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Journal of Asian Architecture and Building Engineering

ISSN: 1346-7581 (Print) 1347-2852 (Online) Journal homepage: www.tandfonline.com/journals/tabe20

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To cite this article: Edibe Begüm Özeren & Pınar Dinç Kalayci (12 Nov 2025): The reflection of architectural design studio practices on student experiences: a phenomenology-based focus group study, Journal of Asian Architecture and Building Engineering, DOI: 10.1080/13467581.2025.2584642

To link to this article: https://doi.org/10.1080/13467581.2025.2584642

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Published online: 12 Nov 2025.

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JOURNAL OF ASIAN ARCHITECTURE AND BUILDING ENGINEERING
https://doi.org/10.1080/13467581.2025.2584642

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The reflection of architectural design studio practices on student experiences: a phenomenology-based focus group study

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ABSTRACT

This study examines the experiences of students in architectural design studios through a phenomenological approach. Focus group interviews were conducted with eight students from the Department of Architecture at a state university in Türkiye using phenomenological research methods. Data were evaluated qualitatively through phenomenological analysis. The analysis identified five main themes: Embodied Design Thinking, Personal and Emotional Learning Journeys, Adaptive and Collaborative Design Practices, Spatial and Relational Studio Dynamics, Representational Mastery and Feedback Integration. The study reveals that architectural design studios employ a process-oriented educational approach and incorporate a variety of experiential learning methods. This study explores the boundaries of architectural design studios from a phenomenological perspective, revealing their fundamental dynamics, activities, and limitations. The impact of different studios and studio topics on learning experiences is examined. It is understood that each studio carries a unique meaning and offers students distinct individual experiences. The study's results offer a new perspective on understanding learning processes in architectural design studios. Therefore, it makes a significant contribution to the existing literature. This research serves as a comprehensive guide for actors in architectural design studios and emphasizes the relationship between personal experiences and theoretical approaches in architectural education.

ARTICLE HISTORY
Received 18 April 2025
Accepted 8 October 2025

KEYWORDS
Architectural design studio; architectural education; phenomenological approach; studio education; qualitative data analysis

1. Introduction

The undergraduate architecture program lasts eight semesters over a four-year period. During this period, students take a variety of courses, including design, structural science, restoration, and architectural history. Architectural design studio courses, which hold the highest weight among these course groups, hold a central position in architectural education. While course hours vary across architecture schools, studio courses generally comprise approximately one-third of the curriculum (Schreiber 2010). In recent years, this central role has been further emphasized through digitally supported studio formats and blended learning environments, especially during and after the pandemic (Al Maani, Alnusairat, and Al-Jokhadar 2021; Megahed and Hassan 2022; Zairul, Azli, and Azlan 2023). Therefore, the learning practices within architectural design studios, which form a significant part of architectural education, constitute the research subject of this study.

Design studios are the places where individuals in architectural education and practice acquire, experience, and interpret design skills, as well as where the formation, development, and evolution of the design process take place. For this reason, architectural design studios are often regarded as the pedagogical core of architectural education. In addition to supporting the cognitive, formal, and socio-behavioral development of individuals, architectural education plays a crucial role in advancing the human-social structure. Research on architectural design studios is directly related to both architectural education and professional practice. Given the complex and multidimensional structures of these studios, it can be argued that their common denominators are learning methods and the design process. Numerous studies on learning methods and personal experiences related to the design process in architectural education have been conducted on individuals (Yurtsever 2017). An examination of design studios, the fundamental spaces where the design process and design culture are shaped, reveals that the learning methods between learners and instructors differ from those in other disciplines (Kvan and Yunyan 2005; Onur and Zorlu 2017; Özdemir 2016). This difference has recently become even more pronounced thanks to peer learning, adaptive approaches, and design pedagogies implemented through digital media (Mariotti and Niblock 2023; Süner-Pla-Cerdà, Öztürk, and Ünlü 2024).

Students' experiences in the design process vary. This research defines the components of the architectural design studio as actors, process, and final product.

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The actors (subjects) include the instructor, the learner, and guest lecturers. The process of the architectural design studio consists of problem announcement, project site visits, drawings, models, critiques, studios, juries, and interim reviews. The final product comprises final projects, exhibitions, final project evaluations, and installations. Through these components, an internal view of the architectural design studio will be obtained through student narratives. In the study to be conducted, the studio experience of students will be deciphered using the phenomenological approach. In this study, the architectural design studio is conceptualized through three components: actors, process, and final product examined via students' lived experiences.

Research Questions:

- How do learners perceive and make sense of their learning experiences throughout the architectural design process?
- How do students define their learning experience in the architectural design studio?
- Do different design studio practices leave distinct "traces" on learners?
- How is the teaching-learning relationship shaped between the studio instructor and the student in the architectural design studio?

1.1. Theoretical framework

Architectural education is shaped by and simultaneously reflects the cultural, intellectual, social, economic, and environmental dimensions of architecture. It encompasses not only technical systems and requirements but also ecological, historical, engineering, health, and safety necessities. Additionally, it includes the role and responsibilities of architects in society, based on an advanced, analytical, and creative mindset (Pressman 1993, 23).

In the early years of architectural education, students, having completed high school, encounter abstract and conceptual design processes for the first time. In this context, the basic design course serves as a crucial phase in developing conceptual thinking and formal expression skills. However, as this process differs from conventional educational methods, many students initially perceive it as a challenging and alienating experience. After engaging with positive sciences such as mathematics, physics, chemistry, and biology, students often struggle with studio-based education that focuses on conceptual design skills. The experimental nature of architectural education, which encourages students to continuously work and explore new design trials, conflicts with the outcome-oriented approach of their previous learning experiences (Jones 1980, 45–98). Students entering architectural education often find themselves navigating a set of unfamiliar cognitive and practical challenges, requiring the gradual development of skills over time. According to Rittel (1985), the first three teachable skills an architecture student should possess are three-dimensional thinking, freehand drawing, and model-making.

Additionally, students must develop the ability to transform abstract concepts such as reasoning, adaptability, and appropriateness into tangible architectural elements like stone, brick, columns, and beams. Other skills, such as understanding construction costs or building techniques, can be acquired through reading books or attending lectures. An architect needs a wide range of abilities, from material comprehension to practical skills. Moreover, these skills must be taught systematically through a structured reasoning process. Academically, it is crucial for students to assess all these aspects equally without prioritizing one over the other (Rittel 1985). Alongside these, critical thinking skills are also emphasized as a fundamental aspect of architectural education. Although students in architectural design studios naturally engage in cognitive processes, design itself is an inseparable part of cultural values and the physical environment. In fact, students gradually discover that they are transforming their projects both culturally and physically. The design project is not solely about building design; it involves reshaping the context from the student's perspective. Therefore, design products in architectural design studios that address cultural issues, are contextually linked, enriched by experimental research, and incorporate diverse digital representations hold the highest pedagogical value (Parsons 2007).

In architectural education, the studio environment represents a physical space where architectural practice is learned, a curricular domain, and a socio-cultural setting (Lawson 2004). The studio is simultaneously conceptualized as a classroom, a space, and a pedagogical method (Cennamo and Brandt 2012). The definition of a studio as "a workspace for a creative individual (such as a theater artist, musician, painter, or sculptor)" aligns with the contemporary understanding of architectural education as the setting where architectural design learning takes place (Ciravoğlu 2003). In architectural education, the design studio serves as a problem-solving activity space where students' imagination is stimulated, and intuitive thinking is well-organized (Öymen Gür 2007).

Over the past century, design education has evolved significantly, benefiting from various psychological and pedagogical research studies worldwide. Numerous teaching-learning theories have drawn on Dewey's constructivism, Freire's critical pedagogy, and Kolb's experiential learning, contributing to new educational discourses (Bindal 2022). When examining learning theories, it is evident that adaptable pedagogical approaches align with the evolving needs of design studios over time. Although different scholars categorize these theories in various ways, four primary

learning approaches have been identified: behavioral, cognitive, constructivist, and humanistic (Şimşek 2015; Yurtsever and Polatoğlu 2020).

In recent years architectural education has been increasingly influenced by adaptive learning technologies and collaborative creation models. These developments enable more personalized, data driven, and iterative learning experiences, fostering deeper engagement and flexibility in studio environments. Interdisciplinary approaches that blend architecture, digital media, sociology and environmental science are becoming an integral part of design pedagogy (Bindal 2022). Zairul (2018) proposed a new learning environment, Studio Oriented Learning Environment (SOLE) to promote student centeredness and dedication in studio environments.

In recent years, online and hybrid studios have become widespread in architectural education. This has reshaped the temporal and spatial fabric of education. Recent research highlights the strengths and weaknesses of digital studios. Metinal and Gumusburun Ayalp (2024) identified critical factors affecting the success of online architectural education and highlighted the importance of interactive, collaborative learning environments. Similarly, Mariotti and Niblock (2023) examined the impact of virtual design studios on first year architecture students. Their study emphasized changes in curriculum development and studio culture. While their study emphasizes the technological dimension of online learning, our research extends this discussion by exploring how such collaborative dynamics manifest in students' lived experiences within a phenomenological framework. Studies by Abu Alatta, Momani, and Bataineh (2023) and Hettithanthri, Hansen, and Munasinghe (2023) reveal that asychronous comments, recorded evaluations, and online collaboration create new impacts on feedback, peer learning and students' ability to act more independently. This finding aligns with our focus on peer learning, but we further investigate how such interactions influence students' identity formation in the studio context. However, some challenges persist, such as the decline in physical model production and the weakening of the ability to perceive space physically.

