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Original Research Article

Identifying the Challenges and Obstacles of Architectural Students' Cognitive Perceptions in the Architectural Design Process*

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Abstract

Problem statement: Architectural education in Iran is encountering fundamental issues and suffering from weaknesses such as confusion in architectural education spaces in Iran, the lack of a somewhat responsive process to the educational needs of students, and, the lack of the student's orientation towards learning architectural design. Unfortunately, in universities, professors pay less attention to the subject of "understanding space," and the problem is how to teach students to create it without a clear understanding of the nature of space. On the other hand, transferring concepts from a visible state to a spatial one is much simpler than transferring them from a mental, verbal, or written state to a spatial one.

Research objective: The main goal of this research is to identify the challenges and problems in teaching architectural design, with an emphasis on the mental perception of students.

Research method: The present study is considered applied in terms of its purpose and data collection and analysis methods within the qualitative research group. The statistical population of the research includes experts and professors in the field of architecture at the Islamic Azad Universities of Tehran and Karaj. The data collection tool is a semi-structured interview, and ATLAS TI software was used for data coding.

Conclusion: The results led to the identification of 46 core codes, 84 indicators, and 17 final themes, which include issues such as the physical conditions of learning environments, outdated methods and design approaches in Iranian universities, the level of familiarity of architecture professors with modern methods, lack of paradigmatic convergence, one-sidedness in architectural design education, visually-centric space creation, and more. Therefore, it can be said that in the educational and research system of Iranian architecture departments, less attention is paid to "mental perception" and architecture students cannot accurately convey their understanding of the environment using past methods such as simple hand tools, paper, and models and convince their audience of the success of their project. Understanding the environment and its mechanisms plays a key role in expressing the environment.

Keywords: Architectural Education, Cognitive Perception, Mental Images, Architectural Design, Atlas.ti.

of Dr. "Mansour Nikpour" which has been done at Architecture Department, Bam Branch, Islamic Azad University, Bam, Iran in 2022.

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Introduction

In recent decades, architecture and construction have become visual products that lack existential-spatial experience, rather than embodying it. As a result, the transparency and sense of lightness and fluidity that are central to modernity's essence have intensified the rational and conceptual dimensions of architecture and led to the disintegration of its physical, sensory, and embodied essence (Shirazi, 2010, 33). One of the consequences of this disintegration is the design of environments that offer nothing for a close-up experience and keep the viewer at a distance. In today's era, all desirable criteria for environmental attractiveness are summarized in "being seen as good"; even modern architectural education is not immune to the pitfalls of visual-centeredness. Various three-dimensional renderings in the CAD system, familiarity, and critique of the environment merely restrict the perception of the environment to capturing it through photography, and so on. These are examples of this issue (Bakhtiyarimanesh, 2012, 25). While architectural experience is a multisensory experience and the qualities of matter, space, and scale are not only perceived visually, but also through hearing, smell, touch, taste, skeleton, and muscles; in fact, architecture is experienced through all senses. Another important issue in understanding the environment means understanding the relationship between spaces. In architecture, there is an intermediate space between buildings that links them together with various meanings, forms, and functions. Whenever several buildings are simultaneously within our field of vision, we feel relationships between them that are created solely through the space between these buildings. This space, as a hidden yet very important factor, plays a key role in the existence or absence of crises in architecture and urban planning. Technological advancements, economic trends, and particular aesthetic viewpoints have led to less attention being paid to the impact and quality of these spaces in cities. Architecture students spend more time designing subjects that are within their surroundings

and overlook the spaces between buildings. The disappearance and neglect of these spaces on a small scale result in abnormalities and disturbances in spatial organization on a larger scale. Therefore, this research aims to investigate the perceptual awareness of architecture students in the intermediate space between buildings and its application in architectural design. Understanding of space in the universities of the country is not done well, and students do not have a general understanding of space, leading to a kind of ambiguity and confusion in their perception of space. This issue is tangible through the architecture and buildings that are seen at the city level. One of the causes of this issue is the weakness in conveying and perceiving the concept of space in universities. The turmoil of architectural education spaces in Iran and the lack of a nearly responsive process to the educational needs of students and the lack of targeting the student's mind towards learning architectural design are among the fundamental issues and weaknesses of our architectural education. In such a way that in academic architectural education, quantitative and numerical evaluation has become the main criterion for evaluating students, with no consideration for quality. All architecture students and professors acknowledge the importance of discussing space in architecture, and this issue has received special attention in most reference books used in universities. Emphasizing the concept of space in architecture is natural, but in fewer university projects, students pay attention to the issue of space, especially the intermediate space between buildings in their design. Perhaps the main problems in this area are related to the issue of education of which we can refer to students' reliance on architecture books and Journals, to put it more clearly, on their images and photos during the design process. Referring to Journal images for perception is seen as a recommended method by architecture teachers and professors. Therefore, perhaps the main issue or problem in the students' neglecting to understand space, especially the space between buildings during the design process, lies

in architectural education. Nowadays, architecture education, as one of the branches of specialized education, requires the expansion of innovative abilities. The primary concern of architects is to create space and three-dimensional forms to fulfill human activities in that space. Like other types of education, architectural education also deals with preserving and transferring professional and social values generally. In light of the issue discussed in this research, the main question pursued in this study is:

What are the main damages and disorders of architectural education spaces in Iran regarding

targeting students' minds toward learning architectural design?

