amir [19]. This study primarily investigates how architectural education in these countries is aligned with contemporary trends and guidelines indicated by the international community. After the presented results, this study suggests improving architectural education and respecting Arab culture and tradition. The mentioned study's importance is finding a way for the local interpretation of the general principles of architectural education.

Finally, a group of authors conducted a comparative study addressing sustainability in architectural education [20]. Although the research presented below does not deal with the concept of sustainability, the mentioned work is

significant because of the methodological approach and how the architectural curricula were analysed.

3. METHODOLOGY

Architectural design skills are a part of the syllabi of numerous higher education institutions in our country. These institutions vary from strictly architectural schools through art faculties and then faculties of civil engineering, both of which focus a component of their study program on architectural design courses. Apart from the academic higher education institutions, courses with architectural design content also appear in the curricula of higher professional studies.

Taking into account the scope of the present paper, the content presented focuses solely on the architectural education programs that grant an academic qualification for registration and practice of architecture. In the Republic of Serbia, there are five such higher educational institutions, and their name, associated universities, level of study and other introductory data are given in Table 1. For the sake of clarity of the text, in the following, these institutions will be referred to by acronyms that are shown in Table 1 in the final column.

Table 1. Basic information on the higher education institutions that are the subject of the present research

	Name of the educational institution	Associated university	Study programme	Level of study	Duration of study (in semesters)	Number of newly enrolled students	Acronym in the following text
1	Faculty of Architecture	The University of Belgrade	Architecture	undergraduate / integrated	8/10	240+64	**ARHUB**
2	Faculty of Technical Sciences	University of Novi Sad	Architecture	undergraduate	8	120	**FTNARH**
3	Faculty of Civil Engineering and Architecture	University of Nis	Architecture	integrated	10	160	**GAFARH**
4	Faculty of Technical Sciences in Kosovska Mitrovica	University of Pristina	Architecture	undergraduate	8	40	**KMARH**
5	Department for Technical Sciences	State University of Novi Pazar	Architecture	integrated	10	60	**DUNPARH**

The study presented in this paper is of a preliminary and explanatory nature. It represents the first step in a comprehensive survey of architectural education on the academic level in the Republic of Serbia. The study adopts a comparative research approach, utilising quantitative methods. Data collection involved a review of existing literature and an analysis of curricula from five educational institutions presented in Table 1. The collected data was analysed to identify architectural education patterns, trends, and discrepancies. To be completely objective, all

information is obtained from each institution's published media on their respective websites.

Once the schools are selected, their curricula are studied from the quantitative perspective on two levels. First, the proportion of courses dealing with architectural design for each year of study and for each school is established using descriptive statistics and Microsoft Excel software. Then, the total number of courses related to architectural design in the entire curriculum for each school is determined again using descriptive statistics and the same software. Finally, the proportion of ECTS credits for architectural design courses is determined concerning the total number of ECTS credits.

The nature of the present research requires the application of qualitative research methods for results to be fully valid and reliable. Applying qualitative methods enables a deeper analysis of the preliminary results obtained by quantitative methods. However, due to limitations in the paper's length, only the research's quantitative aspects are presented here, while the qualitative aspects will be published elsewhere.

4. RESULTS AND DISCUSSION

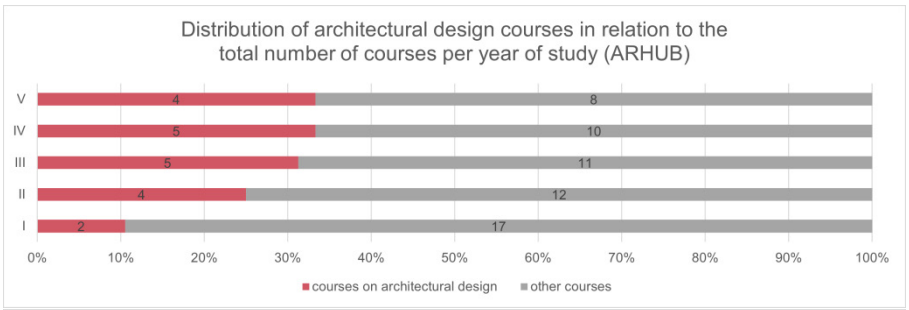
This section will present the results obtained by the previously described methods. After delivering the results, each will be interpreted and discussed in a broader context. At the end of the discussion, the results will be summarised, and guidelines for further research will be presented.