Phenomenological approaches in architectural education are gaining increasing attention for their ability to reveal the subjective, emotional, and sensory dimensions of design learning. Rather than reducing studio practices solely to observable behaviors, this perspective explores how students experience space, process critiques, and construct meaning through design. Recent studies (Alnusairat, Al Maani, and Al-Jokhadar 2021; Tafahomi 2021) highlight the value of this approach in uncovering emotional dynamics, identity formation, and perceptions of design culture. Despite these contributions, previous studies often overlook the sensory and emotional dimensions of studio learning, which are central to our phenomenological approach.

In summary, while prior studies offer valuable insights into technology, collaboration, and pedagogy, few have examined how these factors are experienced and interpreted by students. This study fills this gap in the literature by adopting a phenomenological lens to explore the lived realities of design studio learning (Figure 1).

The theoretical approaches presented in this section not only outline the general framework but also serve as fundamental reference points that guide how this study interprets and makes sense of students' lived experiences in the design studio. Each theoretical perspective directly informs the study's assumptions, methodological decisions, and analytical process, thereby contributing to the overall coherence of the research framework.

1.1.1. Behavioural learning theory

In architectural education, the behavioral learning theory; The most well-known behavioral learning theory is the classical conditioning developed by Pavlov (1849–1936) (Pavlov 1927). The behavioral learning theory is based on experiments conducted on animals such as hunger-deprived or trapped rats in mazes. In most of these experiments, animals that respond to the relevant stimulus are reinforced and escape the difficult situation, making it more likely that they will respond in the same way the next time they encounter the stimulus. For many years, human learning was also explained according to this approach. The biggest flaw of this approach is that it focuses only on the learner's performance, without addressing the reasons behind the performance or the processes happening while the Stimulus-Response link is formed. Whether the learner understands or not was not considered significant either (Johnson, Johnson, and Smith 1991).

This perspective helps explain how external stimuli such as instructor feedback and studio assessments shape students' observable design behaviors and responses during the learning process.

1.1.2. Cognitive learning theory

In architectural education, the cognitive learning theory; Piaget views humans as active beings with the capacity to know and learn everything from the moment of birth. According to Piaget (1978), individuals acquire knowledge through experiences within their environment. Piaget emphasizes that the knowledge gained from external experiences leads to a new cognitive balance through internal, mental adjustments (Aydınlı 2015). Educational scientist Lev Vygotsky (1994) made important contributions to cognitive learning theory. Like Piaget, Vygotsky believed that the environment is crucial for developing creative

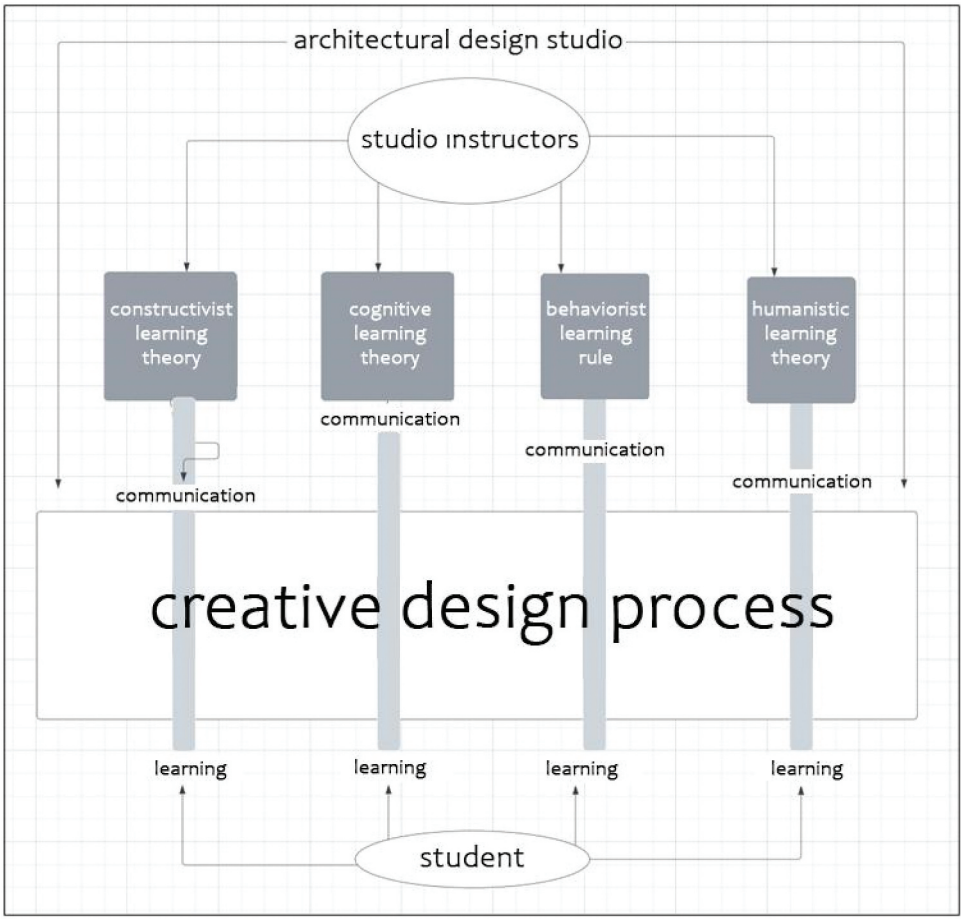


Figure 1. Theoretical framework.

potential. For Piaget, the importance of the environment is expressed through interactions that allow for the construction of thinking and intelligence processes. For Vygotsky, the environment is seen as a condition that enables social effects to emerge and contributes to the construction of subjective aspects. Therefore, while learning can be perceived as cognitive in Piaget's framework, in Vygotsky's view, learning can be understood in historical and social contexts.

This framework informs our understanding of how students process, internalize, and reorganize design knowledge through iterative cycles of critique and reflection in the studio.

1.1.3. Constructivist learning theory

In architectural education, the constructivist learning theory; Among the basic learning theories, the constructivist learning theory is considered a modern perspective and is related to how learning occurs. The constructivist approach emphasizes the assumptions regarding how meanings are attached to concepts. Glasersfeld (1996) argues that there is no objective value to knowledge or reality, and therefore there is no definitive or singular way of knowing the truth. From an educational philosophy standpoint, constructivism adopts the view that knowledge is interpreted individually and constructed through mutual reflections and critiques, in contrast to the positivist idea that emphasizes objectivity (Glasersfeld 1995; Vygotsky 1994). Glasersfeld (2004) asserts that knowledge cannot be passively acquired through senses or communication, and instead, it is actively constructed by the knowing subject. Moreover, the skill of knowing is shaped not by discovering an objective ontological reality, but through the individual's own experiences (Aydınlı 2015).

This perspective supports the analysis of how students actively construct meaning through social interaction, peer dialogue, and collaborative critique sessions within the design studio.

1.1.4. Humanistic learning theory

In architectural education, the humanistic learning theory; This approach considers learning as a function within personal development. It argues that learning is individualized and based on psychological foundations. One of the most common theories discussed is Kolb's Experiential Learning Theory (Özdemir 2016). The humanistic learning model focuses on investigating the learning styles of students in the studio and how students can be more successful. Kolb (1984) introduced the psychological-based, individualized experiential learning theory, which treats learning as a function within personal development. In this learning style, teaching is aimed at fitting

the student's learning styles, which involve placing, changing, differentiating, and assimilating information. This learning style emphasizes the individual. In Kolb's learning model, individuals' learning styles form a cycle, and their position in this cycle is determined using the Learning Style Inventory. This cycle consists of four learning types: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). David Kolb (2015) in his book "Experiential Learning" points out that the learning styles align with the learning behaviors of students in architectural design studios. These include "Feeling" for Concrete Experience, "Watching" for Reflective Observation, "Thinking" for Abstract Conceptualization, and "Doing" for Active Experimentation. However, there is no single learning style that determines an individual's learning process. Each individual's learning style is a combination of these four basic types. Thus, various conditions come together to form a learning situation. These learning styles are "Accommodator," "Assimilator," "Diverger," and "Converger" (Kolb 2015).

This approach underpins the exploration of students' intrinsic motivation, personal growth, and self-directed learning experiences as central components of studio pedagogy.

Taken together, these theoretical perspectives provide a multifaceted foundation for interpreting students' lived experiences in the design studio. They shape not only the analytical lens through which the data are examined but also the methodological decisions and interpretive strategies adopted in this study. By situating the analysis within this theoretical framework, the study ensures conceptual consistency and enhances the explanatory depth of its findings.

