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Exploration of the Tangible and Intangible Aspects Affecting Students' Learning in the Architectural Studios: A Case Study of Lahore, Pakistan.

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Abstract: With the continuous advancements in architecture, design education requires ongoing reforms to bridge the gap between academia and practice. In addition, artificial intelligence (AI) in architectural education transforms traditional teaching strategies by providing data-driven and immersive learning opportunities. This study intends to explore the teaching practices in Lahore's undergraduate architectural design studios and offers a framework for learning that incorporates the requirements of both learners and teachers. This study utilized a mixed-method approach to examine contemporary teaching practices and the challenges teachers and students encounter. The findings suggest that current pedagogical approaches lack a comprehensive understanding of the needs of both, making it challenging to create an optimal setting for learning. As a result of these findings, this study proposes a learning framework that includes tangible and intangible factors influencing the learning experience, such as the physical environment, teaching methodology, and learning techniques, to ensure their foundations are strong. The study's findings contribute to the existing knowledge on architectural pedagogy and provide practical recommendations for improving the undergraduate design studio experience for both students and teachers.

Keywords: Architectural Education, Design Studio Learning, Architecture Pedagogy, Teaching Methodologies.

1. Introduction

Before enrolling in architecture school, there is a common perception that architects primarily create house plans, calculate construction costs, draw proficiently, and oversee construction sites. As taught in typical architecture schools, architects explore spatial organization, circulation patterns, lighting, materials, and structural systems (Roberts, 2015). According to (Schön, 1985)The design studio offers a unique learning environment where students engage in reflective practice, integrating theory and practice. Salama contends that the design studio plays a pivotal role in architectural education and is critical for nurturing students' design skills, creativity, and critical thinking abilities (Salama, 2021). However, traditional teaching methods in architecture schools may not provide enough opportunities for reflection and feedback, resulting in low student engagement and motivation.

Architecture education, like other fields, also faces challenges, and several scholars have discussed these problems. One such problem is the Disconnection between the academic and

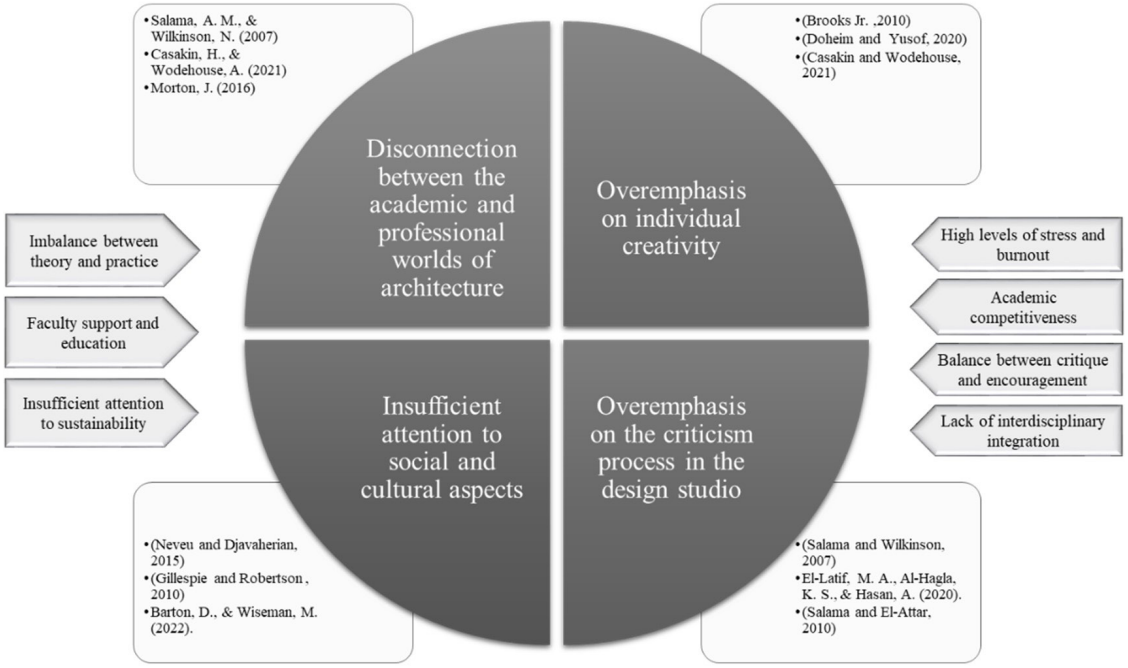

Figure (1). Perceptions and Problems explored by different authors

professional worlds of architecture. (Casakin and Goldschmidt, 1999; Morton, 2016; Salama, 2016). Along with that, there is an overemphasis on individual creativity (Brooks, 2010; Casakin and Goldschmidt, 1999; Doheim and Yusof, 2020) Insufficient attention to social and cultural aspects (Neveu and Djavaherian, 2015), Overemphasis on the criticism process in the design studio (El-Latif et al., 2020; Salama and El-Attar, 2010).

Architectural education is undergoing a paradigm shift with emerging technologies changing student engagement with design. With every passing day, AI is becoming an increasingly important medium in architectural learning, from generative design tools to AI-assisted (Jaruga-Rozdolska, 2024; Nabizadeh Rafsanjani and Nabizadeh, 2023). These tools allow students to explore several design iterations and receive feedback instantaneously while optimizing their solutions in ways hardly dreamt of before.

Hence, this research aims to explore the tangible and intangible aspects affecting students' learning in the architecture studio in Pakistan. It also seeks to identify the gaps among different aspects of architectural learning and propose solutions for more coherent learning based on findings. This motivation helps to form the following research objectives:

1. To understand the architectural learning in the studio through the different theories in literature.
2. To explore the tangible and intangible aspects affecting students' learning in the architecture studio in Pakistan through case studies and observations.
3. To identify the gaps among different aspects of architectural learning through a comprehensive analysis of current practices.
4. To propose solutions for a more coherent learning based on findings by developing targeted recommendations.

2. Literature Review

Architecture is one of the oldest professions that has been practiced. It was one of the most reputable in ancient Eastern nations and was exclusively accessible to the nobles (Kostof and Cuff, 2000). An architect in ancient Egypt received his education at the school for scribes (where they would learn how to read and write hieroglyphic and hieratic scripts) (Kostof and Cuff, 2000). Still,

most learned the art from their family because architectural techniques and skills were passed down from one generation to the next (The Great Soviet Encyclopedia, 1970). Historical evidence suggests architecture schools may be traced back to 1671 in France.

Both tangible and intangible factors influence the learning experience of students in architecture design studios. The physical and material components of a design studio that directly impact the learning environment are referred to as tangible aspects. Examples include the studio layout, furniture, tools and equipment, and materials (Kline, 2011; Obeidat and Al-Share, 2012). These attributes can be measured or seen, as well as experienced through our senses (Katsigarakis et al., 2017)On the other hand, intangible factors are less objective and measurable but can nevertheless impact the learning environment. They can include the instructors' teaching strategies. (Boyer and Mitgang, 1996), attitudes, and approaches (Orsmond and Merry, 2012), the studio's social and cultural setting, and the extent of teamwork and engagement between students (Duffy and Cunningham, 2015). These factors can have a bigger impact on students' participation, motivation, and creativity. Augmented reality and artificial intelligence is rapidly revolutionizing architectural studio learning. The generative tools, driven by AI such as MidJourney and DALL·E, are used by students to generate conceptual ideas regarding design, so the vocabulary visualized by students has broadened (Jaruga-Rozdolska, 2024). Such artificial intelligence analysis of design helps students to evaluate their ideas i.e. structural feasibility, sustainability, and spatial organization while being less time-consuming in repetitive tasks (Afshan and Sharma, 2024; Castro Pena et al., 2021)

Over time, various learning approaches have evolved to enhance effective learning. These approaches, such as Cognitivism, Constructivism, Humanism, and Behaviourism, have advantages and disadvantages in architectural education, depending on the learning objectives and context.