Research Background

The literature has mainly focused on recognizing existing experiences that have a direct relationship with the research question. Therefore, among the numerous and diverse sources available on architectural education, architectural design, and students' architectural perception, our main focus here will be on limited research that has focused on architectural education and its improvement strategies, which are summarized below (Fig. 1).

In the definition of switch architecture design, Gareth views design as a reactive and decision-making process that leads to the production of maps that can be used to transform resources into subjects or systems that help solve human problems or assist humans in meeting their needs. The importance of architectural design in the process of teaching architecture is to such an extent that many consider it the most important topic in architectural discussions (Kurt, 2009).

In 2017, Motiei Mahdizadeh Seraj and Bayazidi published an article discussing the issues in architectural education in basic courses and proposed solutions to improve the abilities of new students. The research results show that a dynamic and purposeful educational experience can be achieved for architecture novices by utilizing combined and simultaneous teaching of basic courses, preparing common lesson plans, continuity of exercises to make them more realistic, emphasis on individual and group exercises, and enhancing motivation, emotional intelligence, and creativity.

In 2018, Abbaspour Shekri, Rahimian & Ferastkhah studied the effect of new teaching methods on the creative growth and academic progress of students. The results of data analysis showed that using methods such as interviews and group participation was more accepted by students and led to greater creativity and academic progress.

In 2011, Talischi Izadi and Einifar conducted a study on the topic of designing assignments and testing educational solutions for developing the design abilities of beginning architecture students. They ultimately concluded that a constructive learning environment for design and architecture enhances the growth of design abilities in beginning students and improves their design creativity.

In their 2009 article on narrative teaching in architecture, Nazi Dizji, Kashtkarqalati and Parvizi discuss the importance of narrative expression in teaching based on the elements of literary narrative and storytelling techniques. In this semi-empirical study, the researchers tested two teaching methods - lecture and narrative - on two groups of 29 students. They found that by using a narrative approach in architecture, narratives can be used to evoke a sense of architectural space and building design, and that the use of storytelling in teaching various architecture courses can enhance the retention of concepts and ethical values in the minds of students.

Fig. 1. Background of research. Source: Authors

The review and analysis of empirical literature in research indicate that extensive studies have been carried out in the field of architectural education in recent years. The dominant theme of these studies has mostly been related to the impact of variables such as storytelling, the use of innovative tools in the process of architectural education, and their influence on the quality of architectural design. However, less attention has been paid to the issue of the mental perception challenges of architecture students in perceiving spaces and the impact of education on their understanding of space and consequently its application in architectural design. This is despite the fact that the conditions and indigenous educational and research patterns in Iranian universities have not been fully explored and identified as they should have been, and some research has addressed them sporadically. It is necessary to first identify the challenges of architectural education in the process of mental perception of students to prescribe a solution for them. In this study, an attempt has been made to explore what is feasible to some extent.

Theoretical Foundations

The translation of "perception" in the dictionary means to arrive, receive or understand. However, the most general meaning of perception is knowledge, which is one of the prominent features of human beings. In a more specialized definition in the field of psychology, perception refers to a mental process whereby meaningful sensory experiences are attained and through which humans establish relationships between things and their meanings (Yeravani & Khodapanahi, 2000, 25). Psychologically, perception is a mental process that involves the selection and organization of sensory information and ultimately assumes an active role in adapting to mental meanings (Carmona, 2010). Regarding the main topic of this research, which is the examination of "perception," reference can be made to extensive studies by renowned theorists in philosophy, such as Edmund Husserl, in the branch of the phenomenology of sensory perception, like

Maurice Merleau-Ponty, and by individuals in the field of architecture, such as Johann Palasma. The five senses of hearing, smell, sight, touch, and taste were first classified by Aristotle (Gehl, 2012, 33). Johann Palasma considers every experience in architecture as a multisensory one, and therefore, according to him, the sense of touch, especially in historical architecture, has been present and However, with emphasized. the emergence of modern times, there has been a profound disconnection in the realm of sensory perceptions (Pallasmaa, 2013,10). Among the philosophers and psychologists who have addressed human and environmental issues, it seems that recent theories such as those of Johann Pallasmaa offer clearer design solutions to the audience (Fig. 3).