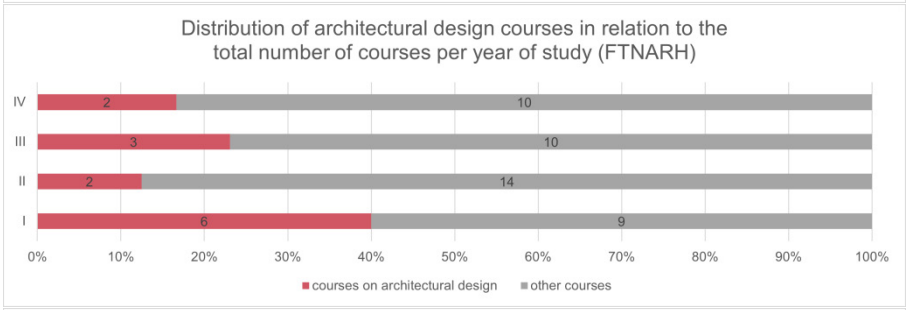
Before further analysing study programs, we will investigate Table 1, which shows the academic institutions offering study programs in Architecture. As Table 1 shows, Architecture studies are offered at five different schools and universities in the Republic of Serbia. It is also noticeable that undergraduate academic studies, lasting eight semesters (240 ECTS), and integrated academic studies, lasting ten semesters (300 ECTS), are equally offered in our country. Based on the information on the enrolment of new students available on the websites of these university institutions, enrolment for a total of 684 students was announced in the upcoming 2023/24 school year. Out of the 684 newly enrolled students, the number of state-funded enrolments at these five faculties is 417. According to publicly available data [21], the total number of state-funded enrolment places in all study programs of undergraduate and integrated studies at state universities in the Republic of Serbia in the upcoming 2023/24 school year is 17,882. Based on this, we can notice that architecture first-year students occupy only two per cent of the total number of state-funded enrolled students in the new school year. Considering the importance of the architectural profession to society, this is a relatively small share.

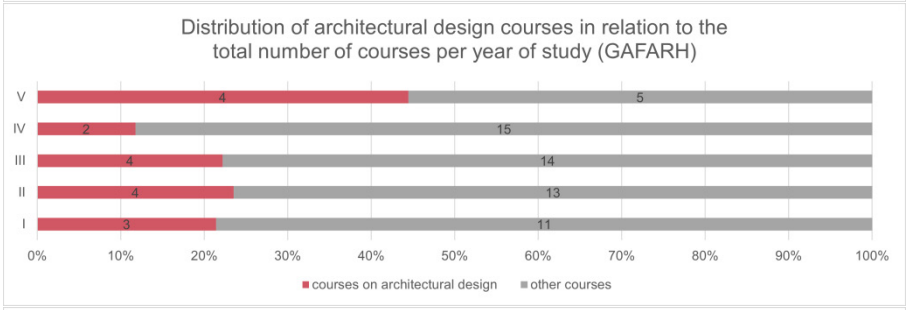
The primary results of the curriculum comparison of the five analysed architecture schools are given in Figure 1. Each of the five graphs shows the ratio of courses directed towards architectural design proportionate to all other courses per year of study. The year of study is indicated on the left side in Roman numerals from the highest to lowest. Furthermore, the percentage of architectural design courses in relation to all other courses is given.

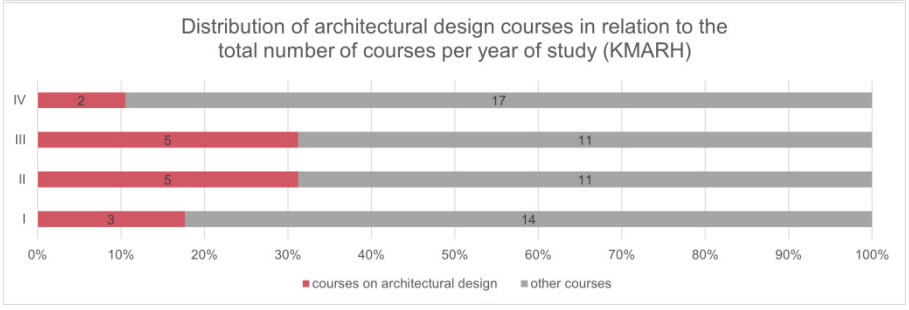
As we can see in the graphs shown in Figure 1, the rate of courses related to architectural design ranges from 10 to 45 per cent. At the same time, we can see

that the distribution of courses on architectural design per year of study does not follow the same pattern at each school. FTNARH (graph 2) has the largest number of architectural design subjects in the first year of study, while in the last year of study, that number is highest at GAFARH (graph 3). In other schools, the largest number of architectural design courses appears in the middle of the study program.