Cognitivism is an approach that emphasizes cognition, including memory, perception, and problem-solving (Kay and Kibble, 2016). It can aid in the development of critical thinking abilities, creativity, and the capacity to evaluate and critique design solutions in architectural education (Brand and Dalton, 2012; Potur and Barkul, 2006). However, the cognitive method is frequently criticized for placing too much focus on personal cognitive processes and ignoring social and cultural influences on learning (Lave and Wenger, 1991).

Constructivism, on the other hand, asserts that students learn by engaging in real-world experiences and creating their perspectives (Topolovčan, 2016). Constructivism fosters design skills in architectural education through projects, teamwork, and reflection. (Jonassen et al., 1995). For instance, involving students in actual construction projects combines theory and practice effectively (Bell and Glinert, 2012). However, critics argue that constructivism may sideline her guidance and expertise (Kirschner et al., 2006).

Humanism places emphasis on a supportive and engaging learning environment that motivates students based on their interests and goals (Lamont, 1983; Tokman and Yamacli, 2007). In architecture education, humanism can help students develop a sense of identity, purpose, and ethical responsibility as designers (Bell and Glinert, 2012; Pinn, 2016). However, humanism can also be criticized for its idealistic view of learning, which may neglect the importance of discipline, rigor, and objective evaluation (Dweck, 1999). Further, critics claim that behaviourism is a passive and rote learning method (Ertmer and Newby, 2013), which might not be appropriate for fostering the skills and aptitudes required for architecture design education (Chen, 2009; Skinner, 1938).

In conclusion, each learning approach has pros and cons in architecture education, and its effectiveness depends on the context and learning objectives. Combining different aspects of these approaches, such as "Constructivist Humanism," "Cognitive-Humanist," or "Cognitive-Behaviourism," creates a more comprehensive and adaptable framework for architectural instruction.

3. Proposed Framework: Cognitive-humanist Learning

The cognitive-humanist teaching approach seems more appropriate (keeping the objectives in mind) since it emphasizes the value of critical thinking, creativity, and personal development by combining the cognitive and humanistic ways of education (Figure 2). It acknowledges the influence of social and cultural influences and the individual cognitive processes affecting learning and development. The cognitive-humanist approach

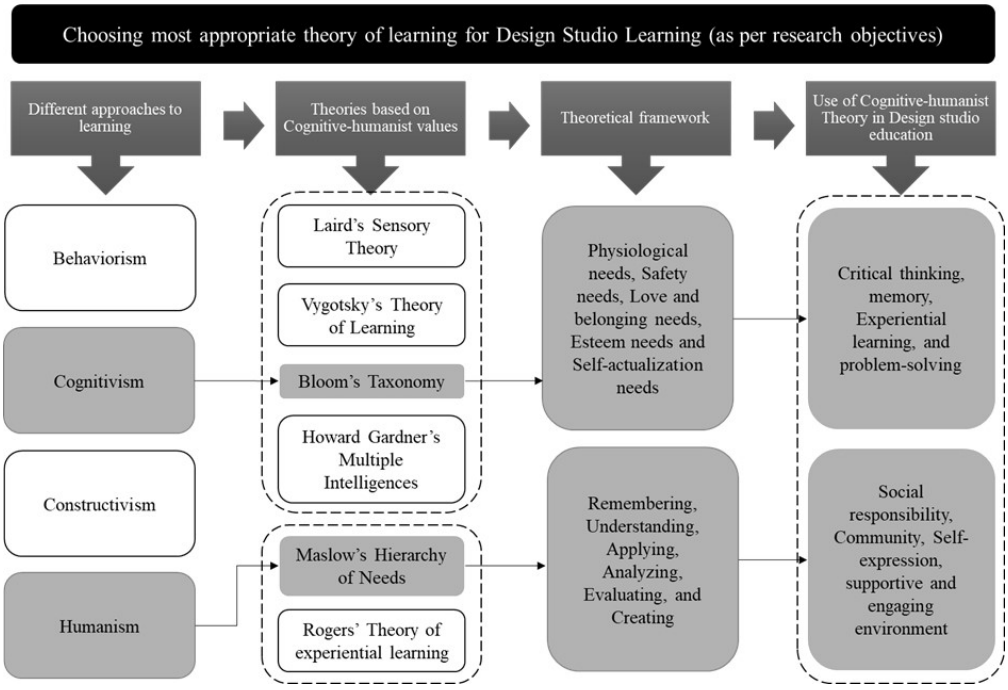

Figure (2). Choosing the most appropriate theory of learning for Design Studio Learning (as per research objectives)

to architecture education can assist learners in developing the technical proficiency and ethical responsibility needed to thrive as architects. It may establish a framework for integrating critical thinking, problem-solving, and reflective thinking with the cognitive and emotional components of learning, such as compassion, accountability, and moral judgment. The cognitive-humanist approach in architectural education can be enhanced with AI-driven tools. AI-assisted tools provide immediate design feedback systems that as a result, assist students to be critical of their work (Zeytin et al., 2024). Moreover, the use of AI evaluation models can create a personalized learning environment, enabling students to identify their strengths and weaknesses in real time. (Dwivedi et al., 2021). This approach also highlights the importance of the physical surroundings for education and growth, emphasizing the need to develop an embracing and dynamic atmosphere that fosters creativity and accelerates learning.

As D.M. Beegle notes in her book (Beegle, 2006), "Students should Maslow before they Bloom." A phrase, more like a play on words, she learned from her mentor, Dr. Bob Fulford, highlights the importance of creating a supportive and nurturing learning environment that prioritizes students' physical and emotional well-being.

4. Methodology

After a preliminary pilot study, the research's data collection started in the middle of November. Lahore is chosen as the preferred location for many significant reasons. Lahore is a notable city in Pakistan as a Centre of architectural education and a thriving social entity (Naz, 2010). It is proud to be home to the country's pioneering architectural institutions, with 11 of country's 20 accredited architectural schools located inside its borders (Iqbal, 2020), making it the city with the highest concentration of architectural educational institutions. As a result, students from Lahore, as well as from other parts of Punjab and the country, embark on the architectural institutions in the city to pursue their education. Also, it is a fascinating location for collecting data because of the city's contrast between old and modern architectural styles, which promotes a stimulating educational environment for learners. Figure 3 exhibits the standpoints of Architecture Schools of Lahore, depicting private sector campuses with diamond-headed arrows and the public sector through circle-headed arrows.

