P-ISSN: 2709-6254	Journal of Development and Social Sciences	Apr-June 2024, Vol. 5, No.2(S)
O-ISSN:2709-6262	https://doi.org/10.47205/jdss.2024(5-II-S)32	[327-334]

Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

Assessing the Effectiveness of Bloom's Taxonomy in Architectural Design Studios: A Study on Implementing Outcome-Based Education in Pakistan

[1]Faiqa Khilat*, [2]Beenish Mujahid and [3]Farah Jamil

1. Assistant Professor, School of Architecture and Planning, University of Management and Technology, Lahore, Punjab, Pakistan
2. Assistant Professor, School of Architecture and Planning, University of Management and Technology, Lahore, Punjab, Pakistan
3. Assistant Professor, School of Architecture and Planning, University of Management and Technology, Lahore, Punjab, Pakistan

***Corresponding Author:** faiqa.khilat@umt.edu.pk

ABSTRACT

This research aims to evaluate the effectiveness and implementation of Bloom's Taxonomy specifically in the architectural institutions of Pakistan with design studios taken as a specific case. The Bachelor of Architecture degree program is designed to give architectural education to participants; focusing on developing skills related to building planning and construction. These skills can be achieved by incorporating the outcome-based education (OBE) system in the curriculum focusing on skill and knowledge building. Bloom's Taxonomy is a powerful tool for promoting OBE in education. A qualitative analysis based on a questionnaire survey was conducted among faculty members of recognized institutions offering Bachelor in Architecture programs, using a convenience sampling technique. The results show that incorporating Bloom's Taxonomy in architectural design studios can improve student learning outcomes and critical thinking ability. It is recommended to integrate the Outcome-Based Education system into the curriculum of architecture to enhance graduate learning milestones and guarantee successful completion of the degree program.

KEYWORDS: Architectural Design Studios, Bloom's Taxonomy, Bachelor of Architecture, Curriculum, Outcome-Based Education (OBE)

Introduction

Architecture is a multidisciplinary field. It not only deals with the designing of buildings but with other aspects like human comfort and perception of spaces. Besides all these, architects are also facing a lot of new challenges in which sustainability and innovation is on the top of level. So there is a need to change the architectural education system. Outcome-based education is an effective way to deal with the challenges of the world. The purpose of outcome-based education is to impart specific skills and knowledge relevant to discipline. Bloom Taxonomy developed by educational psychologist Benjamin Bloom provides a framework to faculty members for curriculum development. Benjamin Bloom categorizes learning outcomes into six levels of complexity from remembering to creation.

Bloom's Taxonomy has been widely used in architectural design studios to improve learning outcomes and assessments. It has been particularly effective in promoting creative thinking, problem-solving, and sustainability integration in design education. By understanding and enhancing the significance of Bloom's Taxonomy to be implemented in design studios more effective and engaging learning experiences for students can be generated.

Despite of its potential benefits, it has not been implemented in most of the architectural institution of Pakistan. The aim of this research is to evaluate the implementation and effectiveness of Bloom's taxonomy. The research was conducted with the help of questionnaire survey. A convenience sampling technique was used to distribute the questionnaire among faculty members from selected institutions offering Bachelor of Architecture programs in Pakistan (Arch & Crp, 2022). The research findings will help faculty members to develop more effective teaching approaches and learning outcomes in the curriculum development regarding architectural education in Pakistan. Architecture is a multidisciplinary discipline that is growing very rapidly with the advancement

Methodology

A qualitative analysis based on a mixed-methods approach was used to investigate the application of Bloom's Taxonomy in Bachelor of Architecture programs in Pakistan. Research was divided into three phases: first phase of research includes literature survey. The literature of Bloom's Taxonomy and its significance in education system was studied with the help research papers, books and web browsing. In the second phase, questionnaire survey was done to assess the implementation of Bloom's Taxonomy and outcome-based education in various institutions offering Bachelor of Architecture programs in Pakistan. The list of institutions offering architecture programs was obtained and subsequently filtered to those recognized by the Pakistan Council of Architects and Planners and the Higher Education Commission (HEC). A convenience sampling technique was used to distribute the questionnaire among faculty members from selected institutions. The third phase was based on research analysis. The questionnaire was analysed to determine the integration of Bloom's Taxonomy in Architectural Design Studios. The focus was given on assessing the extent to which faculty members use Bloom's Taxonomy in their teaching practices (Figure 1).