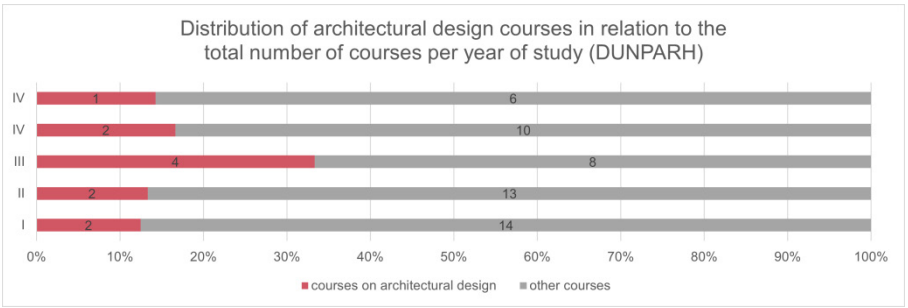


Figure 1. Distribution of courses on architectural design in proportion to the total number of courses per each year of study at the five observed study programs, source: Author

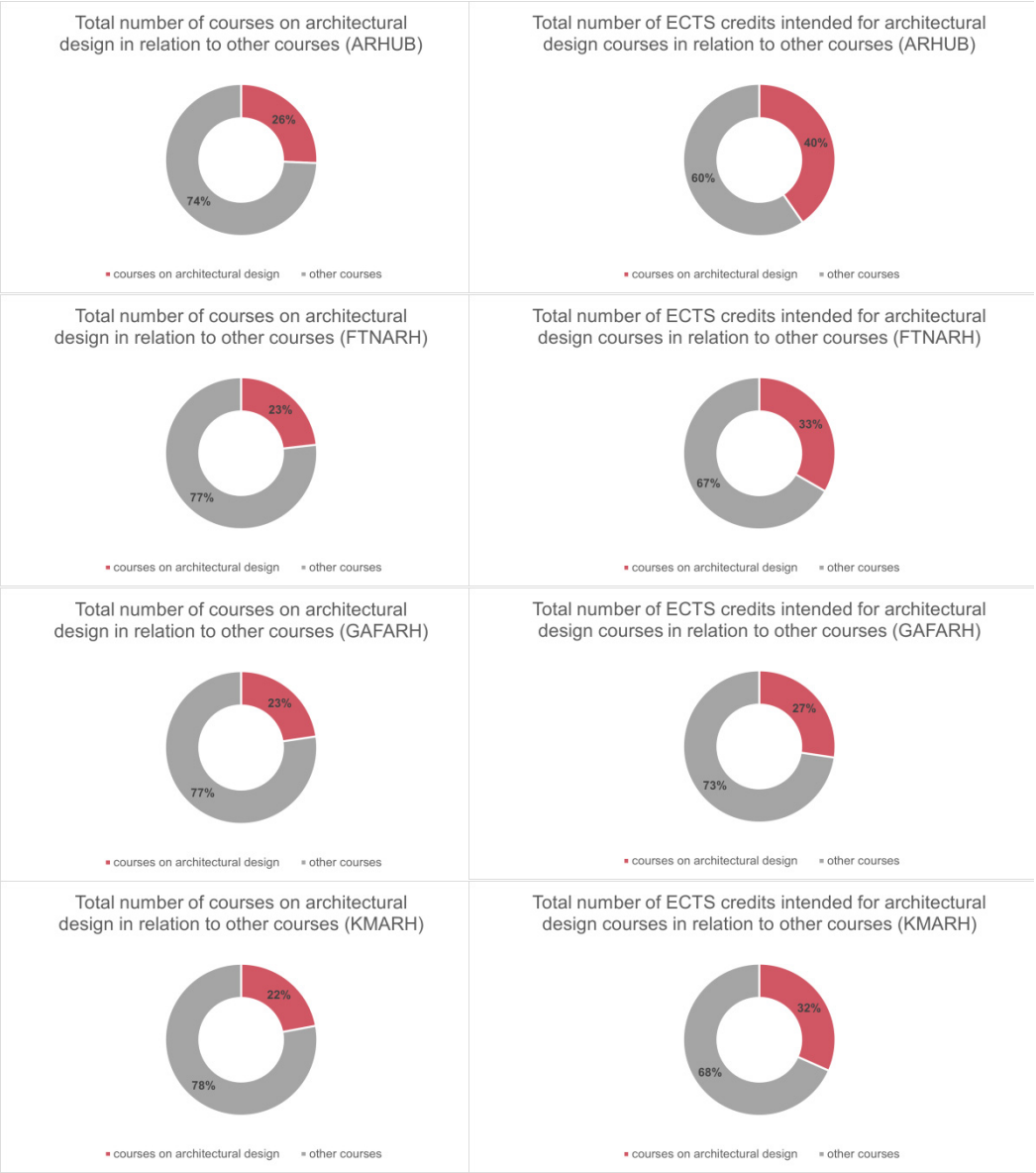
Overall, the largest number of architectural design courses appears at ARHUB (graph 1). That number is almost constant throughout all years of study, while the lowest number of architectural design courses is at DUNPARH (graph 5). We can generally conclude from Figure 1 that courses on architectural design are present in all years of study in all schools and that their percentage is approximately 25 per cent in relation to all other courses. As stated in the literature [16], design courses represent the spine of architectural education, where students apply all of their knowledge and skills. In this context, the question can be raised whether the students from our country are overloaded with other courses, while courses on architectural design, undoubtedly the most important, occupy only a quarter of the content in the analysed curricula. This is a very interesting primary result, thus further qualitative and quantitative research is needed to offer a reliable and valid explanation for this critical issue.