In the process of perception, raw data received through the senses enters the mind and becomes meaningful in some way (Ganji, 2009, 163). Therefore, the process of perception involves three consecutive stages: "sensation", "sensory perception," and "intellectual perception." These stages are closely linked and are distinguished by their credibility (Fig. 2).

• Models for acquiring cognitive maps and mental imagery

Studies show that there are various methods for registering and extracting mental imagery and environmental perception. These methods can be categorized into two groups based on their nature: generative or design-based models, and recognition/ evaluation-based models, also known as nongenerative models.

Generative or design-based models

Some models for extracting mental images from the environment, place the questioner in an active role and read them into their own representation of the environment using various design and drawing methods. These models are called "generative" because they do not have pre-existing data and rely on the active actions of the questioner. In this case, the researcher does not have a role in producing the data (Oliver, 2007). While this method has been

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Fig. 2. The overall process of perception and cognition. Source: Naghizadeh & Ostadi, 2013, 5.



Fig. 3. Effective factors in the perception of the environment. Source: Pakzad & Bozorg, 2011, 166; Bakhtiyarimanesh,2012, 26; Asadpour, Feizi, Mozaffar & Behzadfar, 2014, 15-16.

the most common and demonstrates the "spatial awareness" and "important components of the environment" from the viewer's perspective, it also has its challenges. Even if individuals have extensive experience with the environment, they may not be able to visually reproduce it (Downs & Stea, 1977). Another challenge is when questioners try to draw a "standard bird's-eye view" that they may not have seen before. Additionally, the interpretation of drawn maps and their accuracy checking are among the notable issues (Ueda, Nakajima, Takayama, Petrova, Matsushima & Furuya, 2012). Fig. 4 illustrates one of the concepts presented by Vittrakk. In this figure, the basis of desirable learning is knowledge acquisition. Only these activities, which involve creating real action from relationships and meanings are included as examples of evolutionary learning strategies.

- Non-generative recognition-assessment models

In Recognition-Assessment Models, the questioner is exposed to a set of primary information provided by a research-oriented investigator and is asked to evaluate or recognize them (Grabowski, 2004). In this case, the questioner is in a passive state, and the results are non-generative because the outcome is not a first-hand reproduction by the audience. The "Recognition Operation" method was first used by Ling in Boston. In this method, participants were



Fig. 4. Conceptual map of evolutionary learning components.Source: Sarikhani, Mousavipour, Feiz Abadi, Rahimi & Zarea, 2016, 17.

asked to distinguish familiar and unfamiliar symbols from among images. One advantage of this method is its superiority over the limitation of participants' drawing ability. However, it is not similar to the "Sketch Mapping" method (Wittrock, 1989).

The "Familiar Places Classification" method is another similar example developed by Gold and White (1982). This method involves classifying or grading several familiar places based on specific personality traits such as recreation. Then, these collected classifications are overlaid on an actual map identifying people's reference points based on criteria. The main problem with this method is its emphasis on mapping reactions rather than understanding the spatial representation of the environment. Therefore, it is suitable for investigating mental phenomena rather than being useful for examining the real-world environment (Oliver, 2007). In the "Multidimensional Scaling" method, participants are asked to estimate the distance between several given points in a location. This method is also known as the "Mental Triangle." The triangle can be a city or a country. The data obtained is examined by a computer, and the average is produced as a map (Zanganeh & Fardanesh, 2010). Fig. 5 shows the types of methods for extracting mental images and some indicative examples.

Research Method

This research is categorized as an explanatory study in terms of its nature and applied research in terms of its purpose. The research approach used for data collection and analysis is qualitative. The study was conducted in the universities of Tehran and Karaj and involved architecture professors and instructors who were either members of the architecture

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Fig. 5. An example of mental images and cognitive maps based on various methods. Source: Ueda et al., 2012; Oliver, 2007; De Jonge, 1962.

departments in these universities or had published articles on architectural education challenges and environmental perception in Iran. The study aims to identify the concepts and develop theoretical frameworks based on the challenges and problems of architectural design education related to students' mental and spatial perceptions. The research methodology used a Grounded Theory approach. The grounded theory approach is a systematic research method in social sciences and other fields for discovering and developing theories or hypotheses through data obtained in the natural field. Therefore, the purpose of this approach is to provide detailed, accurate, and systematic procedures for continuous collection and analysis of data from the natural field at the time of occurrence, and theory building using the continuous comparison method (Mirzaei,