Figure (3). Map demonstrating Private and Public sector Architecture Schools in Lahore

Surveys were carried out as a quantitative research technique, and Google Forms was utilized to distribute them. Convenience sampling and Snowball sampling procedures were employed to collect the data. Table 1 exhibits the student and teacher count from each university.

Students and teachers from every architecture school in Lahore were approached through visits and e-mails. Table 2 depicts the exact count; Table 2 depicts the exact number of responses received from each university.

Table (1). Student and Teacher counts from each university.

Sr. #	University	Students	Teachers
1	University of Engineering and Technology	210	12
2	University of Punjab	148	6
3	National College of Arts	281	19
4	Beaconhouse National University	No Data Received	15
5	University of Management and Technology	256	18
6	University of South Asia	89	8
7	Superior University	No Data Received	
8	Institute For Art And Culture	316	20
9	COMSATS University Lahore	170	7
10	The University Of Lahore	215	20
11	Lahore College For Women University	220	11
	Total	1905	136

Table (2). Number of responses from the universities involved in the study.

No.	University	Teachers Frequency	Teachers Percent	Students Frequency	Students Percent
1	University of Engineering and Technology	2	3.4	59	19
2	COMSATS University	2	3.4	9	2.9
3	Beaconhouse National University	2	3.4	-	-
4	National College of Arts	2	3.4	25	8
5	University of the Punjab	2	3.4	44	14.1
6	University of South Asia	4	6.9	21	6.8
7	Lahore College For Women University	11	19	44	14.1
8	University Of Management And Technology	8	13.8	1	0.3
9	Institute For Art And Culture	3	5.2	18	5.8
10	The Superior University	12	20.7	42	13.5
11	The University Of Lahore	8	13.8	48	15.4
	Total	56	96.6	311	100

Table (3). Gender division for the survey respondents.

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Teachers				
Male	25	43.1	44.6	44.6
Female	31	53.4	55.4	100
Total	56	96.6	100	
Students				
Female	160	51.4	51.4	51.4
Male	151	48.6	48.6	100
Total	311	100	100	

This paper focuses on the data and scenarios obtained from the architectural schools of Lahore. Given the research challenges, only a limited visual representation of perspectives from the nine universities involved was compiled, which may have impacted the comprehensiveness of the presented findings. It is essential to acknowledge these limitations because they contribute to the ability to be generalized and the breadth of the study's conclusions. The quantitative data in this study were analysed using Excel and SPSS to carry out several tasks, including frequency calculations and cross-tabulation. Additionally, two different tests were used: Fisher's Exact Test for smaller sample sizes, like teachers, and the Chi-square Test for bigger sample sizes, like students. Gender and the student's academic year were among the variables being studied.

Aligning with the research objectives, the survey questionnaire was carefully designed to capture the essence of two appropriate learning theories: Bloom's Taxonomy and Maslow's Hierarchy of Needs. These theories were adapted and formulated into the survey format students and teachers. Given that the questions in the survey required qualitative responses but needed to be quantified for more reliable and meaningful insights, a Likert scale with a range of five points was chosen as the data collection method. This decision ensured that the collected data would provide valid

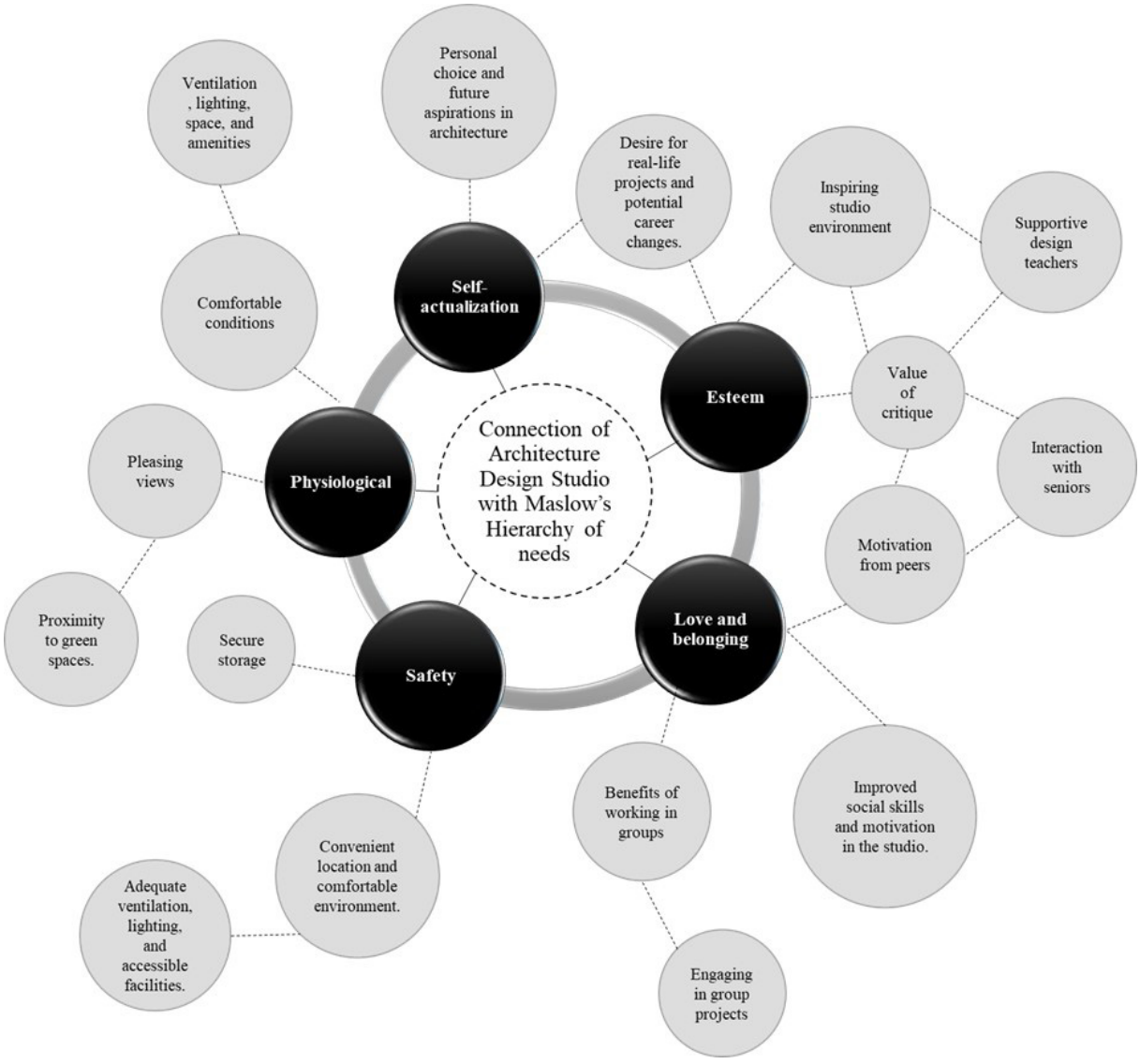

Figure (4). Connection of Architecture Design Studio with Maslow's Hierarchy of Needs

and realistic opinions from the participants. In social science research, the Likert scale is a popular technique for evaluating participants' attitudes and views (Joshi et al., 2015).