After consideration by year of study, the overall curricula were considered. Figure 2 (left) shows the summarised results from Figure 1, i.e., the share of the courses related to architectural design in the total number of courses for the entire study program for undergraduate or integrated academic studies for each of the five analysed architecture schools.

The results shown in this way best illustrate the facts already evident from Figure 1, namely that the courses on architectural design occupy 18% to 26% of the total number of courses in the studies. The largest number of courses related to architectural design appears at ARHUB – 26% (graph 1, left), while the lowest is at DUNPARH – 18% (graph 5, left). The number of courses related to architectural design in comparison to all other courses at the remaining three schools is almost equal and amounts to 23% at FTNARH (graph 2, left) and GAFARH (graph 3, left) and 22% at KMARH (graph 4, left).

It is well-known that students' academic load is expressed in the ECTS points or credits. ECTS stands for *The European Credit Transfer and Accumulation System* and is a European Higher Education Area tool for making studies and courses more transparent [21]. Since 60 ECTS credits are equivalent to a full year of study, the faculties we looked at have a range of ECTS points from 240 to 300, depending on whether the studies are undergraduate or integrated academic studies. Even though the level of studies differs, we were able to investigate and show the share of courses on architectural design in the total academic load of the students expressed through ECTS points. With this analysis, significant and exciting results were obtained, shown on the right side of Figure 2.

First of all, what can be observed, even by a cursory inspection of the right side of Figure 2, is that the courses on architectural design have a more significant share in the number of assigned ECTS credits compared to the total number of courses. This percentage ranges from 27% to even 40%, hinting at the importance of architectural design courses in architectural education. The largest share of ECTS points belonging to courses from the domain of architectural design is evident at ARHUB (40% – graph 1, right). It is essential to mention that this faculty also had the largest share of architectural design courses in the curriculum, as previously described. Also, this institution enrols the largest number of students (see Table 1). This result is followed by FTNARH and KMARH with 33% and 32%, respectively (graphs 2 and 4, right).



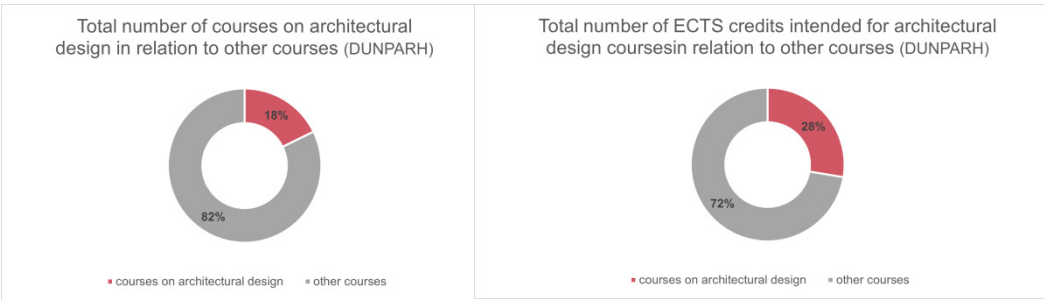


Figure 2. A summary of the total number of courses on architectural design in proportion to all other courses for the entire study program (left); A summary of the total number of ECTS credits for courses on architectural design in proportion to all other courses for the entire study program (right), source: Author