2016, 235). The Grounded Theory approach has two forms, Glaserian and Strauss. According to Anselm Strauss, the Grounded Theory approach is based on qualitative research, and he states that "Our conception of data-oriented research encompasses any kind of investigation that yields findings not arrived at by means of statistical procedures or other means of quantification. Such an approach may be directed toward research on people's lives, descriptions of situations, behaviors, and also organizational functioning, social movements, or international relations" (Strauss & Corbin, 2012, 19). However, contrary to Strauss, the Glaserian approach is based on the claim that everything is data, and therefore it cannot simply be considered a qualitative method. Because data can be obtained not only through interviews and observations but

also using surveys, statistical analysis, and even comparative processes that are conducted using research literature (Mirzaei, 2016, 240). In this study, the Glaserian Grounded Theory approach is used, which is a combination of quantitative and qualitative methods, but in this research, the qualitative phase of analysis is targeted, and the findings of the qualitative phase are addressed. In the qualitative section, an open-ended questionnaire (although interviews have also been used based on their responses) has been employed to identify the issues and challenges. In fact, for the qualitative method, the number of samples selected through purposive non-random sampling continues until theoretical saturation is reached. Based on this, the number of research samples has reached 23 people; theoretical saturation means that the development of questionnaires continued until a new questionnaire did not help to increase new concepts. The software Atlas.ti is used for data analysis, coding, and extracting concepts and themes.

Validity of Research

To achieve credibility in the current research, the member-checking technique was used. This means that when the data was encoded, the codes were given to the participants and they were asked to judge their sentences and codes accordingly. Therefore, by providing data analysis and results, the respondents' reactions were obtained in the report-writing phase. Another method of validating research findings in this study was the researcher's long-term involvement in the research environment and his continuous observations in the research environment (given his teaching experience at universities), including building trust with the research subjects, learning the culture of that environment, and controlling misunderstandings caused by the researcher's or informants' interventions.

Research Findings

In this study, the main source of data for analysis was obtained through semi-structured interviews with statistical samples. The initial interviews were mostly descriptive, and gradually after each interview, the first stage of coding was done. By comparing the initial codes from the interviewees, theoretical codes emerged and in this way, 23 statistical samples were coded. Table 1 provides examples of interviews with statistical samples. The text of the interviews for three samples (although abbreviated) is presented on how the codes were open-coded, etc.

Coding process

The process of text encoding for interview transcripts was conducted as follows: First, the audio files of the interviews were transcribed into texts and the text of the interviews was repeatedly reviewed and the main components were extracted and recorded as codes. Then, similar codes were grouped into categories. Finally, with the consultation of the supervisors, similar codes were identified, modified, and condensed to be relevant to the interview section. All stages were carried out using Atlas. TI software is based on the grounded theory data analysis method. Three stages of open, axial, and selective coding were used to achieve and formulate the theory, as shown in Fig. 6.

In Table 2, the codes obtained from the first stage, i.e. open coding, are listed in detail for the second stage, which includes axial coding and creating major categories.

The present study addresses the issue of identifying the challenges and problems of teaching architecture with an emphasis on students' mental perceptions. Based on a review of the research literature and interviews with experts and professors in the field of architecture, various dimensions, and aspects were identified and examined using grounded theory. The results of the coding in the Atlas ti software are displayed as a tree diagram in the image number shown.

As shown in Fig. 7, 17 issues related to the challenges and barriers of architecture students' mental perception in the architectural design process in Iranian universities have been categorized into

Table 1. Examples of Interview Texts. Source: Authors.



Table 2. Open, axial coding and creation of major categories resulting from semi-structured interviews. Source: Authors.