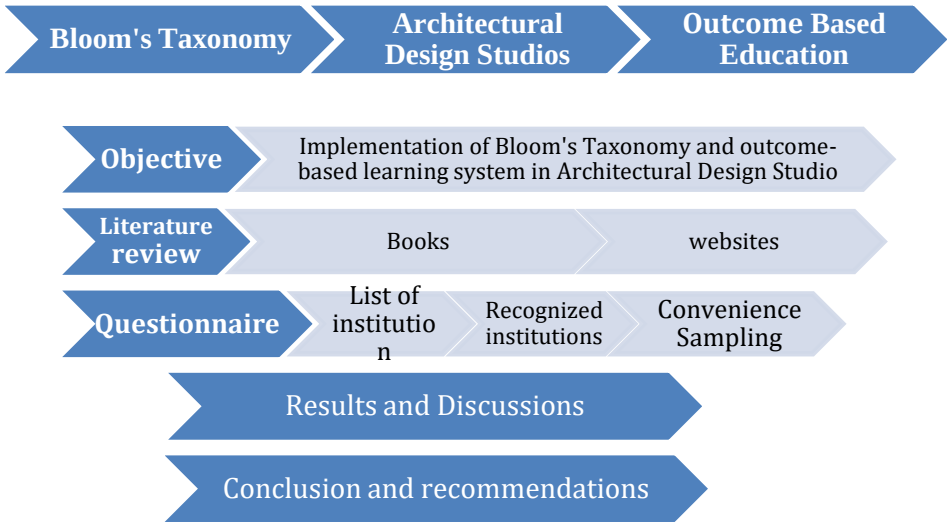

Figure1: Research framework

Literature Review

Architectural design studio encompasses a wide range of aspects that cover the physical and structural characteristics of the buildings. Researches indicate a good architecture not only reflects the physical requirements of the users but also covers the cultural, social, and environmental context. Architectural education is a multi-layered field that involves a deep understanding of many disciplines, including philosophy, value systems, sustainability, structures, and technology. For producing innovative and holistic

architects, architectural education must integrate diverse types of subjects with the practical subject of Design Studio (Ibrahim & Utaberta, 2012).

Design Studio is also considered to be a fundamental part of architecture education, that provides a platform for the students to develop their knowledge, skills, and creativity in a collaborative and supportive environment. In the curriculum of architecture, the Design Studio is the core subject that accounts highest credit hours per week. Other subjects are taken as Allied Sciences and Technologies such as Material and Construction, Structure for Architects, Energy and Environment, History Theory and Critical Analysis, Building Services, Professional Practice, and further Communication Tools to support Design Studio learning(HEC, 2013). Literature shows that the objective of a Design Studio is to equip the students with the skills and knowledge required to develop creative and innovative design solutions that allows a balance of creative and pragmatic thinking(Valsson, 2022).

Studio Learning in Architecture

In architecture education, the studio learning environment created in the design studio is considered to be the most valuable and transformative in terms of learning experience. Working in a design studio offers unique stages and platforms for students to enhance and develop their knowledge, skills, and creativity in a collaborative environment and gives them a hands-on experience. Studio learning and teaching offers a unique set of innovative ideas with many significance and benefits. For the students or participants, it covers the real-world challenges and problem-solving skills that develop critical thinking(Mancini & Glusac, 2020). Also working in a studio provides a collective area or space for the students for their research and experimentation that is essential for the development of artistic and advanced solutions. Furthermore, working in the studio environment promotes a sense of community work and collaboration among students, anticipating teamwork and enhancing their communication skills. These studio participants develop a range of capabilities that are considered important for their success in the field and practice in architecture such as,

- Design thinking and problem-solving skills
- Creativity and innovation
- Communication and collaboration skills
- Technical skills in design software and other tools
- Critical thinking and analysis skills
- Holistic understanding of the built environment and its impact on society

Moreover, the students working in a design studio get a chance to develop a portfolio of their work that showcases their skill set and capabilities. These portfolios can further be used to launch their talents in the field to potential employers and collaborators. The architectural design studio supports the participants to become inspiring designers equipped with the knowledge to influence the built environment positively (Mancini & Glusac, 2020).