The smallest share of ECTS points intended for courses on architectural design is present at DUNPARH – 28%, followed by GAFARH – 27%. As stated in the literature [15], student work is most heavy on design courses, and therefore each course must be carefully developed to ensure that students are not overloaded. For example, the same significant research states that a design course with six credits means more than 21 hours of work per week of the semester [15, p. 25]. Therefore, these results potentially indicate that architecture students in our country are overloaded and overwhelmed by the amount of work needed to finish their studies. The fact of student overload is also recognised in the literature [15], [18], [22]. However, we must remember that the present research is preliminary, and it may still be too early to draw such sharp conclusions.

Based on the preliminary quantitative results presented in this paper, there is a clear need for a comprehensive study of architectural education in the Republic of Serbia. In terms of the direction of future research, several topics can be highlighted that would be interesting to the research community that deals with the issues of architectural pedagogy. First, based on the presented research, the curricula should be further examined to establish the distribution of courses that develop future architects' basic competencies, knowledge, skills and design. This model of architectural competencies is well established and already described in the literature [16], [23]–[25].

Then, as emphasised several times throughout the paper, it is necessary to examine the content of the courses dealing with architectural design in the Republic of Serbia more deeply. Qualitative research would make it possible to establish whether our country's approach to teaching architectural design is homogeneous or heterogeneous. Also, qualitative research would confirm whether there is a dominant methodology for teaching architectural design skills. Finally, it would be useful to examine architectural education from the perspectives of teachers and students, which is the author's plan for future research.

5. CONCLUSIONS

This research represented the first step in studying architectural pedagogy in the Republic of Serbia. A solid theoretical framework has been established that enables linking the results with the international context. Also, the methods that should allow the realisation of such a complex undertaking are presented. Bearing

in mind the importance of architecture for society, both in the past, present and future, it is entirely legitimate and justified to direct the attention of the academic community to the importance of research in architectural pedagogy.

Preliminary results that potentially indicate an imbalance between the importance of architectural design courses and their position in the curriculum in our country direct attention and emphasise the necessity of further studies.

REFERENCES

[1] Boyer Ernest L., Mitgang Lee D.: **Building Community: A New Future for Architecture Education and Practice. A Special Report.** *Princeton, NJ: Carnegie Foundation for the Advancement of Teaching*, 1996.

[2] Rowe Peter G.:**Design Thinking**. Cambridge, Massachusetts: MIT Press, 1987.

[3] Kokotovich Vasilije, Purcell Terry: **Mental synthesis and creativity in design: an experimental examination**. *Design Studies.*, vol. 21, no. 5, pp. 437–449, 2000, doi: 10.1016/S0142-694X(00)00017-X.

[4] Senturer Ayse, Istek Cihangir: **Discourse as representation of design thinking and beyond: Considering the tripod of architecture - Media, education, and practice**. *International Journal of Art and Design Education.*, vol. 19, no. 1, pp. 72–85, 2000, doi: 10.1111/1468-5949.00204.

[5] Dorst Kees, Cross Nige: **Creativity in the design process: Co-evolution of problem-solution**. *Design Studies.*, vol. 22, no. 5, pp. 425–437, 2001, doi: 10.1016/S0142-694X(01)00009-6.

[6] Smith Korydon: **Curiositas and studiositas: Investigating student curiosity and the design studio**. *International Journal of Art and Design Education.*, vol. 30, no. 2, pp. 161–175, 2011, doi: 10.1111/j.1476-8070.2011.01691.x.

[7] Tepavčević Bojan: **Design thinking models for architectural education**. *The Journal of Public Space.*, vol. 2, no. 3, pp. 67–72, 2017, doi:10.5204/jps.v2i3.115.

[8] Casakin Hernan: **Metaphors in the Design Studio: Implications for Education**. in *DS 33: Proceedings of E&PDE 2004, the 7th International Conference on Engineering and Product Design Education*, 2004, pp. 265–273.

[9] Kowaltowski Doris, Bianchi Giovana, De Paiva Valéria Teixeira: **Methods that may stimulate creativity and their use in architectural design education**. *International Journal of Technology and Design Education.*, vol. 20, no. 4, pp. 453–476, 2010, doi: 10.1007/s10798-009-9102-z.