2. Method

While the study includes multiple studio contexts, its primary aim is not to conduct comparative case analysis, but rather to deepen the understanding of diverse lived experiences in architectural design studios through a phenomenological lens.

This study adopts a descriptive phenomenological research design grounded in the work of Moustakas (1994) to explore students' lived experiences in architectural design studios. Multiple studio contexts were included, but they were not treated as bounded comparative cases; instead, they provided varied experiential contexts that deepened the phenomenological richness of the study. The study does not seek to compare these studios against one another; rather, they are included to capture a broader spectrum of pedagogical environments and enrich the phenomenological depth of the findings. Any references to individual studios are therefore descriptive illustrations rather than comparative evaluations. The central focus remains the students' subjective experiences, aligning with descriptive phenomenology's aim to uncover the essence and structure of lived phenomena. The study's methodological framework followed Moustakas (1994) seven-step process: (1) bracketing of researcher bias, (2) data collection through semi-structured focus group and individual interviews, (3) intuiting and textual description of the phenomenon, (4) inductive open coding from participants' direct statements, (5) description of emergent meanings, (6) structural synthesis of relationships and deep meanings, and (7) synthesis of themes. This layered process enabled both phenomenological reduction and imaginative variation. In the fourth stage, an open coding process was conducted inductively based on verbatim transcripts from focus group interviews. Following this, deductive codes derived from relevant literature were integrated to enrich and refine the emerging categories. This two-step approach ensured that the final themes reflected both participants' lived experiences and established theoretical constructs.

Although the study incorporates multiple studio contexts, it does not aim to compare them as distinct cases. Instead, it adopts a descriptive phenomenological approach in line with Moustakas (1994), focusing on students' lived experiences across different learning environments. The studio contexts serve only as varied backdrops that enrich the phenomenological inquiry without shifting the unit of analysis away from subjective experience.

The research group; According to Creswell (2007) in his book "Qualitative Inquiry and Research Design: Choosing among Five Approaches," the qualitative research design and sample size for focus groups should range between 5–15 participants. Focus groups typically consist of 6–12 people (Stewart and Shamdasani 1990). Krueger (1988) suggested that some focus groups might be smaller if participants have more to share. To prevent data loss in the research, in-depth interviews were conducted with small groups. Therefore, the study is limited to four different studios, with four studio leaders and eight students. A total of 12 people were interviewed for this study.

First-year students were excluded from the sample because their exposure to architectural studio culture is typically limited to introductory courses. As the study aimed to explore students' reflections on immersive and long-term design experiences, participants were selected from more advanced studio levels, where students had already completed at least one full studio cycle.

The phenomenological approach method's first stage is the bracketing stage. In this phase, the researcher completely eliminates preconceived biases and removes irrelevant definitions. In the second stage, the suspension stage, the stories of individuals are collected. Direct sentences and expressions are transcribed into written records. The third stage is the intuiting (textual description) stage. In this phase, brief descriptions are made for each phenomenon. The fourth stage is the analysis stage.

In this phase, open coding was created for this study. In the fifth stage, known as the textual description stage, the researcher develops descriptive narratives that reflect the core meanings of each participant's lived experience, staying close to their original wording while organizing them around key phenomena. In the sixth stage structural descriptions are made and clear and deep meanings are discovered. In the seventh and final stage main and auxiliary themes are created. Open coding was first conducted inductively using participants' verbatim expressions. Following this, literature based codes were used to support and extend emerging themes allowing for both inductive and abductive reasoning. This layered approach enables deeper insights into the structural and textual descriptions, consistent with phenomenological reduction and imaginative variation (Moustakas 1994). Initial open coding was conducted inductively based on verbatim transcripts. Subsequently, the codes were extended through abductive reasoning by referring to relevant literature. After initial coding, similar codes were clustered into preliminary categories based on conceptual affinity. These categories were then synthesized into higher-order themes that captured the structural and textual essence of the phenomenon. Each theme was supported by multiple coded excerpts and iteratively refined through several rounds of comparison. Ultimately the final coding structure combined both the data points and concepts from the literature making the interpretations more meaningful. In this process, the essence of the phenomenological approach was preserved. For each theme sources from the literature were reviewed and explained. This stage uncovers the embedded meanings of phenomena, which are the essence of the phenomenological approach. MAXQDA 2024 was used as a supportive tool to organize and visualize qualitative data; however, the thematic structure was shaped by interpretive and phenomenological reflection, rather than by code frequencies or statistical dominance. The software was used to systematically store codes, track their frequency, and visually map their relationships, facilitating a transparent and traceable analytical process. Manual cross-checking was also performed to ensure coding reliability. In line with this methodological framework, this study adopts an interpretivist phenomenological stance, grounded in the view that knowledge about studio learning is constructed through the lived experiences and subjective meanings of participants. Rather than seeking objective truths, the research focuses on interpreting how students perceive, articulate, and make sense of their design studio experiences. Throughout the analysis, the researchers engaged in reflexive interpretation, acknowledging their own positionality and the co-constructed nature of meaning between participants and researchers. This epistemological orientation guided all analytical choices and ensured that findings remained faithful to the essence of participants' lived realities. These themes were developed through second-cycle coding and reflect the interpretive essence of students' lived experiences, aligning with the phenomenological research tradition (Moustakas 1994; Saldaña 2021). Following the steps of the phenomenological approach, the relationship between the learner's experience in architectural design studios and learning theories was discovered (Figure 2).

Although the study encompasses multiple architectural studio settings, they were not treated as independent comparative cases. Instead, they provided diverse educational and experiential contexts to deepen the exploration of students' lived experiences within studio environments. The aim

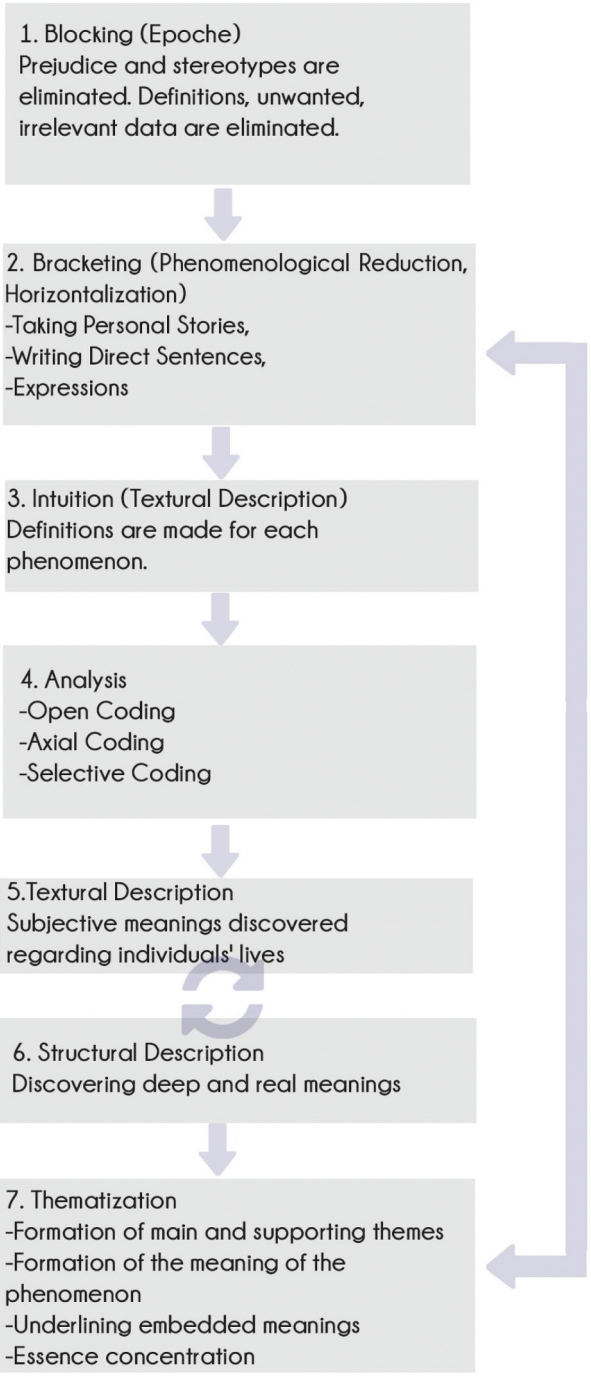


Figure 2. Phenomenological research model (Creswell 2007; Moustakas 1994; Patton, 2014).

is to explore the lived experiences of students within the architectural design studio environment, using these varied contexts as a means to deepen understanding (Creswell 2007). The students studied in various studios, achieving the highest grade (AA) and the lowest grade (CC) in the courses. The research aimed to uncover the phenomena of these studios based on students from different academic levels. Interviews were conducted with four studio instructors and eight students from four different studios. The student interviews were analyzed, revealing the phenomena, limitations, and different subcomponents of the studios (Figure 3).

This study was conducted in compliance with ethical research standards. Participants were informed about the purpose and scope of the study, and their voluntary participation was secured in accordance with ethical guidelines through verbal consent. No personal or identifiable information was recorded. The study adhered to institutional research ethics protocols (Figure 4).