Initial coding	Major categories	Row
Inappropriate physical conditions of learning environments in universities (A1). Mastery of atelier-based system in the Iranian educational system (modernist system) (A2).	Physical condition of learning environments (A)	Causal conditions
The outdated methods of architectural design in Iran (B1). The gap between Iranian universities and the advancements made in design approaches in the world(Mastery of Functional Design Techniques) (B2).	The outdated methods and design approaches in Iranian universities (B)	
Professors' unfamiliarity with new architectural design techniques (C1). Professors' lack of being up-to-date (C2).	Professors' familiarity level with modern techniques.(C)	
Educational errors resulting from ignoring the abilities and mental inclinations of students (D1). Employing uniform methods without considering individual and personality differences (D2).	Psychological and mental factors of students, such as enthusiasm, self-efficacy, confidence, academic commitment, conformity of individual abilities and talents with expertise, and fields of architectural design (D)	
Students' lack of engagement with new and common modeling techniques at the global level (E1). Not using concept modeling in architectural design education (E2). Ignoring the psychological, emotional, and physical needs of spaces and their spatial qualities (E3).	Using volumetric modeling in architectural design education (E)	
Neglecting the fundamental approaches in space design (F1). The loss of guiding and directing theories in the field of architectural design education (F2).	Lack of paradigmatic coherence (F)	Background
The dominance of the Cartesian and rational perspective in architectural designs (G1). The absence of using a hermeneutic approach in architectural design (G2).	The dominance of the Cartesian perspective (G)	
Limited connection with other educational groups, especially in the field of psychology, for a better understanding and recognition of individuals' mental state (H1).	Limited activity in the academic community (H)	
Increasing specialized knowledge for what practical application? What knowledge, for whom, and where? (I1).	Ambiguous guidelines for professional action: What knowledge, for whom, and where? (1)	
Architectural design education based on the needs of the client (J1). Forms and functions, neglecting contextualism (J2).	Functionalism in architectural design education (J)	strategies
Neglecting students' ideation ability in the process of designing buildings and spaces (K1). Drawing and coloring objective subjects through photographing buildings and spaces (K2).	Drawing and coloring objective subjects in architectural design education (K)	
Neglecting professors' understanding of students' relative comprehension in the process of architectural design (L1). Imposing established principles of space and building design on students in education (L2).	Mastery of non-generative design methods and evaluation models in architectural design education (L)	
 Lack of interactive and reciprocal relationship between teacher and student in architectural design education (M1). A one-sided view of the professors towards the subject matter, not engaging students' minds for presenting creative ideas and thoughts (M2). Lack of suitable space for contemplation and thinking for students (M3). 	Unilateralism in architectural design education (M)	Intervening conditions
Insufficient background of students in relation to architectural design education without understanding the effective components of it (NI). Lack of motivation and mental concern in students for presenting a design (N2).	Lack of emotional intelligence and creativity in students (N)	
The lack of practical and theoretical mastery among students in architectural design methods (P1). The gap between practical and theoretical subjects (P2).	Lack of distinction between education and training in universities (P)	Consequences
The academic level of classes and repetitive exercises (Q1). The weakness of the academic system, dissatisfaction with the level of education at universities (Q2). The superficiality of producing specialized knowledge, mechanical reproduction of science (Q3).	The uncertain future of the field of architecture (Q)	
Ignoring other perceptions of the audience (R1). Formation of non-human spaces (R2).	Creating a visual-centric space (R)	



Fig. 7. The final model obtained from grounded theory. Source: Authors.

5 dimensions (contextual, background, strategic, outcome, and intervention conditions). Each of these issues has subcategories that were identified as the perceptual challenges and barriers for students in the architectural design process. In the tree diagram, the relationship between the issues and their subcategories is indicated by "In case of," while the relationship between codes and subcategories is indicated by "In part of." The overall figure represents a structural view that was obtained through qualitative research and findings from experts in the field. It shows the subcategory's connection with the main and sub-sections, and each one is a part of the theoretical framework related to the perceptual challenges and barriers in the architectural design process of Iranian university students.

Discussion

The findings of this study are consistent with the findings of other studies. This consistency includes issues such as the lack of distinction between education and training in universities, difficulties and complexities in transferring conceptual structures in the architectural education process (Taghizadeh, 2015), the physical conditions of learning environments (Uysal, Aydin & Sirakaya, 2012; Ustaomeroglu, 2015), and the one-sidedness of architectural design education in Iranian universities (Bahtuyi & Nikkar, 2015).

One of the factors identified in this study regarding professional tasks and architectural design in academic environments is the quality of educational and learning environments (design studios as the main core of architectural education). Since the space and environment in which learning takes place have a significant impact on students' learning and cognitive development, these spaces should be designed with the principles of environmental psychology in mind. Robert Gifford discusses the principles and standards of designing educational and learning spaces in his book "Environmental Psychology: Principles and Practice." According to Gifford, factors such as noise level, light and color, indoor climate quality, furniture, etc. have a significant impact on students' learning and cognitive development. Therefore, by designing appropriate frameworks for classrooms and architectural studios and paying attention to proper and flexible layout planning, we can create an environment that promotes creativity and cognitive growth for students. Another factor that was identified as an agent in the research issue is the old-fashioned methods of architectural design taught in Iranian universities. In Iran, architectural design is taught using a convergent method (teacher and apprentice), which is not compatible with the new conditions and the spirit of the community's and students' pluralistic attitudes. The convergent teaching method has characteristics

such as slowness, lengthiness, and shallow teaching accompanied by a deep influence on the behavior, disposition, and movements of the teacher on the apprentice. Given the global, technological, social, cultural, and mental developments of society, this method is no longer effective. Tabibzadeh and Parva compared convergent and divergent methods in his article in 2001. The research findings showed that the convergent method uses uniform and traditional methods, techniques, and work tendencies in the teaching process. In addition, attention to both theoretical and practical foundations takes place simultaneously in this method, and there is less focus on students' mental perception and apprentices are more passive. In contrast to the convergent approach, there is the divergent (modern) approach which is mostly done in groups and experimentally, and there is no possibility of the master's personality deeply influencing the student. In this method, there are various experiences from different teachers and educators because students are in contact with different people and professors, and in these conditions, it is possible to use diverse and sometimes unconventional perspectives. The theoretical foundations are used loosely and separately, and it is possible to implement and operate them in the experimental world. Considering that in modern times, neither is the society homogeneous nor its architecture based on principles and standards. Moreover, there are no responsible and knowledgeable professors, and no obedient and accepting students. Educating architecture is based on the convergent method in an Iranian non-traditional society with a pluralistic world spirit is not possible. This has resulted in imitative architecture (repeating past patterns) or receptive architecture (such as multi-story collective housing with a central courtyard), which lacks the desirable features of traditional architecture and faces difficulties in responding to new needs and constraints. Considering that scientific environments, students, and societal conditions have undergone profound changes in recent years, the