[10] Wang Tsungjuang: **A new paradigm for design studio education**. *International Journal of Art and Design Education.*, vol. 29, no. 2, pp. 173–183, 2010, doi: 10.1111/j.1476-8070.2010.01647.x.

[11] **UIA, UNESCO-UIA Charter for Architectural Education.** *International Union of Architects.*, p. 12, 2017, [Online]. Available: https://www.uia-architectes.org/webApi/uploads/ressourcefile/178/charter2017en.pdf. (29.6.2023)

[12] Farivarsadri Guita: **Critical view on pedagogical dimension of introductory design in architectural education**. in *Proceedings of AEE 2001- Architectural Education Exchange, Architectural Educators: Responding to Change*, 2001, pp. 1–11.

[13] Öztürk Maya N., Türkkan Elif E.: **The Design Studio as Teaching / Learning Medium – A Process-Based Approach**. *International Journal of Art and Design Education.*, vol. 25, no. 1, pp. 96–104, 2006, doi: 10.1111/j.1476-8070.2006.00472.x.

[14] Brandt Caro B., Cennamo Katherine, Douglas Sarah, Vernon Mitzi, McGrath

Margarita, Reimer Yolanda: **A theoretical framework for the studio as a learning environment**. *International Journal of Technology and Design Education.*, vol. 23, no. 2, pp. 329–348, 2013, doi: 10.1007/s10798-011-9181-5.

[15] Soliman Ashraf M.: **Appropriate teaching and learning strategies for the architectural design process in pedagogic design studios**. *Frontiers of Architectural Research.*, vol. 6, no. 2, pp. 204–217, 2017, doi: 10.1016/j.foar.2017.03.002.

[16] Ghonim Mohammed: **Toward calibrating architectural education: An approach to promote students' design abilities**. *International Journal of Architectonic, Spatial, and Environmental Design.*, vol. 11, no. 4, pp. 37–62, 2017, doi: 10.18848/2325-1662/CGP/v11i04/37-62.

[17] Ghonim Mohammed, Eweda Nehad: **Investigating elective courses in architectural education**. *Frontiers of Architectural Research.*, vol. 7, no. 2, pp. 235–256, 2018, doi: 10.1016/j.foar.2018.03.006.

[18] Ostwald Michael, Williams Anthony: ***Understanding Architectural Education in Australasia: volume 1 An Analysis of Architecture schools, Programs, Academics and students***. *Australian Learning and Teaching Council*, 2008.

[19] Salama Ashraf, Amir Abdulgader: **Paradigmatic trends in Arab architectural education: impacts and challenges**. *Paper intended for Publication and presentation at the International Congress of Architecture: The International Union of Architects-UIA: Istanbul. Turkey*, no. May, 2005.

[20] Álvarez Santiago Porras, Lee Kyungsun, Park Jiyoung, Rieh Sun – Young: **A comparative study on sustainability in architectural education in Asia-with a focus on professional degree curricula**. *Sustainability.*, vol. 8, no. 3, 2016, doi: 10.3390/su8030290.

[21] **European Credit Transfer and Accumulation System (ECTS).** https://education.ec.europa.eu/education-levels/higher-education/inclusive-and-connected-higher-education/european-credit-transfer-and-accumulation-system. (29.6.2023)

[22] Curry Terrence Michael: **A theoretical basis for recommending the use of design methodologies as teaching strategies in the design studio**. *Design Studies.*, vol. 35, no. 6, pp. 632–646, 2014, doi: 10.1016/j.destud.2014.04.003.

[23] Krathwohl David R.: **A Revision of Bloom's Taxonomy: An Overview**. *Theory Pract.*, vol. 41, no. 4, pp. 212–218, 2002, Accessed: Jul. 16, 2018. [Online]. Available: https://www.jstor.org/stable/pdf/1477405.pdf.

[24] Arens Robert, Hanus Joseph, Saliklis Edmond: **Teaching Architects and Engineers: Up and Down Bloom's Taxonomy**. *Proceedings of the American Society of Engineering Education Global Colloquium* 2009.

[25] Savic Marko, Kashef Mohamad: **Learning outcomes in affective domain within contemporary architectural curricula**. *International Journal of Technology and Design Education.*, vol. 23, no. 4, pp. 987–1004, 2013, doi: 10.1007/s10798-013-9238-8.