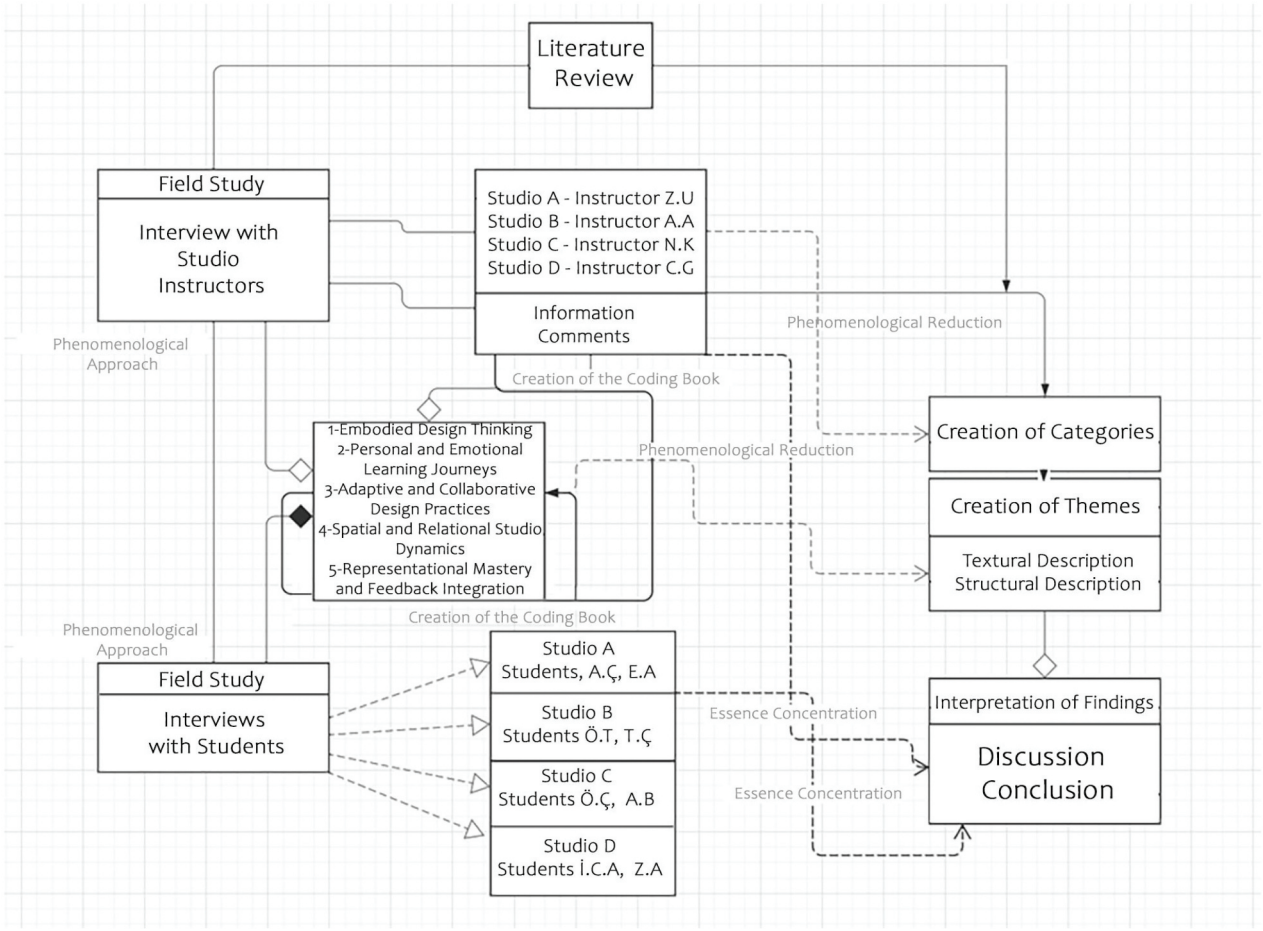


Figure 3. Method.

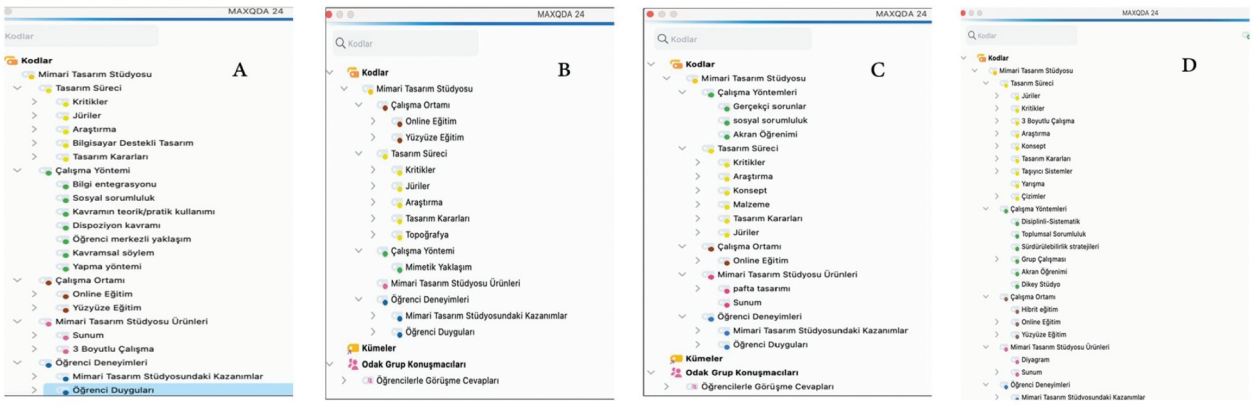


Figure 4. Excerpt from MAXQDA – sample coding structure showing codes, categories, and themes.

3. Studio contextual profiles

Although each studio is presented individually, these profiles serve to contextualize the lived experiences rather than to compare bounded cases in the traditional case study sense. While the findings are presented with reference to individual studios, this is not intended as a comparative analysis. Instead, the differences serve to illuminate the variety of lived experiences that emerge within distinct pedagogical contexts. The research focuses on the experiences of students and studio instructors in architectural studios. The embedded meanings in the responses provided during the interviews were sought through codes (MAXQDA 2024). A deductive approach was used in the creation of the coding book. Previously conducted studies in the literature were reviewed, and based on this, the Open Coding method was employed to extract the codes. The conceptual and theoretical framework was considered during this process. After the codes were created, categories were formed. This categorization process led to the identification of themes. By determining the titles, the themes were uncovered. In the creation of visual representations of the codes, the mind mapping method was used to visualize them.

3.1. Studio A

After the codes were determined, they were simplified to extract the essence of the interviews. Five refined themes were identified for Studio A: Embodied Design Thinking, Adaptive and Collaborative Design Practices, Spatial and Relational Studio Dynamics, Representational Mastery and Feedback Integration, and Personal and Emotional Learning Journeys.

In Studio A, the students placed particular emphasis on the design process, articulating in detail the intuitive and experimental approaches they experienced while developing their projects. Furthermore, their personal learning experiences stood out, with their emotional engagement and evolving perspectives throughout the studio process becoming notably evident. Student reflections frequently centered around Embodied Design Thinking in Studio A, suggesting that this theme played a particularly prominent role in shaping their learning experience. Themes related to Spatial and Relational Studio Dynamics were coded less frequently, suggesting that physical or social studio context played a relatively smaller role in shaping student narratives in Studio A.

In Figure 4, when auxiliary words, prepositions, and conjunctions are removed in the MAXQDA analysis, the most frequently used words reveal an inquisitive and instructive structural system. In the Studio A working file, the word "Research" stands out due to the frequency weights of the words used by two students during the interview. The word "Research" points to abstract conceptual readings for Studio A. Words like Public, Hatay, Architectural, and Model are also frequently mentioned.

The coding from interviews with students in Studio A most often featured the word Research. Other notable codes include Behavioral Elements, Experience, Realizing What's Learned, Justice, Earthquake, Public Spaces, and Model.

3.2. Studio B

The visual map showing the distribution of students' responses according to the themes is provided (Figure 5). Studio B is structured around the following interpretive themes: Embodied Design Thinking, Adaptive and Collaborative Design Practices, Spatial and Relational Studio Dynamics, Representational Mastery and Feedback Integration, and Personal and Emotional Learning Journeys.

In Studio B, students' narratives were particularly shaped around their experiences of coping with conceptual challenges and the jury processes, with personal and emotional learning journeys taking center stage. While multiple themes were present, students' narratives were predominantly shaped by personal and emotional learning journeys, with embodied design thinking also playing a key role through self-reflection and adaptation. Studio B participants primarily focused on reflective and conceptual aspects of design rather than tangible outputs.

In Figure 5, after removing auxiliary words, prepositions, and conjunctions in the MAXQDA analysis, the most frequently used words were examined. In the Studio B working file, the word Mosque stands out, indicating the subject in the program of requirements. Words like Units, Critiques, and Design are also commonly used.