Bloom's Taxonomy

Bloom's taxonomy is a system or classification for categorizing the learning objectives and goals in education. It was established in the 1950s by Benjamin Bloom and his colleagues and is still extensively used today in education. It provides a convenient framework for designing learning experiences and knowledge flow and promotes deeper understanding and critical thinking. In the educational system, it develops clear learning objectives, designs assessments and evaluations that line up with learning objectives where it improves teaching and learning strategies. The Bloom taxonomy is a framework

in a hierarchy that catalogues the learning objectives into six levels of complexity, extending from simple recall to complex evaluation (Figure 2).

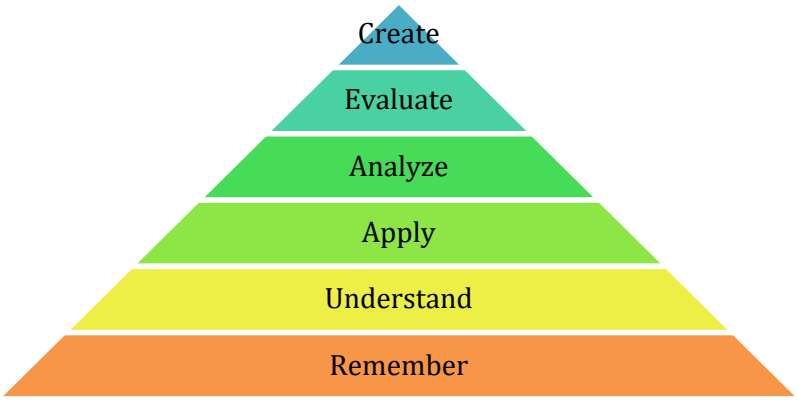

Figure 2: Levels of Bloom Taxonomy Source: (Bloom's Taxonomy, n.d.)

Bloom's Taxonomy has three domains, the cognitive domain is knowledge-based, the Affective domain is Emotion-based and the third psychomotor domain is action-based (Ekramul Hoque, 2020).

The revised Bloom's Taxonomy module is essential in the preparation of course learning outcomes and assessments (Attia, 2021). One of the research discusses that there are various experimentations in the architectural education system as the challenges faced by architectural design students in integrating sustainability measures into their designs and emphasizes the need for a new approach in architectural education to address these challenges, preparing future architects with a high awareness of sustainability and its implications on design and decision-making processes. (Sarhan & Rutherford, 2014). Moreover, other authors discuss that a balance between Design Studio and other subjects throughout an architectural course is needed to ensure effective learning. A balance between Design Studio and other subjects throughout an architectural course is needed to ensure effective learning. The paper outlines important aspects of Architecture Design Studio and proposes a Bloom Taxonomy for Design Studio learning to ensure education objectives are met (Ibrahim & Utaberta, 2012). Bloom's taxonomy could provide an invaluable and indispensable roadmap for crafting effective learning outcomes that drive the whole process of course design. Bloom's taxonomy has been a significant tool in course design for sixty years. Integrating Bloom's taxonomy with other approaches like backward design and Vygotsky's zone of proximal development can be invaluable for crafting effective learning outcomes (Sideeg, 2016).

The cognitive domain that includes the behaviors regarding developing mental skills comprehending the Architectural education that aims to acquire a profession within the efforts of designing and building along with creative solutions. It contains theoretical and practical courses. In this paper; an elective course named 'New Buildings in Historical Environments-Studio' included in the educational program of a student completing the course considered to have various domains of the course as successfully the course of New Buildings in Historical Environment, conservation, where he can classify, explain design, develop and evaluate these areas (Birlik, 2015).