methods of teaching architecture design must move towards involving students' mental perceptions and intellectual independence, and experientialabstraction methods should be employed with an emphasis on problem-solving based on students' mental teachings. In the overall architecture education system and specifically in architectural design education, there is no opportunity for brainstorming and mental engagement of students, and the professor-centered system dominates the Iranian university architecture education system, making students more passive and imitative.

One of the topics addressed in this study is the weakness of professors and the use of traditional methods in teaching architecture design. This is in contrast to all universities worldwide where, in addition to using new technologies, professors focus solely on teaching some general knowledge and design techniques, a trend that is more noticeable in Iranian universities. The art of architecture professors in teaching is to give a sense of architecture to students, and one solution is to integrate theoretical and practical workshops. However, in Iranian universities, theoretical education dominates over practical education. Dr. Hojjat states in his article: "Today, the scope of the architecture world is much broader than becoming an architect by attending classes and looking at the professor's work. One of the main requirements of architecture design education is the student's exploration of the time, place, and experience of architectural works from ancient times to the present" (Hojjat, 2013). Experts emphasize the importance of experience in learning and highlight the creativity and internal nature of students in the learning process, which is accomplished through intuitive learning and designing various spaces. In intuitive learning, students do not simply look at the problem mathematically, logically, and technically but by internalizing the problem, they find a suitable solution subconsciously, which requires recognizing and incorporating the creativity and talent of students in the architecture education process. One of the

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established solutions for architecture students to address the issue is to use the hermeneutic approach. The level of understanding and comprehension of artistic subjects is directly related to students' abilities in understanding and appreciating the artistic expression and the ability of the artwork to evoke a sense of evaluation on the subject. This mode of thinking should be explored in theories of interpretation and hermeneutic philosophy. Hermeneutics reflects perception states and norms conveyed through language and plays a serious, important, and influential role in understanding and interpreting phenomena. Perception identifies the meaning of each text in conjunction with the author's intended mental act, and disregarding it leads to deviation from the truth. Hermeneutics, based on diverse meanings from various phenomena of existence, including speech, behavior, written texts, and artwork, is an appropriate approach to examine the function of students' minds in perceiving the environment. Prior perception and integration of insights are important concepts in hermeneutics. Prior perception means that every recipient of the piece has prior knowledge and awareness of the object in question, making it possible to provide a genuine interpretation of it. Integration of insights implies that the "inclination towards perception and understanding" arises from the assumption that the recipient's prior knowledge is mixed with the designer's insight and reasoning (purpose and goal), and vice versa.

One of the other issues identified about the challenges and problems of teaching architecture design is the dominance and mastery of functionalist thinking among architecture professors and instructors in universities. Modern architecture is a movement in architecture that emerged in the early twentieth century. The approach of architects within this movement emphasizes simplicity, functionality, a departure from tradition and historical concepts in architectural design, and a move towards a global and international style, away from indigenous, cultural, and historical inclinations. The pioneers of

modern architecture always emphasized that today's architecture cannot rely on past forms. Functionalism is one of the principles of modern architecture. The most important slogan of modern architecture is Le Corbusier's statement that "form follows function." Unfortunately, this way of thinking has been ingrained in the Iranian architectural design education system in recent years, and students are influenced by such ideas to only consider the volumetric, formal, and functional dimensions of space in their designs, resulting in the formation of single-functional, uniform, and unchangeable spaces. The spaces we see today in buildings, such as dining rooms, bedrooms, and offices, are the result of modern architecture and its functionalist thinking. Due to a lack of sufficient knowledge about psychological and environmental needs, a comprehensive definition of functionalism has not been presented in the architectural design education system. Non-material events are considered the most fundamental inherent ability of humans to understand phenomena because the meaning of objects for living beings (humans and animals) is identified through the abilities of those objects and the intelligent perceptual system (Gibson, 1966). In fact, these functional abilities are what give them meaning, and what people perceive first are actions and events that the physical form and pattern of the environment present, which is less emphasized in the architectural design education process in Iranian universities, and most of the principles are focused on the formal, volumetric, and spatial aspects of spaces in a class by professors, while the psychological, mental, and physical needs of individuals are what shape the function of the space in the designer's mind.