In the coding results from interviews with students in Studio B, the Behavioral Elements code appeared most frequently. In Studio B, students' emotions are crucial because they overcome many challenges during the design process. Other notable codes include Historical Environment, Sloping Terrain, Mimetic Approach, Online Education, and Positive Contribution from the Instructor Dialogue.

3.3. Studio C

In Studio C, the themes were interpreted as: Embodied Design Thinking, Personal and Emotional Learning Journeys, Adaptive and Collaborative Design Practices, Spatial and Relational Studio Dynamics, and Representational Mastery and Feedback Integration. In Studio C, students described their design processes as both structured and experimental, with material exploration and problem-solving skills positioned at the core of their approach.

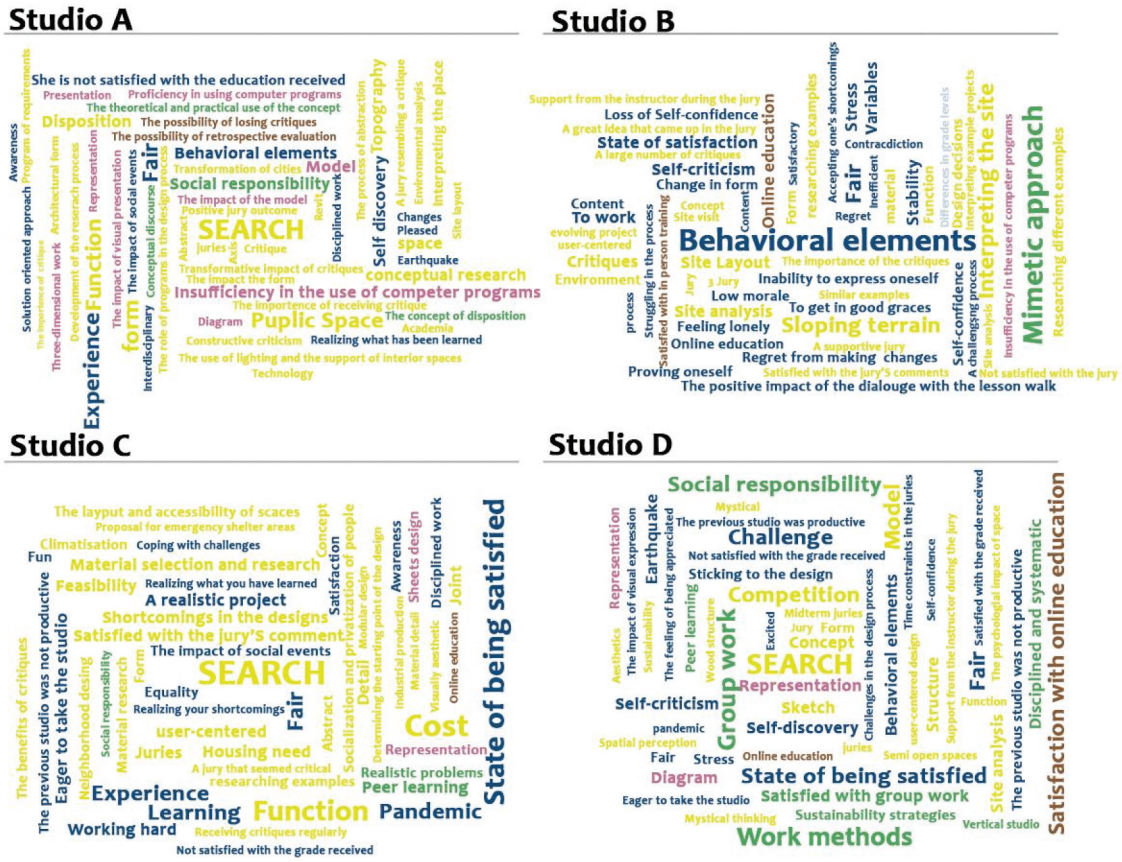


Figure 5. Code clouds of the Studio.

Their narratives also revealed personal growth and emotional transformation experienced throughout the process.

A characteristic feature of Studio C is the disciplined approach to work. The students are expected to work consistently throughout the process, without interruption, unless in cases of necessity.

In the MAXQDA analysis, after removing auxiliary words, prepositions, and conjunctions, the most frequently used words were examined. In the Studio C working file, the words material and studio stand out, indicating that material plays a significant role in Studio C for ensuring the feasibility and producibility of the design. Both students conducted in-depth research on materials throughout the design process. Words like panel, project, and jury were also frequently mentioned.

Students in Studio C frequently emphasized the role of research in informing their design decisions. These reflections align with the themes of embodied design thinking and adaptive and collaborative design practices, illustrating how material and contextual constraints informed students' design logic.

3.4. Studio D

In Studio D, the refined themes include; Embodied Design Thinking, Personal and Emotional Learning Journeys, Adaptive and Collaborative Design Practices, Spatial and Relational Studio Dynamics, and Representational Mastery and Feedback Integration. In Studio D, students particularly emphasized the complexity of the design process, which was shaped by a competitive environment and themes of sustainability. Their narratives also highlighted how they coped with individual challenges and the sense of fulfillment they experienced during the project development.

Codes related to Spatial and Relational Studio Dynamics were less prominent in Studio D, suggesting that contextual or interpersonal factors were not the primary focus of student reflections. In the MAXQDA analysis, after removing auxiliary words, prepositions, and conjunctions, the most frequently used words were examined. In the Studio D working file, the word design stood out. Both students worked in-depth on design during the architectural design studio course. Words like model, competition, jury, and critique were also frequently mentioned.

The Research and Competition codes were the most frequently coded in the interviews with students in Studio D. This suggests that the character of Studio D revolves around a competition culture, closely tied to representational mastery and iterative feedback practices. During the design process in Studio D, codes like earthquake, social responsibility, group work, satisfaction, and representation were also found (Figure 5).

4. Evaluation

Common features identified across studio narratives
Critiques and Jury Reviews in the Design Process:

- Students described critiques and jury evaluations played a significant role in all studios. These processes helped students develop their projects and provided a continuous feedback mechanism.

Research:

- Students emphasized how research informed their design thinking, enabling them to gain in-depth knowledge on various topics.

Online Education:

- Due to the pandemic, all studios were conducted online via Zoom.

Student Experiences and Achievements:

- In all studios, students described growth in self-awareness and discipline, often in relation to the iterative and challenging nature of studio work.

Experiential differences observed across studios
Design Decisions and Approaches:

- Studio A: Students reflected on conceptual readings and creativity-oriented designs.
- Studio B: Students reflected on their engagement with materials, spatial form, and the historical context as central elements of their design experience.
- Studio C: Narratives revealed that students explored modular and industrial design as frameworks for addressing urgent, real-world needs particularly through applications like emergency housing.
- Studio D: Addressed broader and more abstract topics like sustainability, flexibility, and environmental psychology.
- Working Methods:
- Studio A: Students reflected on adopting integrative approaches that combined diverse knowledge areas with a strong sense of social responsibility.
- Studio B: Students described working with a more defined and structured methodology, often referencing a mimetic approach that shaped their design thinking.
- Studio C: Students in Studio C reflected on addressing realistic design problems and highlighted the importance of peer learning as part of their studio experience.
- Studio D: Narratives from Studio D, emphasized structured and disciplined work processes with several students describing their experience within a vertically integrated studio model.

Architectural Design Studio Outputs:

- In both Studio A and Studio B: Students described engaging with traditional representation methods, including person presentations and physical model making, as key parts of their design communication.
- Studio C: Students in highlighted board design and visual techniques as key tools for expressing their ideas.
- Studio D: Students reflected on modern communication tools like diagrams and visual representations.

General Evaluation
Learning Approaches:

- The studios aimed to equip students with essential skills such as critical thinking, research, and creative problem-solving.

Student Emotions:

- It was observed that in every studio student experienced similar emotions such as challenges, self confidence, and awareness of the learning process. Students across studios expressed a range of emotions, including confidence, challenge, and reflective awareness. In Studios A and D, feelings of fairness were especially emphasized, while students in Studios C and D often described satisfaction with the process and outcomes.

5. Discussion

The educational experience in architecture studios provides students with a unique learning platform characterized by various challenges and advantages. Students have the opportunity to apply theoretical knowledge into practice while also developing their creative and critical thinking skills. However, during this process, the importance of time management, coping with stress, and collaboration skills becomes evident.

5.1. Embodied design thinking

This theme addresses RQ1 by exploring how learners perceive and make sense of their learning experiences throughout the architectural design

process, illustrating the shift from passive to active engagement through research, critiques, and jury practices.