Outcome Based Education

Education is a key driver of economic growth and development, and its impact is felt globally, especially in developing countries. Unfortunately, Pakistan's education sector has struggled to make progress in recent decades. Lack of funding, inefficient budget allocation, and poor management have all contributed to subpar educational

outcomes. In recent years, there has been a rising concentration in Outcome-Based Education (OBE)regarding curriculum development in Pakistan. Outcome-based education is an approach that focuses on what students should be able to do at the end of their learning, rather than just instruction facts (Asim et al., 2021). This approach has the potential to transform the higher education system in Pakistan to student learning outcomes. Initial research regarding the insertion of OBE in the curriculum of architecture programs indicates that collaborating studio-based education provides a platform to incorporate cognitive and behavioural skills that are essential for professional practice. Contemporary education in architecture has shifted from the traditional emphasis on providing students with explicit knowledge and skill sets towards an outcome-based and student-centered educational approach (Savic & Kashef, 2013). Another research discusses the scenario of the Philippines where the implementation and development of an Outcome-Based Education in curriculum design procedure for an undergraduate architecture program has been discussed. (Ozaeta & Fajardo, 2019) . The curriculum development in Pakistan aims to shift from a teacher-centered approach to an Outcome-based education system.

Results and Discussion

Thirty-two responses from faculty members across ten architectural schools in Pakistan have been analyzed to explore the integration of Outcome-Based Education (OBE) and Bloom's Taxonomy in Architectural Design Studios. Only responses from faculty with over five years of experience were considered to ensure a diverse range of insights . The findings express that 75% of the faculty are aware of the module of Bloom's Taxonomy. They have confidence that the levels of Bloom's Taxonomy can be effectively integrated into the Architectural Design Studio environment, with 34.4% emphasizing the affective domain, 43.8% the psychomotor domain, and 59.4% as the cognitive domain. Furthermore, 68.8% of respondents advocate for a curriculum design that primarily focuses on the cognitive level. Additionally, over 80% of the faculty are knowledgeable about the OBE system and its application in professional education, with a majority endorsing its effectiveness in the context of Architectural Design Studio learning.

Table1
Surveyed institutes of Pakistan

Sr. No.	Name of Intuition/University
1	NED University of Engineering and Technology, Karachi
2	Lahore College for Women University, Lahore
3	Bahauddin Zakariya University Multan
4	Indus Valley School of Art and Architecture, Karachi
5	COMSATS University Islamabad
6	University of the Punjab, Lahore
7	Sir Syed University, Karachi
8	University of Southern Punjab, Multan
9	NFC-IET Multan
10	The University of Lahore, Lahore
11	University of Gujrat, Gujrat
12	Aror university, Aror
13	Karachi Institute of Technology and Entrepreneurship, Karachi
14	Nazeer Hussain University, Karachi
15	Hazara University, Manshara
16	University of Engineering and Technology, Lahore
17	Superior University, Lahore
18	University of South Asia, Lahore
19	National College of Arts, Lahore

20	Beaconhouse National University, Lahore
21	University of Management and Technology UMT

Table 2
Teaching experience of the respondents

Teaching experience of the respondents	5-10 Years	11-15 years	16-20 Years	21-25 years	More than 25 Years
	37.5 %	34.4 %	18.8%	-----	9.4 %

Table 3
Implementation of Outcome-Based Education and Bloom Taxonomy

Sr. No.	**Survey Questions**	**Responses**		
		Yes	**No**	**Maybe**
1.	Awareness of Outcome-based education	*81.3%*	----------	*18.8 %*
2.	Institutional curriculum on OBE	*51.3 %*	*21.9 %*	*25%*
3.	Awareness of Bloom taxonomy	*75 %*	*15.6%*	*9.4%*
4.	Institutional curriculum based on bloom taxonomy	*50%*	*15.6%*	*34.4%*

Table 4
Integration of Bloom Taxonomy in Curriculum and Architectural Design Studios

Sr. No.	**Surveyed Questions**	Range(Low to High)					
		0	1	2	3	4	5
1.	Precision of Bloom Taxonomy followed in architectural design studio	12.5 %	3.1%	15.6 %	37.5 %	25%	6.3 %
2.	Adoption of Outcome Based Education in architectural design Studio	9.4 %	6.3 %	9.4 %	40.6%	28.1 %	6.3 %
3.	Effectiveness of Outcome Based Education in Architectural Design Studio	3.1 %	6.3 %	6.3 %	25 %	40.6%	18.8 %