The theoretical basis guiding this survey design is depicted in a mind map in Figure 4 that incorporates fundamental concepts from Maslow's Hierarchy of Needs. The groundwork for identifying important facets of participants' experiences was laid by the hierarchy's five levels: physiological, safety, belongingness, esteem, and self-actualization. This study intended to understand how architecture students perceive their learning environment and what factors impact their motivation and engagement by adopting this conceptual framework. In addition, Figure 5 illustrates how implementing Bloom's Taxonomy in a profound grasp of learners' cognitive growth and competence development in the design studio. The study aimed to determine the degree to which

learners demonstrate critical thinking, problem-solving, and creative endeavours during design projects by linking the survey questions with levels of Bloom's taxonomy, including remembering, comprehending, applying, analysing, evaluating, and creating.

The paper will further divide tangible and intangible factors that affect students' learning in architectural studios in the Results, employing concepts from Maslow's Hierarchy of Needs and Bloom's Taxonomy.

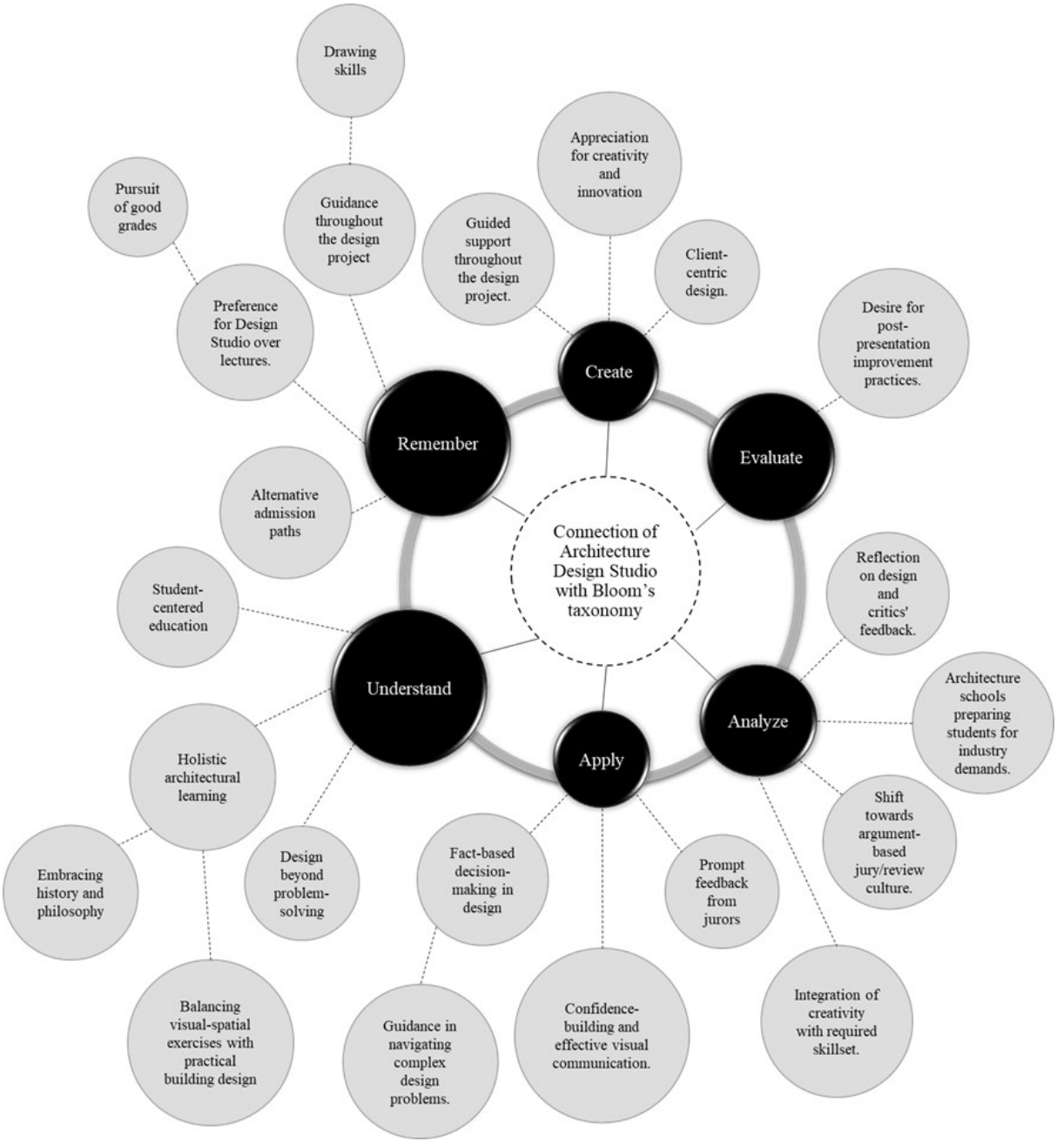

Figure (5). Connection of Architecture Design Studio with Bloom's taxonomy

Table (4). Students and Teachers' Responses corresponding to Maslow's Hierarchy of Needs

		Student's Response			**Teacher's Responses**		
Tier	Statements	Agree + Strongly Agree	Neutral	Disagree + Strongly Disagree	Agree + Strongly Agree	Neutral	Disagree + Strongly Disagree
Physiological Needs	Studio ventilation and temperature	47%	38%	15%			
	Studio lighting	53%	36%	11%			
	Toilet facility near the studio	49%	18%	34%			
	Studio windows and views	34%	25%	41%			
	Green space near the studio	37%	22%	41%			
Safety Needs	Walkway and activity centers	46%	27%	27%			
	Studio storage space	24%	32%	44%			
	Studio and traffic noise	69%	20%	11%			
Love and Belongingness Needs	Spaces for interaction and group work	30%	28%	42%			
	Comfort with group work	52%	31%	17%			
	Group projects and skills improvement	59%	23%	18%	61%	17%	22%
	Design studio and improved social skills	74%	20%	6%			
	Motivation: Studio vs home	51%	27%	22%			
Esteem Needs	Teacher as a cheerleader	81%	14%	5%	66%	24%	10%
	Critique from studio fellows	68%	21%	11%			
	Learning from seniors	57%	28%	15%	78%	10%	12%
	One-to-one discussion with the teacher	72%	18%	10%			
	Teacher's room and studio proximity	45%	25%	30%			
	Peer influence on work ethic	71%	17%	12%			
	Stimulating studio interior	18%	34%	48%			
Self-Actualization Needs	Design education and reality gap	44%	33%	23%	45%	22%	33%
	Real-life vs conceptual projects	51%	28%	21%	53%	29%	18%

5. Results

To comprehensively address the multifaceted nature of architecture studio learning and students' experiences, this study further divides the findings into tangible and intangible factors responding to distinct levels of Maslow's hierarchy and Bloom's taxonomy, respectively. Through a detailed analysis of many aspects of architectural education, the study carefully examines how design studio learning aligns with Maslow's hierarchy of needs. Table 4 indicates a clear expression of responses corresponding to the application of Maslow's hierarchy of needs.