- Defining the content of the design topic requires a detailed preliminary study (Nicol & Pilling, 2020). Students frequently described the early stages of the project as critical for shaping their understanding of the design task. In this context, the study supports previous research. If the project topic and scope are not well-prepared, it becomes quite difficult for students to understand the subject. Consequently, students struggle significantly with time management.
- The design problem is one of the biggest challenges architecture students face (AboWardah, 2020; Taneri & Doğan, 2021). After understanding the project topic, the most challenging phase for students has been found to be research and concept development.
- In architectural project courses, the process involves examining and analyzing various dimensions, including the site and surrounding environment, social requirements, and needs programs, and transforming design data into spatial relationships (Kılınç, Özer, and İpek 2022). It has been observed that the compatibility between the given site and the needs program is highly important. Especially when the site differs from standard forms and is large in relation to the needs program, students face significant difficulties in site placement.
- Competitions allow students to compare their skills with other competitors. Winning a competition, securing first place, or even just participating provides students with great confidence, which in turn fosters creativity. This motivates them to create better and bolder projects (Białkiewicz 2020). Organizing architectural design projects as group work and, at the same time, as a competition has particularly positively impacted students' motivation and ensured more active use of studio spaces where design courses are conducted (Uçar and Levent 2013). Students expressed that participating in competitions enhanced their motivation and encouraged bolder creative decisions. Encouraging students to participate in competitions serves as an indicator that increases efficiency in studios. Architectural competitions, in which students participate individually or as part of a team, require the generation of solutions for specific topics/problems within a short period, despite a high probability of losing. Regardless of the outcome, such competitions provide significant educational gains in architectural training (Dinç 2010).
- The jury system is a traditional architectural learning assessment tool (Pekdaş and Kutsal 2021). Architectural juries in design studio studies are equivalent to exams in written courses; thus, students experience mixed emotions. Beyond being an exam, juries provide students with learning opportunities in an atmosphere that can be humorous, confrontational, or reassuring (Alagbe et al. 2017). In general, it is acknowledged that juries, in addition to assessment, should further advance students' intellectual development by providing constructive criticism that clarifies the strengths and weaknesses of the design and expands on critical design issues related to the project (Salama and El-Attar 2010). However, the study supports the view that juries are the most important learning spaces in studios. It is particularly understood that students' learning levels increase during the preparation phase for juries and the jury process itself. This corresponds with findings from Tafahomi (2021) and Khan and Thilagam (2023), who emphasize juries as reflective spaces that shape critical thinking and deepen learning. Juries are essential components of design studios where students develop a critical perspective and improve their studio outputs (Tafahomi 2021). Even students with struggling projects gained motivation through constructive feedback. The study also supports the argument that interim juries contribute more than final juries (Musa 2020). This aligns with existing literature suggesting that the jury process, when conducted constructively, can deepen students' critical reflection and design articulation skills (Salama and El-Attar 2010; Tafahomi 2021). However, such benefits depend significantly on the tone and quality of feedback, as overly negative or abstract critiques may result in stress or confusion rather than learning.

5.2. Personal and emotional learning journeys

This theme responds to RQ1 and RQ4 by examining how students' personal reflections and emotional experiences shape their understanding of learning, while also capturing how communication and mentorship dynamics influence the teaching – learning relationship.

- Denel (1998) states that the goal of a studio instructor is not only to teach design but also to help students develop their personalities. However, a study by Çil and Demirer Özer (2021) found significant differences between the expectations of studio instructors and

students' perceptions, pointing to a lack of effective communication. The master-apprentice relationship in architectural design studios must be carefully understood. Due to its nature, architectural education differs from other disciplines and is based on a master-apprentice model. In this context, the master is expected not only to train the apprentice academically but also to impart values such as communication, psychology, solidarity, and justice, thus preparing them for life. However, there are certain challenges in translating this expectation into practice.

5.3. Adaptive and collaborative design practices

This theme relates to RQ2 and RQ3 by highlighting how collaborative approaches and pedagogical strategies influence students' understanding of studio learning and lead to differentiated outcomes based on diverse teaching methods.

- Kuhn (2001) states that it is important for students to experiment in multiple design environments and explore how different settings highlight various aspects of a design problem. In this sense, constantly changing studios each semester help students gain different perspectives. However, students shared that transitioning between different studio systems required adjustment but also provided diverse perspectives. Exposure to various experiences and applications in studios allows students to develop problem-solving skills from different perspectives, as well as gain proficiency in using tools and methods.
- Teamwork is a parameter that enhances the quality of architectural education (Dinçer, Özeren, and Yağcı 2022). Although teamwork presents various challenges, collaborative project production and the division of labor provide students with valuable skills. Previous studies have found a significant relationship between students' satisfaction with teamwork instruction and their satisfaction with both the outcomes and processes of team projects (Tucker and Abbasi 2015). In this respect, the findings are consistent with other studies. Experiencing roles within a team, breaking individualistic tendencies, and fostering peer learning in different studios contribute significantly to architectural education. Additionally, studies supporting these findings suggest that teamwork automatically facilitates mutual knowledge exchange among students and encourages them to defend their ideas openly. The group work inherent in architectural training not only enhances individual skills but also provides a collective learning environment.
- The application of different teaching methods by studio instructors broadens students' perspectives, and they report being satisfied with these experiences. The use of various design methods and tools contributes to architectural education and enhances the understanding of learning processes (Demirbaş and Öğüt 2020; DiSalvo et al. 2017). This result aligns with previous studies highlighting the benefits of varied learning environments (Afacan, 2018; Shareef and Farivarsadri 2020; Kvan & Jia 2005; Onur and Zorlu 2017). Additionally, literature suggests that diverse learning methods boost student motivation (Mostafa et al. 2010; Özdemir 2016).

5.4. Spatial and Relational Studio Dynamics

This theme addresses RQ2 and RQ4 by analyzing how spatial organization, peer relationships, and instructor interactions define students' learning experiences and shape the evolving teaching – learning dynamic.

- As in all disciplines, social events also influence architectural education (Karagülle 2023; Nalçakan and Polatoğlu 2008; Akdağ and Beyhan 2024). Consistent with previous studies (Zairul 2023; Şuta 2022; Alnusairat, Al Maani, and Al-Jokhadar 2021), the findings indicate that hybrid systems are more efficient in architectural education. This is because they allow students to record lessons, revisit past critiques, review feedback given to other students in greater detail, and manage their time more effectively.
- Students and instructors described online platforms like Zoom as beneficial for accessing recorded critiques and managing feedback flow. Studio instructors report that through Zoom, they can simultaneously follow the critiques of 30 students and review the recordings later. These findings align with the literature (Varma and Jafri 2021; Hassanpour 2023). However, the disadvantages of online education include the near disappearance of traditional model-making in the design process and the lack of peer learning that occurs in face-to-face collaborative work. Furthermore, infrastructural issues negatively impact the quality of education.5.5. Representational Mastery and Feedback IntegrationThis theme responds to RQ3 by demonstrating how different studio practices leave distinct traces on learners through variations in representational strategies, feedback mechanisms, and conceptual focus.

Table 1. Mapping of research questions and thematic findings.

Research Question	Corresponding Themes	Explanation
RQ1: How do learners perceive and make sense of their learning experiences throughout the architectural design process?	Embodied Design Thinking, Personal and Emotional Learning Journeys	Students' learning shifts from passive to active roles through research, critiques, and jury processes.
RQ2: How do students define their learning experience in the architectural design studio?	Spatial and Relational Studio Dynamics, Adaptive and Collaborative Design Practices	Reflects students' perceptions of instructor strategies, working culture, and studio modalities (e.g., hybrid, online).
RQ3: Do different design studio practices leave distinct "traces" on learners?	Representational Mastery and Feedback Integration, Adaptive Design Practices	Highlights the differentiated outcomes (e.g., emphasis on materiality, conceptual focus, or competition-based learning).
RQ4: How is the teaching-learning relationship shaped between the studio instructor and the student?	Personal and Emotional Learning Journeys, Spatial and Relational Studio Dynamics	Captures the mentor-apprentice dynamic, communication styles, and student agency in response to critique culture.

- The representation of projects is highly important. Students in early design courses frequently described challenges with using computer-aided design tools to fully express their ideas. During the process of producing project visuals, students often require additional support. Elements such as lighting, materials, and textures, which are essential in defining a project, do not always effectively convey the intended design, leading students to feel inadequate. Technology serves as a production tool in architecture (Akin 2018). Technological advancements alter spatial requirements, and the adequacy of these requirements directly impacts the quality of education (Rzazade Yılmaz and Polat 2020). Increasing the number of elective computer courses in lower grades could help address this issue. Moreover, incorporating elective courses that promote interdisciplinary collaboration – such as digital design studios – could aid students in producing graphical elements like diagrams to communicate their designs more effectively. Providing curriculum diversity is crucial for integrating architectural education with professional practice and enhancing the quality of education (Akgün 2016).

Table 1 illustrates how the thematic findings emerged in response to the study's core research questions, in line with its phenomenological orientation. This mapping reinforces the study's epistemological foundation and clarifies the interpretive connection between lived experiences and the research aims.

As summarized in Table 1, each major theme is directly linked to one or more of the study's research questions. These themes collectively capture how students perceive their learning experiences (RQ1), define their engagement with studio practices (RQ2), respond to diverse pedagogical approaches (RQ3), and navigate the teaching-learning dynamics shaped by instructor feedback (RQ4).