Another identified issue in this study is the lack of paradigmatic consensus in architecture. Students are generally interested in different approaches, which sometimes contradict each other, without having a deep and systematic theoretical understanding of their nature. This attention to different and opposing perspectives has led to a lack of paradigmatic consensus in architecture education groups. In fact, students use theories without considering the epistemological and ontological foundations and existing methods in the field of architecture. Therefore, it is not surprising that students engage in designing architectural spaces that originate from various approaches and methods (Fig. 8).

Conclusion

The present study examines and identifies the challenges and problems of teaching architecture design, with an emphasis on students' mental perception. It was found that factors such as the physical condition of learning environments, outdated methods, and approaches to design in Iranian universities, the level of familiarity of architecture professors with modern methods, lack of paradigmatic convergence, performance-oriented training, proficiency in non-generative design methods and evaluation in architecture education, the one-sidedness of architecture design education, etc. are identified as challenges and barriers to students' mental perception in the field of architecture design. Since each student has a mental image of their environment that codes their surroundings, and as this study has shown, these images vary according to individual differences and each person's image is different from others. These codes are formed through direct experience of the environment or what the person has heard and imagined about the environment, providing designers with the possibility of designing and building readable and imaginable buildings, complexes, neighborhoods, and cities. However, due to the predominance of the visual sense over other senses in the process of teaching architectural design, the focus has been on the attention of environmental designers to visual design, overlooking the fact that some individuals in society are unable to perceive visual qualities.

In conclusion, creating a visually-oriented space



Fig. 8. Codes and final concepts. Source: Authors.

that ignores the audience's other perceptions has led to unfamiliar spaces for students in the physical environment of architecture and the city, resulting in the dehumanization of space. If we consider this issue in the context of urbanization, we will mostly address the problems and issues arising from this lack of attention to the issue and understand the importance and fundamental nature of it, as summarized at the bottom of the list:

- The emergence and occurrence of human and social crises in modern architecture are due to the lack of attention to human perception and senses in space;

- Abnormalities and disorders in spatial organization on a large scale;

• Spatial anonymity.

Considering this issue can have a significant impact on improving the design and construction of the physical environment and ultimately creating a more desirable personal and social environment. Understanding the environment and its mechanisms plays a key role in expressing the environment. On the other hand, since it provides an important platform for the growth of creative forces in architecture students, it deserves more attention and emphasis. Additionally, it is possible to extract elements that have been important in the mental image of architecture students and identify the elements and relationships of the spatial structure of the city and use them to improve the quality of the environment. Architects must be familiar with the concept and nature of architectural space before starting the design process and focus on creating this space. Therefore, architects' perception of architectural space will greatly affect the design. In conclusion, the findings and results of this study are consistent with similar studies mentioned in the empirical literature. They indicate the theoretical proposition that in the process of design education in Iran, a one-dimensional view is dominant (rational, technical, and tactical) that aligns more with the principles of building construction than design principles. This preference for learning technical skills over gaining advanced knowledge has led to the formation of a one-dimensional and visual perspective

on design and space. However, the subject of design and its education is a very complex process that is related to the designer's and students' worldviews. In other words, the way architecture students and learners perceive and learn from philosophical, artistic, intellectual, mental, and environmental interactions shapes their approach to architectural design. Learning and education in these areas lead to the formation and development of meaningful and spiritual aspects of architecture. The output and result of traditional and common methods presented to architecture students in academic environments is a one-dimensional architect and designer who does not consider the impacts of their design and thought on the environment, nature, audience, and users of the space. This gap is caused by the lack of appropriate worldview and mental perception of the designed space, which has not been adequately taught.

Reference list

• Asadpour, A., Feizi, M., Mozaffar, F. & Behzadfar, M. (2014). Typology of models and comparative study of methods for registering mental images and cognitive maps of the environment. *Bagh-e-Nazar*, 12 (33), 13-22.

 Motiei, B., Mahdizadeh Seraj, F. & Bayazidi, Gh. (2017). An approach to dynamic and purposeful teaching of basic architecture courses. *Education Technology*, 13 (1), 191-202.

• Abbaspour, A., Shekri, M., Rahimian, H. & Ferastkhah, M. (2018). Effective accountability model of public universities: mixed study. *Research in educational systems*, 13 (44), 7-22.

• Talischi, Gh. R., Izadi, A. A. & Einifar, A. R. (2011). Cultivating the design ability of beginner architectural designers to design, apply and test a constructivist learning environment. *HONAR-HA-YE-ZIBA*, 17 (4), 1-18.

• Nazi Dizji, S., Kashtkarqalati, A. R. & Parvizi, R.(2009) The use of narration in architectural education. *Scientific Research Journal of Education Technology*, 5 (2),123-134.