Varying student experiences are revealed by examining elements like ventilation and lighting. Significant differences exist in how male and female students view amenities such as lavatories. The relevance of these relationships is highlighted by statistical analysis (p-value=0.045, Pearson Chi-Square=9.768), which suggests that fulfillment of physiological needs and the studio learning environment have a significant link. The significance of a favorable learning environment is emphasized by exploring secure infrastructure. The study acknowledges how important it is to meet the unmet safety demands to facilitate effective design studio learning. The third tier, "Love and Belonging Needs," is addressed by the practice of group

projects and collaboration, which have a favorable effect on social skills. These factors are interrelated; nevertheless, multiple responses indicate possible links with unfulfilled physiological requirements. The Pearson Chi-Square value of 32.618 (DF=16) and the p-value of 0.008 indicate a strong connection between the variables.

According to a cross-tabulation between gender and practical learning through group projects, only 48 percent of female students and 64 percent of male students agreed with this idea. With a p-value of 0.045 and a Pearson Chi-Square value of 9.719 (df=4), evidence shows a significant association between the variables. Perceptions of motivation by teacher have been found to decrease during ascending academic years. Strong correlations between the variables, as indicated by statistical analyses with a p-value of 0.016 and a Pearson Chi-Square value of 30.322 (df=16), highlight the strong influence of these interactions on students' confidence and competency. Considering the responses gathered concerning stimulating ambiance and interior in the design studios, the results were quite alarming. Only 18 percent of students confirmed having a good interior while a greater portion opposed the statement. This indicates a significant gap in providing an environment that's supposed to ignite creativity.

To meet self-actualization needs, design studios must promote creativity, independent learning, and practical engagement. The results highlight specific weaknesses in the way that education is carried out nowadays, providing the cause for reassessment of pedagogical strategies. Interestingly, though as per cross-tabulation, 48 percent of the teachers who agreed to this were male and 27 percent were female, suggesting that more male teachers had reservations about the current scenario.

Moving forward, Bloom's taxonomy is utilized to analyze the more intangible side of Architecture design studio learning. From the foundational level of 'Remember' to the pinnacle of 'Create', this analysis covers various cognitive learning aspects in the context of effective architecture education.

The importance of experiential learning is highlighted by 81 percent of students and 72 percent of teachers who favor studio culture over lectures. The perception that good design and grades go hand in hand is noteworthy; 57 percent of students and 60 percent of teachers concur. Regarding gender differences, there is a substantial association (p=0.028, Pearson Chi-Square=28.421), with 48 percent of female students and 59% of male students agreeing. The studio system promoted visual-spatial exercises, as most agreed, and some even preferred. Students in their final year came to more agreements. There was a correlation between these variables (p = 0.051 and 0.027). This demonstrated concern over the possible learning gap.

The third level, 'Apply,' involved integrating real-world knowledge into design studio instruction. The majority of respondents agreed that practical work was beneficial. As the school years progressed, students' communication and confidence increased. There was a correlation between these variables (p = 0.032 and 0.014). These results demonstrated that fact-based decision-making was one of the main objectives of cognitive development. However,, the jury or review process did not provide prompt feedback for some students, which hindered their learning.

The 'Analyze' level of taxonomy marks the first flight of the stairway towards the ultimate goal of creativity, the first level of higher-order skills. While some teachers and students concurred, that creativity is meaningless without a skillset, most did not. Furthermore, it was demonstrated that jury practice was less evidence-based and more about 'just proving the point'. Further, after receiving jurors' feedback on their work, the majority of students wish to make revisions. Even though most students desire this opportunity, some teachers choose not to give it to them. mismatch. This mismatch may impact the teaching technique and the exchange of ideas between educators and learners. The concept of the final level 'Create' focuses on encouraging and valuing innovation in design projects. While most students claimed to have received guidance during design projects, others didn't agree. While most educators acknowledged to have facilitated during the projects, some weren't sure. This prompts the question: shouldn't every student receive enough equitable guidance? Additionally, 62 percent of the students felt inspired to be imaginative and creative in design studio, with the remaining students feeling the opposite way. More male students than female students felt it. The statistical analysis demonstrated a strong relationship between the students' gender and their perceptions of creativity (Pearson Chi-Square = 10.204, p = 0.037). Contrary to what the students believed, most teachers valued originality and

creativity. Female teachers were more likely to say this. The gender of teachers and their perception of creativity also showed a significant correlation (Fisher's Exact Test = 0.018; Pearson Chi-Square = 9.847, p = 0.043).

6. Discussion

This section probes into the relationship between these factors using emerging themes from the quantitative data analysis investigated previously. It further identifies the gaps among different aspects of architectural learning.

The studio environment consists of intangible and tangible aspects. As per historical records of architecture education, the Bauhaus (1919) introduced this idea of teaching theory and practice of a subject by an artist and a craftsperson (Kvan et al., 2004). Even in Architecture schools before that, practical learning has been mandatory for design learning. (Griffin, 2019; Wallace, 2000). Fortunately, Table-5 reveals how students and teachers both strongly prefer Studio learning over a classroom. It is also evident in the same table that a larger number of students learn better through practical tasks, and this alignment of shared recognition of the benefits of the design studio's experiential and practical learning methodologies. As a result, it enhances cognitive development by engaging multiple senses, promoting creative problem-solving, and supporting real-world learning applications (Piaget, 1952; Sharunova et al., 2022)Further, studio learning improves confidence and visual communication, and the ratio increases as students advance over their academic years, indicating the design students' potential growth over time.

AI is becoming a significant assistant in the teaching process. 'AI-based tutors' are in a position to provide almost immediate criticism on design projects, empowering students to iterate quickly without being hindered by the waiting time for in-studio reviews (Paris et al., 2017)AI-based research tools are helping students more effectively analyze precedent studies, thus widening their other architectural references and case studies. (Yuan, 2023). Yet, while AI may aid in the efficient teaching process, it is unable to replace the very dialogues and human mentorship that lend architectural learning a unique character (Eskandarivatannezhad, 2023). AI applications in design studio environments are currently manifested in software like Grasshopper or Rhino, which are parametric and generative design applications through which one can easily work on complex forms. AI has helped transform how students look at design and associated problems by analysing space utilization and optimization of layouts (Sourek, 2024; Zeytin et al., 2024)While this is indeed an exciting new frontier, it also requires educators to ensure that students keep control of their creative process and are not overly reliant on algorithmic solutions.

In a design studio, achieving maximum productivity may also entail meeting measurable criteria like physiological and safety requirements. To begin with, Table 4 uncovered an astonishing finding from the survey. Only 18 percent of students (Esteem Needs) acknowledged having stimulating studio interiors, while the remaining have flat, barren walls, which is proven by visits to the different architecture schools. This indicates a significant gap in providing an environment that ignites creativity. The natural environment and reliable infrastructure are vital assets for cognitive development in architecture design learning (Anderson, 2013; Lave and Wenger, 1991; Salama et al., 2007).

Findings of this study clearly state how teachers are the life of any architecture school and how they led and nurtured students in the past. These findings are also consistent with (Olweny, 2017) , who notes that effective communication between students and teachers introduces them to the norms of the architectural profession. Findings from the quantitative data collection (Table 4) revealed that students prefer personalized interactions to foster practical guidance and communication. (Bernacki et al., 2021). As a result, this enables them to of the subject matter, their design concerns, and focused feedback, strengthening their learning experience. Students consider their design teachers their support system, which manifests the potential implications for their cognitive development and psychological well-being. (Sanger and Gleason, 2020). Statistical analysis revealed how this sentiment declines as it grows towards the final year. The deteriorating number of students with positive sentiments raises questions about potential factors; is this academic pressure? Expectations from teachers or changing teaching methodologies? To establish an environment that supports both cognitive development and well-being, it is necessary to incorporate effective communication, guidance, and appreciation.