6. Conclusion

This study contributes to architectural education literature by offering empirical insights into how diverse studio settings shape students' learning processes, perceptions, and experiences. By emphasizing student-centered, flexible, and research-driven pedagogical models, the findings advocate for curricular diversity and critique culture in design education. These conclusions provide practical recommendations for structuring architectural design studios in a way that aligns with both traditional and emerging educational needs.

In Studio A, the design process focuses on acquiring practical skills to develop students' projects. Student reflections in Studio A often emphasized the importance of research as an integral part of their design process suggesting a strong orientation toward inquiry based learning.

In Studio B, the design process emphasizes conceptual development and research. One of the characteristic features of Studio B is case study research. A conscious examination of a wide variety of examples is conducted based on similar programs, sites, and environments. Within this scope, students are encouraged to develop the ability to interpret applied examples and gain awareness in project analysis. Students adopt a theory based approach to enhance their critical thinking and analytical skills.

In Studio C, the design process highlights material research, social responsibility, and problem-solving skills. A notable feature of Studio C is the regular critiques. Students focus on practical applications to develop solutions sensitive to real-world problems. One of the defining characteristics of this studio is its emphasis on material knowledge and construction details.

In Studio D, the design process centres around three dimensional work and sustainability strategies. While developing architectural projects for competitions students balance technical and aesthetic factors. A striking feature of Studio D is the large and diverse jury panel, which brings multiple perspectives to the studio environment. It can be stated that Studio D is an environmentally conscious studio that instils sustainability awareness in students.

When evaluating the category of student emotions, it is evident that students at different levels in the studios experience varying degrees of difficulty. In

particular, second-year students in Studio B described significant challenges in adapting to conceptual complexity within the design process, as reflected in their own accounts and narratives of these difficulties. In Studio C, third-year students participate, while in Studio A and Studio D, both third- and fourth-year students are enrolled. This diversity in class levels has resulted in variations in knowledge, experience, and maturity levels among students.

Students in Studio B reflected on individual behavior patterns as a key part of their learning experience, and upper-year students further engaged with broader humanistic concepts such as social equality, justice, and awareness as integral dimensions of their studio engagement. This indicates that students' perspectives evolve and diversify throughout their undergraduate education. Consequently, it can be concluded that the design studios students participate in throughout their architectural education not only provide professional knowledge but also foster societal awareness, experience, and critical thinking.

6.1. Learning theories and studio relationships

Studio A focuses on developing abstraction skills and creativity. The student emotions and learning styles discussed in Section 2 are particularly significant in this studio, as students begin to cultivate design thinking and creative problem-solving skills. The methods examined in Section 2—such as drawings, models, and concept development – help students express their creativity and overcome emotional barriers in the design process. This studio emphasizes critical feedback to enhance students' creative thinking abilities. For these reasons, Studio A is associated with the **constructivist learning approach** (Figure 6).

Studio B is centered around critiques, drawings, and juries, focusing on how students overcome emotional and cognitive barriers in the creative design process. The student-centered approach, recognition, and awareness support the studio's experimental and research-based theoretical development. Therefore, since Studio B enhances the learning process through creative and innovative methods, it is linked to the **cognitive learning theory** (Figure 6).

Studio C emphasizes sustainable design principles and environmental awareness. In this studio, critiques, juries, and drawings allow students to learn how to consider environmental responsibilities while developing solutions to real-world problems. It highlights the importance of developing a deep understanding of the environmental impact of design and fostering empathy. The analysis explores how students' knowledge and attitudes toward environmental sustainability are reflected in their design processes and final design solutions. Due to these reasons, Studio C is associated with the **humanist learning theory** (Figure 6).

Studio D aims to integrate social interactions and spatial experiences into the design process. Within the framework of **competitions, three-dimensional studies, critiques, and evaluations** examined in Section 2, this studio provides an essential platform for students to explore how they can incorporate social context and user experiences into their designs. Students who experience the competition process analyze the impact of the **constructivist learning theory** on design processes and outcomes through peer assessments. Studio D explores how interactions, knowledge, observations, and interpretations can be integrated into design within the constructivist learning approach (Figure 6).

6.2. Studio phenomenon information

- **Studio A**: Focuses on acquiring practical skills and applied methods. It provides a studio environment



Figure 6. Learning theories and studio relationships.

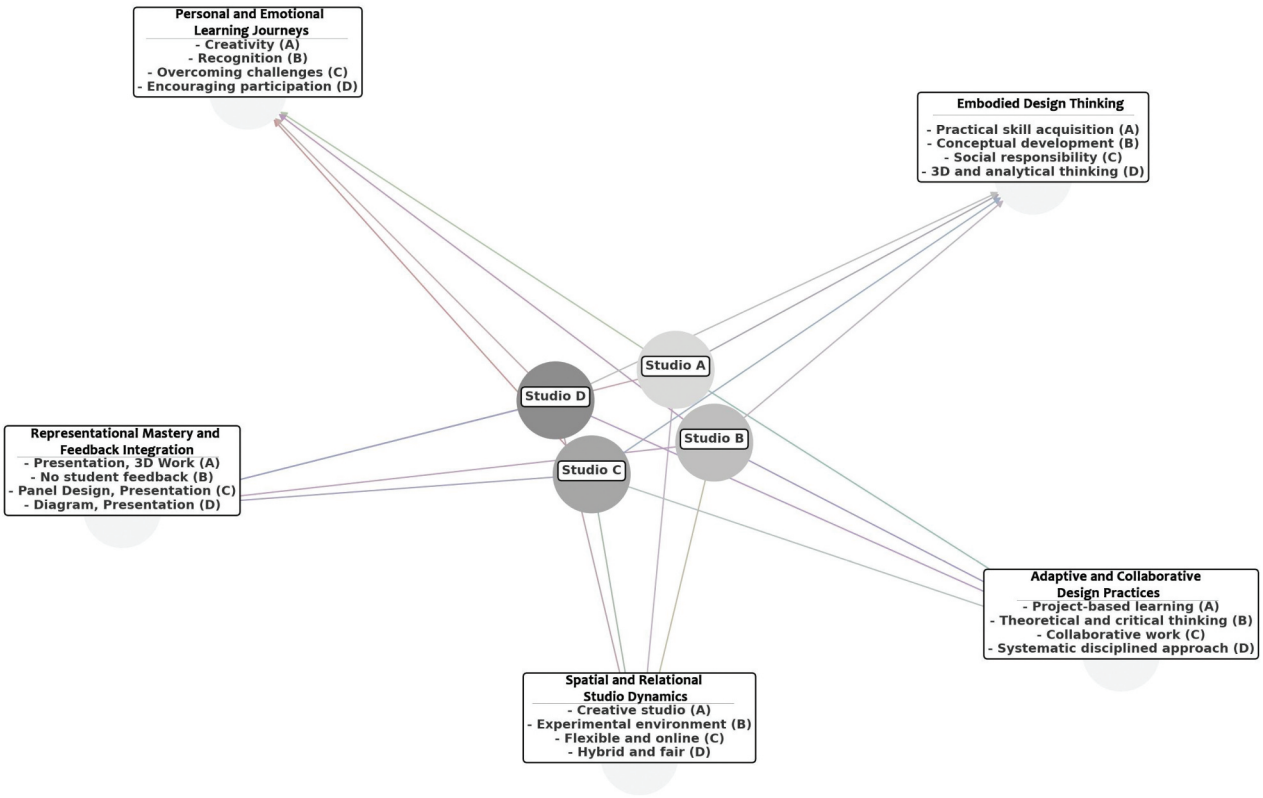


Figure 7. Architectural design studio phenomenon information.

where creativity is emphasized, project-based learning is adopted, and knowledge integration is ensured in terms of student experience (Figure 7).

- **Studio B**: Emphasizes conceptual development and theoretical foundations. It offers students opportunities for recognition and awareness, prioritizes education based on theoretical principles, and fosters an experimental, research-driven working environment (Figure 7).
- **Studio C**: Centers on social responsibility and addressing real-world problems. It cultivates discipline and the ability to overcome challenges, promotes a collaborative working environment, and offers a student-centered approach based on flexibility and an online education model (Figure 7).
- **Studio D**: Provides a three-dimensional and analytical thinking-based approach. It ensures a fair learning environment, offers a systematic and guided learning approach, and recommends integrating face-to-face and online interactions through a hybrid education model (Figure 7).

Students frequently described the architectural design process as a central and recurring experience in their learning journey. The project theme, design process, and the student's position within juries create limiting factors, which are considered common components in almost all studios. The working environment varies depending on the students and studio variables. It can be stated that experiential learning and individual breakthroughs play a role in this process. Learning methods and student experiences vary according to students' individual behaviors. While individual characteristics are emphasized in this theme, if a studio has a distinct character, the student becomes a direct influencing factor within this theme. The identified themes possess different categories that define the strengths and weaknesses of architectural education. Studies conducted on these categories will play a role in enhancing the quality of the education provided.

Some students have emphasized that effective communication with the studio instructor is a crucial parameter in managing the process, revealing that one of the most important tools in studios is communication itself. It has been observed that critiques are a vital educational tool for students facing various challenges in the design process. Regardless of the studio's topic and operation, students' narratives suggest that early engagement with research, regular feedback, and sustained effort were key factors in their sense of achievement.