Table 5
Effectiveness and focused achievable level of Bloom taxonomy

Sr. No	**Surveyed Questions**	**Bloom Taxonomy Domain**		
		Affective	**Cognitive**	**Psychomotor**
1.	Level of Bloom Taxonomy achievable in Architectural Design Studio	34.4 %	59.4 %	43.8 %
2.	Bloom Taxonomy More Focused in Curriculum of Architectural Design Studios	34.4 %	68.8 %	37.5 %

Conclusion

The purpose of the research was to evaluate Bloom's Taxonomy's efficacy in architectural design studio learning in Pakistan, emphasizing outcome-based education (OBE). The responses received from the faculty identify that Bloom's Taxonomy could be implemented in the context of an architectural design studio. The study also revealed that the faculty members perceived that more than 80% of the faculty members are aware of the outcome-based education system in Pakistan and its implementation in architectural design studios in the curriculum of architecture. It allows the students to understand goals and guide educational institutions toward completing outcome-based programs. It has been concluded that incorporating Bloom's Taxonomy can enhance student learning outcomes.

Recommendation

The research highlights the integration of Bloom's Taxonomy and Outcome-based Education system into the architectural education system in Pakistan to improve the knowledge and skill development of the students. Therefore, it is recommended to integrate the OBE into the schooling of architects, enhance learning milestones, and guarantee successful graduates. Further research can still be done based on this study to show how Bloom's Taxonomy and outcome-based education system can be implemented in different contexts and if this impacts student performance or not.

References

Arch, B., & Crp, B. S. (2022). *Status Of Educational Institutes Offering*. *7*.

Asim, H. M., Vaz, A., Ahmed, A., & Sadiq, S. (2021). A Review on Outcome Based Education and Factors That Impact Student Learning Outcomes in Tertiary Education System. *International Education Studies*, *14*(2), 1. https://doi.org/10.5539/ies.v14n2p1

Attia, A. S. (2021). Bloom's taxonomy as a tool to optimize course learning outcomes and assessments in architecture programs. *Journal of Applied Science and Engineering (Taiwan)*, *24*(3), 315–322. https://doi.org/10.6180/jase.202106_24(3).0006

Birlik, S. (2015). Taxonomy of the Cognitive Domain: An Example of Architectural Education Program. *Procedia - Social and Behavioral Sciences*, *174*, 3272–3277. https://doi.org/10.1016/j.sbspro.2015.01.993

Bloom's Taxonomy. (n.d.). https://bloomstaxonomy.net/

Ekramul Hoque. (2020). *Educere centre*. 3 Domains of Bloom's Taxonomy. https://educerecentre.com/what-are-the-three-domains-of-blooms-taxonomy/

HEC. (2013). Curriculum of Architecture B.Arch (5-Years). *Higher Education Commission*, *Revised 2008*, 33.

Ibrahim, N. L. N., & Utaberta, N. (2012). Learning in Architecture Design Studio. *Procedia - Social and Behavioral Sciences*, *60*(Figure 1), 30–35. https://doi.org/10.1016/j.sbspro.2012.09.342

Mancini, F., & Glusac, T. (2020). Experiential and integrated learning environments - Teaching urban design studio at curtin university. *International Conference on Higher Education Advances*, *2020-June*, 1045–1053. https://doi.org/10.4995/HEAd20.2020.11192

Ozaeta, E. U., & Fajardo, A. C. (2019). An OBE-centered Development Procedure for a B. S. Architecture Curriculum: Insights on its Application. *Asia Pacific Journal on Curriculum Studies*, *2*(1), 1–6. https://doi.org/10.53420/apjcs.2019.1

Sarhan, A., & Rutherford, P. (2014). Integrating Sustainability in the Architectural Design Educational Process. *ECAADe 32*, *1*, 323–332.

Savic, M., & Kashef, M. (2013). Learning outcomes in affective domain within contemporary architectural curricula. *International Journal of Technology and Design Education*, *23*(4), 987–1004. https://doi.org/10.1007/s10798-013-9238-8

Sideeg, A. (2016). Bloom's Taxonomy, Backward Design, and Vygotsky's Zone of Proximal Development in Crafting Learning Outcomes. *International Journal of Linguistics*, *8*(2), 158. https://doi.org/10.5296/ijl.v8i2.9252

Valsson, S. (2022). Blooms Taxonomy in Studio Design Process in Architecture Education. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4212297