(Groat and Wang, 2002) mention how studio culture is built upon providing a sense of community, belongingThe studio environment is fuelled by collaborative activities, group projects, teamwork, etc., and support. Findings (Love and Belonging needs) demonstrate students' positive perception of studio learning, which aids in the improvement of their social skills. A studio environment fosters collaboration and peer interaction, resulting in better communication abilities. The studio environment is fuelled with collaborative activities, such as group projects and teamwork. (Salama, 2012) , may provide students with enough opportunities to enhance their social capabilities for future professional practice. It also explains the significance of peer interactions and social learning while revealing a clear pattern emerging in the data regarding students feeling motivated to work efficiently when they observe their fellows working diligently in the design studio, and feedback and criticism. This disposition seemingly serves as an example of a domino effect. Observing your peers gives a cumulative sense of being better and competition, which may fuel effective design learning, yet it could also put students under pressure.

The jury system or feedback, a concept that dates back to 1795 as an integral part of the practices established by the French system at the École des Beaux-Arts of Paris (Condit and Drexler, 1978; Griffin, 2019; Kostof and Cuff, 2000), is still evolving in the current architectural education scenario. However, this evolution may also raise concerns about its consequences. The study results reveal that nearly half of the participants favour Juries based on arguments rather than evidence. This could indicate an absence of understanding of the jury's objectives, which include networking and professional practice simulation as well as the development of critical thinking, inclusivity, design improvement, and feedback (Ballantyne and Packer, 2013).

According to findings, effective learning is also evidenced by the fact that most students reconsider their design choices after the presentation. This aligns with the cognitive development theory, which emphasizes critical thinking through introspection. Table-5 supports this learning strategy by demonstrating that sure students base their design decisions on logic and evidence. Making decisions based on facts transcends intuition and enhances cognitive and analytical abilities. (Salama et al., 2007).

Beyond jury/reviews, the curriculum's balance remains in question. Table 5 ('Understanding' from Bloom's Taxonomy) indicates that students largely agree that the architecture design school system favours visual-spatial studio exercises while perhaps neglecting the practical application of design. While spatial innovation is essential, an adequate learning framework should also cover useful topics that prepare students for projects they may encounter in the real world as professional practitioners. Many students seek the opportunity to improve their work after expert feedback given that they want to progress. However, there is an inconsistency between students' expectations and teachers' practices since more teachers state that they currently offer post-presentation improvements. Yet the findings uncover the difference between student determinations and the practices currently implemented by teachers, possibly indicating a potential imbalance in the teaching practice.

The final point brings this discussion to the very beginning; a closer look at architectural education reveals critical viewpoints influencing the conversation around the academic-professional rift in the field. (Casakin and Goldschmidt, 1999; Park and Lee, 2022) Note about architects' responsibility to be creative problem-solvers, and to innovate designs to overcome everyday needs and global challenges. As demonstrated by this study, most teachers and students support this responsibility. However, more students than teachers believe that architecture programs should prepare students for national and industrial demands. This inconsistency indicates a misalignment of expectations between students and teachers. Right on the same spectrum of this discourse, there's a difference in different pedagogies adopted by different architecture schools, which is to prefer conceptual projects over real-life projects or vice-versa. Results indicated that while teachers have differing views, half of students favor real-world projects. This starts with a debate between creative and practical methods. Generational gap and learning experience differences could cause the disconnect between students and teachers. (Ciravoğlu, 2014; Salama, 2012). Cognitive development aids learners in becoming better problem solvers. This narrative blends various perspectives to create a complex portrait of architectural education. Teachers and

Table (5). Students and Teachers' Responses Corresponding to Bloom's Taxonomy

Tier	Statements	Agree + Strongly Agree (%)	Neutral (%)	Disagree + Strongly Disagree (%)	Agree + Strongly Agree (%)	Neutral (%)	Disagree + Strongly Disagree (%)
Remembering	Design Studio is better than a lecture	81%	13%	6%	72%	19%	9%
	Good design, good grades	57%	26%	17%	60%	24%	16%
Understanding	Design beyond problem-solving	35%	28%	37%	41%	21%	38%
	Visual-spatial Studio favored	41%	40%	19%	43%	35%	22%
	Student-centered education system	68%	43%	10%	52%	41%	7%
	History and philosophy important	70%	19%	11%	76%	17%	7%
Applying	Creativity useless without skillset	47%	29%	24%	40%	28%	32%
	Design decisions based on facts	72%	19%	9%			
	Design Studio boosts confidence	75%	20%	5%			
	Prompt feedback from the juror	69%	27%	4%			
Analyzing	Reflecting on design and critics	65%	24%	11%			
	Argument-based juries/reviews	54%	32%	14%	66%	10%	24%
	Creativity is useless without a skillset	47%	29%	24%	32%	28%	40%
	Not responsible for social change	37%	23%	40%	20%	14%	66%
Evaluating	Improving work after a presentation	69%	19%	12%	74%	12%	14%
Creating	Guidance for design stages	81%	13%	6%	40%	20%	40%
	Creativity and innovation are valued	62%	31%	7%	80%	11%	9%

students place equal weight on theoretical and technical parts of design learning, according to Table-5 findings. The social roles of architects, the harmony between creativity and pragmatism, learning objectives, and the nature of design are just a few of the themes that form the rich tapestry of architectural discourse (Abdullah et al., 2011; Taneri, 2013).

7. Conclusion

This study explored conceptual frameworks that highlighted the benefits of developing critical thinking with decision-making skills in students. Additionally, it drew attention to the essential but overshadowed aspect of student well-being in the studio learning context. Investigating these interconnected components aims to advocate the notion of supporting students' holistic well-being as well as effective cognitive development. Further, this study offers insights that may aid in improving educational practices and policies for a more balanced and productive learning environment. The design studio's proposed learning framework for students and teachers incorporates tangible and intangible factors. In addition to emphasizing the teacher's role in promoting learning and developing a supportive and inclusive learning environment, the framework also considers characteristics like teamwork, feedback, communication, and experience in the design studio. The framework provides a thorough method of design studio pedagogy that meets teachers' and students' multiple demands and goals.