6.3. Significance and contribution to the literature

This study evaluates the impact of different studio formats on students in architectural design education, highlighting the importance of diversity and various

pedagogical approaches. By examining how studio formats influence student experiences, working methods, and the design process, the study demonstrates how diversity enriches education. The research, which investigates four different studios, reveals that each studio possesses a unique identity. Students described the studios as student-centered, open, and respectful of individual expression. Various methods are used in all studios to enhance students' academic performance. Taking courses from different instructors and forming more inclusive juries contribute to students' academic success.

6.3.1. Evaluation of pedagogical approaches

The research analyzes how different studio formats impact students' learning processes and experiences, revealing the effectiveness of various pedagogical approaches. This analysis provides insights into which pedagogical methods are more effective in architectural education and how students learn best.

6.3.2. Introducing new perspectives to the literature

This study contributes to the literature by highlighting the role of studio format diversity in shaping design education. This allows future researchers and educators to explore the impact of different educational models and pedagogical approaches on student satisfaction in greater depth.

6.3.3. Guidance for practical implementation

The thesis provides data that can serve as a reference for studio instructors in planning studio formats, content, and methodologies. In this regard, the research adds a new dimension to architectural design studio studies, contributing to the enhancement of architectural studio education quality and improving students' learning experiences.

6.3.4. Understanding of student experiences

This study, employing a phenomenological approach, seeks to deeply understand how students perceive and experience different architectural design studio formats and how these experiences influence their learning processes. The findings reveal that students initially adopt a passive role under the guidance of instructors, gradually becoming more active as the process progresses. A similar dynamic is observed during jury sessions, where grading anxiety contributes to student passivity. Each studio's unique structure and pedagogical approach occasionally lead to adaptation challenges; however, exposure to diverse design environments ultimately enhances students' satisfaction, creativity, and motivation. The variety in topics, teaching methods, and studio dynamics from semester to semester prevents monotony and enriches students' educational experiences.

However, it is important to acknowledge that such diversity may also result in challenges. Students may face difficulties in adjusting to different teaching styles, expectations, or studio cultures from one semester to another. This includes confusion about evaluation standards and critique structures, especially when the pedagogical approaches vary widely among instructors. Some students reported feeling uncertain or demotivated during these transitions, particularly when assessment criteria were perceived as inconsistent or subjective. These factors can temporarily hinder learning progression and affect students' confidence in their design abilities.

6.3.5. Supporting a student-centered approach in education

The phenomenological method promotes an approach that centers on students' experiences and perceptions. The thesis emphasizes the importance of student-centered education, aiming to create a more responsive and understanding educational environment. In this context, all studios are found to be student-centered. Students can directly communicate with studio instructors and freely express their ideas. Therefore, the studios examined in this study are identified as respectful of individual rights and values, egalitarian, and free environments. Studios highlight the necessity of fostering a space for free thought, which is crucial for improving academic performance. Consequently, architectural design studios should be free, student-centered, and egalitarian.

6.3.6. Course curriculum and studio course accreditation

Providing standardized education across universities is noted as a challenge to the concept of originality (Özeren and Dinç Kalaycı 2023). Particularly for newly established institutions, applying the same curriculum as well-established universities despite technical and infrastructural limitations creates challenges for both educators and students, leading to a loss of uniqueness. Enforcing accreditation processes without ensuring the necessary infrastructure will likely cause problems among educators and students. The multifaceted nature of architectural education is often not fully addressed in undergraduate courses at many universities, leaving the studio courses to bear the entire educational burden. Studio education, the most crucial component of architectural training, is considered the primary element across all universities. However, variations exist in its implementation. These differences are particularly evident in teaching methods, independent of faculty and student numbers. Horizontal, vertical, and hybrid studio structures are commonly observed. Over time, these different studio models are expected to become more widespread across universities as they align their curricula.

By eliminating obstacles to diversity in education, studio education can be adapted to fit the institutional structures of different universities. Maintaining a balanced distribution between instructors and students is essential, particularly in newly established institutions, where this balance is often not achieved (Özeren and Dinç Kalaycı 2023).

6.3.7. European qualifications framework and MİAK (architecture accreditation board) criteria

In the context of Türkiye's integration into the European Union, uncertainties remain regarding architectural education and its adaptation to EU standards. While architectural programs in EU member states require a certain level of alignment, Türkiye – being a non-EU country – faces various uncertainties and challenges in terms of global integration. In the United States, the only organization accrediting professional degree-granting institutions in architecture, The National Architectural Accrediting Board (NAAB), considers numerous criteria, including physical facilities, information resources, financial resources, administrative structure, professional degrees, curricula, and student performance standards.

6.3.8. Diversity in architectural design education and its effects

It has been observed that students, who design in different studios each semester, are motivated by this variety. Exposure to diverse studio environments and instructor feedback fosters student motivation and academic development.

6.3.9. Evaluation of pedagogical approaches

The study highlights the pedagogical impact of different studio formats on student learning processes.

6.3.10. Bringing new perspectives to the literature

The study introduces a new perspective to the existing literature by emphasizing the importance of studio formats in architectural education. It provides future researchers and educators with the opportunity to examine in greater depth the effects of different educational models and pedagogical approaches on student satisfaction.

6.3.11. In-depth understanding of student experiences

By adopting a phenomenological lens, the study offers a deeper understanding of how students experience and perceive different studio formats, and how these experiences affect their learning trajectories. It has been found that in the early stages of the design process, during research and concept development, students take on a passive role under the guidance of the studio instructor, whereas in later weeks, they adopt a more active role.

Architectural design studios operate not only as spaces of production, but also as experiential environments where students actively construct meaning through interaction, feedback, and iteration. Each stage of the design process – research, critique, reflection, and development – offers a unique learning opportunity that shapes both the student's design thinking and their perception of self within the architectural discipline. As such, studio learning is inherently subjective, layered, and pedagogically rich.

6.3.12. Recommendations for future studies

This study examines three studios conducted in an online setting and one hybrid studio. In this regard, face-to-face education may present various anomalies. Although this study interprets both online and hybrid education based on student experiences, the ways instructors conduct their studios and their physical interactions with students could be the focus of another study. Comparing how students develop over the years in architectural design studios and assessing the similarities or differences in this development process could be an essential area for future research. Future studies could explore how students' skills and competencies evolve throughout their architectural education.

Future research may also investigate the impact of different learning theories and pedagogical approaches in design studios. By evaluating students' initial skill levels and knowledge base, researchers can determine how these skills and knowledge develop over time. Additionally, analyzing the effectiveness of various learning theories based on student development could be valuable. Understanding the effects of different studio formats on student experiences can be considered an important step in creating more effective educational environments in architectural education.

Moreover, efforts can be made to align architectural design studio courses with Bologna Course Information Packages for accreditation purposes. Architectural faculties in Türkiye can exhibit original drawings, models, and iconic prototypes of final projects from design studios. Guest faculty members from different schools can be invited to these exhibitions, and discussions can be held with guest teams regarding the content and scope of the exhibitions. The exhibitions can be shared on digital or social platforms. The selection of drawings and models for exhibition can be determined by the project's significance and the discretion of the exhibition organizers. The outcomes of design studio projects can be presented as they were throughout the critique and evaluation process during the semester. The scope of these initiatives can be expanded, making each a potential research area. Additionally, future studies can examine the

similarities and differences in development processes among various student groups, class levels, and studio experiences. The influence of different academic backgrounds, cultural contexts, or personal characteristics on student development can also be analyzed. This could help educators adjust their pedagogical strategies to better accommodate students' diverse needs and learning styles.

In conclusion, such future studies can provide valuable insights into evaluating the effectiveness of architectural design education and improving future educational practices. Recognizing how students evolve during studio education can help educators adopt more effective support strategies.

Overall, the findings presented in this study directly address the research questions by illustrating how students perceive and make sense of their studio experiences (RQ1), how they define and articulate their learning processes (RQ2), how pedagogical practices shape differentiated learning pathways (RQ3), and how teaching-learning relationships evolve through feedback and critique (RQ4). This synthesis underscores the multifaceted nature of architectural studio learning, revealing the cognitive, emotional, and social dimensions that underpin students' experiential development and highlighting the pedagogical significance of diverse studio settings.

Acknowledgements

This study is derived from Dr. Edibe Begüm Özeren's PhD Thesis titled "An Evaluation On Student Focus Group In Architectural Design Studio Practice", completed at Gazi University, Faculty of Architecture, Graduate Education Institute, under the supervision of Prof. Dr. Pınar Dinç Kalaycı.

Author contributions

Methodology, E.B.Ö and P.D.K.; Investigation, E.B.Ö; Resources,E.B.Ö and Data curation, E.B.Ö and P.D.K; Writing – original draft, E.B.Ö and P.D.K. All authors have read and agreed to the published version of the manuscript.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Ethical approval

This study was conducted with the ethical approval of the Ethics Committee of Gazi University Rectorate, under the research code 2023–629.

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