• Bahtuyi, R. & Nikkar, M. (2002). The role of aesthetics in the architectural education process, the collection of articles of the international conference of engineering and applied sciences, non-governmental organizations and centers. Tehran, Iran.

• Bakhtiyarimanesh, E. (2012). Enhancing balanced sensory perception in the workshop of understanding and expressing the environment. *Saffeh*, 26 (73), 23-38.

• Carmona, M. (2010). *Public Spaces Urban Spaces* (F. Gharaee, Trans.). Tehran: University of Tehran. [in Persian]

• De Jonge, D. (1962). Images of Urban Areas Their Structure and Psychological Foundations. *Journal of the American Institute of Planners*, 28 (4), 266-276.

• Downs, R. M. & Stea, D. (1977). *Maps in Minds: Reflections on Cognitive Mapping*. New York: Harper & Row Publishers.

• Ganji, H. (2009). *General Psychology*. Tehran: Salavan Publications.

• Gehl, J. (2012). *Human city* (A. Ghaffari, and L. Ghafari, Trans.). Tehran: elam-e- Memar Publications.

• Gibson, J. J. (1966). *The Senses Considered as Perceptual Systems*, Houghton Mifflin. USA: Boston.

• Gifford, R. (2017). *Research methods in environmental psychology.* Tabriz: Publications of Tabriz University of Islamic Arts. [in Persian]

• Grabowski, B. J. (2004). *Generative Learning Contributions to the Design of Instruction and Learning*.[On Line]. Available from: http://www.aect.org/edtech/28.pdf.

• Hojjat, I. (2013). *Tradition and innovation in architectural education*. Tehran: University of Tehran.

• Makkizadeh, F., Farajpour, A. H. & Shahni Yeylaq, M. (2011). Identifying Factors Affecting the Acceptance of Web-Based Information Systems by University Users. A Grounded Theory Study. *Journal of Academic Library and Information Research*,46 (59), 59-81.

• Mirzaei, Kh. (2016). *Qualitative Research: Research, Researchers, and Writing Research Papers*. Tehran: Fuzhan Publications.

• Naghizadeh, M. & Ostadi, M. (2013). A Comparative Study of the Concept of Perception and its Process in Philosophy and Environmental Psychology and its Application in Urban Design. *Islamic Architectural Researches*, 3 (1), 3-14.

• Oliver, K. (2007). *Psychology in practice: environment*. London: Hodder & Stoughton Educational.

• Pakzad, J. & Bozorg, H.. (2011). *Alphabet of environmental psychology for designers*. Tehran: Arman Shahr Publishing House.

• Plasma, Y. (2013). *Skin Eyes; Architecture and Sensory Perception* (R. Qodsi, Trans.). Tehran: Parham Naqsh Publications. [in Persian]

• Sarikhani, R., Mousavipour, S., Feiz Abadi, N., Rahimi, E. & Zarea, M. (2016). The effect of education based on the constructivist learning model on the learning outcomes of nursing students in the physiology course. *Development Stategies in Medical Education*, 4 (1), 16-26.

• Shirazi, M. R. (2010). *Sensory architecture and the subtle phenomenology of Johann Palasma*. Tehran: New Event Publications.

• Strauss, A. & Corbin, J. (2012). *Basics of qualitative research techniques and stages of production of grounded theory* (E. Afshar, Trans.). Tehran: Ney publishing house. [in Persian]

• Tabibzadeh, K. S. & Mohammad, P. (2020). A comparison of divergent and convergent thinking in the architectural design process with an emphasis on architectural education. *Architectureology*, 18 (3), 147-154.

• Ueda, H., Toshihiro, N., Norimasa, T., Elena, P., Hajime, M., Katsunori, F. & Yoji, A. (2012). Landscape image sketches of forests in Japan and Russia. *Forest Policy and Economics* 19.

• Ustaomeroglu, A. A. (2015). Concept-interpretation-product in architectural design studios-karadeniz technical university 2nd semester sample. Procedia-social and behavioral sciences, 7th World Conference on Educational Sciences, (WCES-2015), 05-07 February 2015, Novotel Athens Convention Center, Athens, Greece 197, 1897-1906.

• Uysal, M., Aydin, D. & Siramkaya, S. B. (2012). A model intended for building the design education in the context of cultural variety and continuity: Sille design studio. *Procedia-social and Behavioral Sciences*, (51), 53-63.

• Wittrock, M. C. (1989). Generative processes of comprehension. *Educational psychologist*, 24 (4), 345-376.

• Yeravani, M. & Khodapanahi, M. K. (2000). *Psychology of Emotion and Perception*. Tehran: Samt.

• Zanganeh, H. & Fardanesh, H. (2010). Designing an educational model based on the theory of constructivist learning. *Development Horizon of Medical Education*, 4 (1), 19-28.

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