Moreover, the proposed learning framework adds to the current discourse on design studio pedagogy in architecture education. With the help of technological insights, cognitive-humanist learning can be improved with the emergence of artificial intelligence. The cognitive-humanist

approach seems particularly ideal for AI's role as an intelligent assistant that fosters the development of problem-solving and decision-making skills rather than displacing human creativity (Nabizadeh Rafsanjani and Nabizadeh, 2023). The framework questions conventional pedagogical paradigms and proposes a more vibrant, inclusive, collaborative learning environment that aligns with the architectural profession's changing requirements. By introducing a novel approach to design studio pedagogy, the study makes a significant contribution to the broader field of architectural education and provides an invaluable resource for teachers and students in architecture schools in Lahore (and potentially beyond)

8. References

Abdullah, N.A.G., Beh, S.C., Tahir, M.M., Che Ani, A.I., Tawil, N.M., 2011. "Architecture design studio culture and learning spaces: A holistic approach to the design and planning of learning facilities." Procedia - Soc. Behav. Sci. (15), 27–32. https://doi.org/10.1016/j.sbspro.2011.03.044

Afshan, N., Sharma, S., 2024. "Exploring the Impact of Ai on Architectural Creativity and Efficiency." Int. J. Multidiscip. Res. (6), 1–18. https://doi.org/10.36948/ijfmr.2024.v06i02.15753

Anderson, J.R., 2013. "The Architecture of Cognition." Archit. Cogn. https://doi.org/10.4324/9781315799438

Ballantyne, A.J., Packer, J., 2013. The Design Jury: An Instructional Guide to Architecture Students' Critique and Feedback Sessions, Routledge.

Beegle, D.M., 2006. Se Poverty, Be the Difference.

Bell, S., Glinert, E.P., 2012. "Learning by building: Complementary methods for teaching computer science and engineering." J. Eng. Educ. (101), 39–60.

Bernacki, M.L., Greene, M.J., Lobczowski, N.G., 2021. "A Systematic Review of Research on Personalized Learning: Personalized by Whom, to What, How, and for What Purpose(s)?" Educ. Psychol. Rev. (33), 1675–1715. https://doi.org/10.1007/s10648-021-09615-8

Boyer, E.L., Mitgang, L.D., 1996. Building Community: A New Future for Architecture Education and Practice. A Special Report.

Brand, S.T., Dalton, E.M., 2012. "Universal Design for Learning: Cognitive Theory into Practice for Facilitating Comprehension in Early Literacy.," in: Forum on Public Policy Online. ERIC.

Brooks, F.P., 2010. The Design of Design: Essays from a Computer Scientist.

Casakin, H., Goldschmidt, G., 1999. "Expertise and the use of visual analogy: Implications for design education." Des. Stud. (20), 153–175. https://doi.org/10.1016/S0142-694X(98)00032-5

Castro Pena, M.L., Carballal, A., Rodríguez-Fernández, N., Santos, I., Romero, J., 2021. "Artificial intelligence applied to conceptual design. A review of its use in architecture." Autom. Constr. (124), 103550. https://doi.org/https://doi.org/10.1016/j.autcon.2021.103550

Chen, I., 2009. "Behaviorism and Developments in Instructional Design and Technology," in: Rogers, P.L., Berg, G.A., Boettcher, J. V, Howard, C., Justice, L., Schenk, K.D. (Eds.), Encyclopedia of Distance Learning, Second Edition. IGI Global, Hershey, PA, USA, pp. 153–172. https://doi.org/10.4018/978-1-60566-198-8.ch023

Ciravoğlu, A., 2014. "Notes on Architectural Education: An Experimental Approach to Design Studio." Procedia - Soc. Behav. Sci. (152), 7–12. https://doi.org/10.1016/j.sbspro.2014.09.146

Condit, C.W., Drexler, A., 1978. The Architecture of the Ecole des Beaux-Arts, Technology and Culture (19). https://doi.org/10.2307/3103775

Doheim, R.M., Yusof, N., 2020. "Creativity in architecture design studio. Assessing students' and instructors' perception." J. Clean. Prod. (249), 119418. https://doi.org/https://doi.org/10.1016/j.jclepro.2019.119418

Duffy, F.M., Cunningham, D.J., 2015. "The intangible aspects of architectural design studios: A survey of student perceptions."

Int. J. Archit. Plan. (3), 63–78.

Dweck, C.S., 1999. Self-theories: Their role in motivation, personality, and development., Self-theories: Their role in motivation, personality, and development., Essays in social psychology.

Dwivedi, Y.K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J., Eirug, A., 2021. "Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy." Int. J. Inf. Manage. (57), 101994.

El-Latif, M.A., Al-Hagla, K.S., Hasan, A., 2020. "Overview on the criticism process in architecture pedagogy." Alexandria Eng. J. (59), 753–762. https://doi.org/https://doi.org/10.1016/j.aej.2020.01.019

Ertmer, P.A., Newby, T.J., 2013. "Behaviorism, Cognitivism, Constructivism: Comparing Critical Features From an Instructional Design Perspective" (24), 55–76. https://doi.org/10.1002/piq

Eskandarivatannezhad, M., 2023. "Human-AI symbiosis: The best approach for AI implementation in business decision-making in complex systems."

Griffin, A., 2019. The Rise of Academic Architectural Education Academic, 1st ed, Routledge (1st).

Groat, L.N., Wang, D., 2002. Architectural Research Methods.

Iqbal, M., 2020. "A study of the impacts of social background on the Learning Experiences and Approaches of students in Architectural Design Education in Pakistan ."

Jaruga-Rozdolska, A., 2024. "Artificial intelligence as part of future practices in the architect's work: MidJourney generative tool as part of a process of creating an architectural form." Architectus (3). https://doi.org/10.37190/arc220310

Jonassen, D., Davidson, M., Collins, M., Campbell, J., Haag, B.B., 1995. "Constructivism and computer-mediated communication in distance education." Am. J. Distance Educ. (9), 7–26.

Joshi, A., Kale, S., Chandel, S., Pal, D., 2015. "Likert Scale: Explored and Explained." Br. J. Appl. Sci. Technol. (7), 396–403. https://doi.org/10.9734/bjast/2015/14975

Katsigarakis, K., Kourkoulis, S.K., Perdikaris, A., 2017. "The importance of the physical environment in architecture design studio education," in: 3rd International Conference on Higher Education Advances (HEAd'17). Valencia, Spain, pp. 387–394. https://doi.org/10.4995/HEAd17.2017.5116

Kay, D., Kibble, J., 2016. "Learning theories 101: Application to everyday teaching and scholarship." Adv. Physiol. Educ. (40), 17–25. https://doi.org/10.1152/advan.00132.2015

Kirschner, P., Clark, R., Sweller, J., 2006. "Why Minimal Guidance During Instruction Does Not Work : An Analysis of the Failure of Constructivist , Discovery , Problem-Based , Experiential , and Inquiry-Based Teaching." Educ. Psychol. (41), 75–86.

Kline, R., 2011. "Studio culture and learning: A consideration of the influences of studio teaching on learning in design." Art, Des. Commun. High. Educ. (10), 57–73.

Kostof, S., Cuff, D., 2000. The Architect: Chapters in the History of the Profession, Emersion: Emergent Village Resources for Communities of Faith Series.

Kvan, T., Mark, E., Oxman, R., Martens, B., 2004. "Ditching the Dinosaur : Redefining the Role of Digital Media in Education." Int. J. Des. Comput. (6).

Lamont, C., 1983. "The Philosophy of Humanism." Sci. Soc. (47).

Lave, J., Wenger, E., 1991. Situated learning: Legitimate peripheral participation., Situated learning: Legitimate peripheral participation., Learning in doing: Social, cognitive, and computational perspectives. https://doi.org/10.1017/CBO9780511815355

Morton, J., 2016. "'Adjacent worlds': An analysis of a genre at the intersection of academic and professional communities." J. English Acad. Purp. (22), 54–63. https://doi.org/https://doi.

org/10.1016/j.jeap.2016.01.003

Nabizadeh Rafsanjani, H., Nabizadeh, A.H., 2023. "Towards human-centered artificial intelligence (AI) in architecture, engineering, and construction (AEC) industry." Comput. Hum. Behav. Reports (11), 100319. https://doi.org/https://doi.org/10.1016/j.chbr.2023.100319

Naz, N., 2010. "Commentary Development of Architectural Education in Pakistan: A Historical Perspective" (7), 6–19.

Neveu, M.J., Djavaherian, N., 2015. Architecture's Appeal: How Theory Informs Architectural Praxis, Online access with DDA: Askews.

Obeidat, A., Al-Share, R., 2012. "Quality Learning Environments: Design-Studio Classroom." Asian Cult. Hist. (4). https://doi.org/10.5539/ach.v4n2p165

Olweny, M.R.O., 2017. "Students′ motivation for architecture education in Uganda." Front. Archit. Res. (6), 308–317. https://doi.org/10.1016/j.foar.2017.06.002

Orsmond, P., Merry, S., 2012. "The importance of self-assessment in students' use of tutors' feedback: A qualitative study of high and non-high achieving biology undergraduates." Assess. Eval. High. Educ. - ASSESS EVAL HIGH EDUC (38), 1–17. https://doi.org/10.1080/02602938.2012.697868

Paris, E.H., Washington, S.R., Chui, M., Francisco, S., London, T.A., 2017. "Artificial Intelligence the Next Digital Frontier ?"

Park, E.J., Lee, S., 2022. "Creative Thinking in the Architecture Design Studio: Bibliometric Analysis and Literature Review." Buildings (12). https://doi.org/10.3390/buildings12060828

Piaget, J., 1952. "The origins of intelligence in children." Orig. Intell. Child. https://doi.org/10.1037/11494-000

Pinn, A.B., 2016. What is Humanism and Why Does it Matter?, Studies in Humanist Thought and Praxis.

Potur, A.A., Barkul, Ö., 2006. "Creative thinking in architectural design education," in: 1st International CIB Endorsed METU Postgraduate Conference Built Environment & Information Technologies, Ankara. pp. 113–125.

Roberts, A., 2015. "The Link between Research and Teaching in Architecture" (4205). https://doi.org/10.11120/jebe.2007.02020003

Salama, A., 2021. Transformative Pedagogy in Architecture and Urbanism. https://doi.org/10.4324/9781003140047

Salama, A.M., 2016. "Design Studio Pedagogy : Horizons for the Future."

Salama, A.M., 2012. "Knowledge and Design: People-Environment Research for Responsive Pedagogy and Practice." Procedia - Soc. Behav. Sci. (49), 8–27. https://doi.org/10.1016/j.sbspro.2012.07.002

Salama, A.M., El-Attar, M.S., 2010. "Student Perceptions of the Architectural Design Jury." Archnet-IJAR Int. J. Archit. Res. (4), 174–200.

Salama, A.M., Wilkinson, N., (eds.), 2007. "Design Studio Pedagogy: Horizons for the Future" 376.

Sanger, C.S., Gleason, N.W., 2020. Diversity and Inclusion in Global Higher Education, Diversity and Inclusion in Global Higher Education: Lessons from Across Asia. https://doi.org/10.1007/978-981-15-1628-3_4

Schön, D.A., 1985. The design studio : an exploration of its traditions and potentials.

Sharunova, A., Wang, Y., Kowalski, M., Qureshi, A.J., 2022. "Applying Bloom's taxonomy in transdisciplinary engineering design education." Int. J. Technol. Des. Educ. (32), 987–999. https://doi.org/10.1007/s10798-020-09621-x

Skinner, B.F., 1938. The Behavior of Organisms, Century psychology series.

Sourek, M., 2024. "AI in architecture and engineering from misconceptions to game-changing prospects." Archit. Intell. (3). https://doi.org/10.1007/s44223-023-00046-9

Taneri, B., 2013. "Architecture Students ' Perceptions of Design and Its Transformations Throughout Their Education" 83.

The Great Soviet Encyclopedia, 1970. "Architectural Education." Gt. Sov. Encycl.

Tokman, L.Y., Yamacli, R., 2007. "REALITY-BASED DESIGN STUDIO IN ARCHITECTURAL EDUCATION." J. Archit. Plann. Res. (24), 245–269.

Topolovčan, T., 2016. "Art-Based Research of Constructivist Teaching" (18), 1141–1172. https://doi.org/10.15516/cje.v18i4.2074

Wallace, N., 2000. "Ecole Beaux-Arts Beaux-Arts Caf é" 4–7.

Yuan, P.F., 2023. "Toward a generative AI-augmented design era." Archit. Intell. (2), 16. https://doi.org/10.1007/s44223-023-00038-9

Zeytin, E., Öztürk Kösenciğ, K., Öner, D., 2024. "The Role of AI Design Assistance on the Architectural Design Process: An Empirical Research with Novice Designers TT - Tasarım Sürecinde Üretken Yapay Zeka Asistanlarının Rolü: Mimarlık Öğrencileriyle Ampirik Bir Araştırma." J. Comput. Des. (5), 1–30. https://doi.org/10.53710/jcode.1421039

doi:10.33948/JAP-KSU-37-3-4

استكشاف الجوانب الملموسة وغير الملموسة المؤثرة على تعلم الطلاب في استوديوهات الهندسة المعمارية: دراسة حالة لاهور، باكستان

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ملخص البحث. مع التطورات المستمرة في مجال العمارة، يتطلب تعليم التصميم المعماري إصلاحات مستمرة لسد الفجوة بين الدراسة الأكاديمية والتطبيق العملي. بالإضافة إلى ذلك، نتج عن دخول تطبيق الذكاء الاصطناعي في تعليم العمارة تحول في استراتيجيات التدريس التقليدية من خلال توفير فرص تعلم غامرة وشاملة تعتمد على البيانات. تهدف هذه الدراسة إلى استكشاف ممارسات التدريس في استوديوهات التصميم المعماري الجامعية في لاهور، وتقدم إطاراً للتعلم يراعي متطلبات كل من المتعلمين والمعلمين. استخدمت هذه الدراسة نهجاً متعدد الأساليب لدراسة ممارسات التدريس المعاصرة والتحديات التي يواجهها المعلمون والطلاب. تشير النتائج إلى أن المناهج التربوية الحالية تفتقر إلى فهم شامل لاحتياجات الطلاب والمعلمين، وهو ما يجعل من الصعب إيجاد بيئة مثالية للتعلم. بناءً على هذه النتائج، تقترح هذه الدراسة إطاراً تعليمياً يشمل العوامل الملموسة وغير الملموسة المؤثرة على تجربة التعلم، مثل: البيئة المادية، ومنهجية التدريس، وتقنيات التعلم؛ لضمان قيام العملية التعليمية على أسس قوية. وتُسهم نتائج الدراسة في تعزيز المعرفة المتوفرة حول أصول التدريس المعماري، وتقدم توصيات عملية لتحسين تجربة استوديو التصميم الجامعي لكل من الطلاب والمعلمين.

الكلمات المفتاحية: التعليم المعماري، التعلم في استوديو التصميم، علم أصول التدريس المعماري، منهجيات التدريس.