

Original Research Article

A Review of Critical Training in Architectural Design

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Abstract

Problem statement: Mental awareness depends on having “critical thinking”. This type of thinking emphasizes changing educational approaches in academic systems. Critical thinking requires the skills of analysis, inference, data evaluation, and inference. Components of “critical thinking” force learners to challenge their views, hypotheses, and designs. Hence, “critical thinking” is a cognitive skill. Based on such cognition, there is no absolute knowledge in the world. Education is beyond the transfer of theories, achievements, and scientific laws and the recall of facts. Therefore, this article scrutinizes, analyzes, and critiques the teaching of architectural design in Iran in terms of “critical thinking”.

Research objective: “Critical thinking” is subject to a change in perception of “learning” because learning is inherently associated with growth. In other words, the evolution of intellectual structures and the construction of meaning and concept is a complex and cognitive practice. Therefore, what is considered the weakness of “critical thinking” in architecture students is the weakness of the higher education system in planning architectural design education.

The current system of architectural education trains students to design what they have learned, and naturally, the product of this educational system does not develop cognitive thinking; they are just like robots that act on what is planned for them. Therefore, the approach to teaching architectural design should be shifted to critically oriented teaching based on “critical thinking”.

Research method: This research is fundamental. However, its application in teaching architectural design is a matter of course and is considered descriptive-analytical research in terms of nature and method.

Conclusion: The absence of an accurate and comprehensive method in Iranian architectural education, if it has not hindered the development of architecture, has limited it. Paying attention to strategies of critical teaching in architecture, classifying, and identifying the correct ways of criticism in teaching architectural design can instill a sense of awareness and ability in architecture graduates. It can also contribute to an accurate and rich architectural design in the country. However, the effectiveness, strengths, and necessity of using critical thinking in architecture education require changes in the course topics.

Keywords: *Criticism, Architecture, Education, Design, Critical thinking.*

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Introduction

The lack of Persian and Latin resources in the field of criticism and its theoretical foundations is becoming more and more noticeable with the more serious position of theoretical courses in the country's architectural education system. Although in recent years there have been studies on criticism and its impact on architecture education, it should not have found its place in architecture education.

It can be argued that the critique is more intangible and more or less in the critiquing of the architectural studio. But it is not used as a necessary thing and is a procedure defined by professors.

Since architecture is more related to culture and art than a technical and engineering matter, like any other cultural and artistic phenomenon, there is a need for a critical critique of it. Referring to the texts and the opinions of the speakers and the observations of the authors, it may not be unreasonable to say that the need for critique in architecture education is considered a serious issue in the architectural community. Critical judgment affects the historical course of architecture. It also changes its direction fundamentally. In architecture schools, teachers, based on their knowledge and experience, always try to provide opportunities for students to acquire the desired knowledge, skills, and attitudes by using different teaching methods. However, in most of the architecture schools in Iran, especially at the undergraduate level, critical education is not provided as it should be and it is not scientifically planned.

Also, universities are diverse in terms of space, body and educational facilities, attitudes, level of knowledge and experience of professors, etc., they are also different in terms of quality. Also, due to the practicality of teaching architectural design, each professor uses different aspects and types in their teaching method. At the same time, in all these teaching methods, there is no room for "criticism"! Thus, "critique" can serve as a basis for the basics of design and subconsciously bring methods closer together, and in particular, the results of architectural

education in various schools of architecture. Therefore, it is necessary that "criticism" as one of the main pillars of education be considered by educational planners. Of course, critique must be such that future architecture can be predicted and promoted.

Due to the great impact of practical courses in architectural design training, managing architectural workshops (studios), in the direction that the architecture student after graduation, has the status of a creative architect, is a serious task that the largest volume of architectural training includes. But it should also be noted that architecture education does not necessarily make the architect student a designer, and this creativity in architecture can be expressed in the form of architectural researchers, architectural theorists, architectural critics, and so on.

In architectural studios, the combination of theory and practice must be done in a very skillful way, along with teaching how to critique in line with the scientific framework and the way the student and professor express themselves so that an architecture student can do what he/she learns in theory, and in practice, to apply those teachings in his/her designs in the best way possible.

In the "critique-based" training method, students' work is not evaluated solely through the final exam. Rather, students' designs are frequently reviewed and evaluated during the semester and in the design process, in the critiques, discussions, actions, and reactions he/she has with professors and sometimes with their classmates in the studio and the designs are gradually completed and finally finalized by the professors by presenting the final work at the end of the semester.

Therefore, criticism and analysis in critiquing are an essential tool for teaching architecture, and the quality of criticism and analysis, in other words, the quality of architecture education and communication with the student, is based on the expertise, knowledge, expertise and professional experience of professors.

In critiquing sessions; the students usually explain their work. The professor then raises the problems of the student's proposal, or in other words, critiques the student's plan!

In non-critical education, students are extremely vulnerable at this stage and turn to defensive and reciprocal behavior, and the teacher may deviate from the path of critical guidance to impose his opinion on them, with unnecessary distortions, and a positive change in the student design process. Criticism is therefore expected to guide the students, rather than merely show someone's disapproval or emotional endorsement or impose someone's opinion. If the professor gives the student the right to comment (that is, both the professor and the student, without prejudice, try to justify their views correctly) and the student has the necessary knowledge and courage to comment, mutual criticism has occurred.

Now, according to the students' opinions, the professor should provide them with appropriate strategies, and this time, the students should have the right to comment on the proposed solutions of the professor, and this mutual discussion should continue to enrich the professor and the student. Finally, the "critique" method is applied to the "correction".

But, unfortunately, such a method is less common in our architecture schools because this method requires the teacher to have enough information and be knowledgeable, skilled, and up-to-date. Moreover, students must have enough knowledge to comment. In addition, the atmosphere of the studio has demanded and required such relations and conditions. In other words, the educational system must have learned such an atmosphere in the curriculum. Not only the teacher is required to be prepared and observe it, but also the student is aware and prepared for this type of method. But such an atmosphere is less prevalent in the studios of our Iranian higher schools of architecture except in the case of experienced, knowledgeable, and experienced teachers².

But is this the best guidance or correction method

in the studio? If we are content with mere criticism, the answer is definitely no³. But if the students' thoughts and ideas are stimulated by this method, and in addition to being critical and finding the courage to discuss and comment, the students will gradually gain self-confidence and be able to critique themselves and their works.⁴ This method will gradually become common among students, and they will learn to criticize each other's work (Sadram & Nadimi, 2015, 3).

In this case, it can be said that "criticism" can be one of the most important and effective factors in activating critical thinking in students, and criticism not only between professors and students but also between classmates and even other different students. Learning and communication can be very effective in conveying concepts.

Significance of the study

University education in the form of architecture in our country today is nearly eight decades old. But no completely satisfactory method or methods have been developed in this field. This point is more and more present in all schools of architecture.⁵ In this regard, although no course called "Criticism" is taught in architecture schools, some architects interested in theory and involved in academic spaces consider themselves "critics". But in general, they do not train "critics", but train architects with different backgrounds who appear to be critics. In fact, sometimes, these kinds of teachers consider themselves as the authority and object to the work of others. Although the objections may be correct, the objections are not critical. This indicates that we generally lack a deep understanding of "critique" in architectural education.

On the other hand, it is customary for architects not to write, but to draw (design) and build what they have in mind. Thus, the notion that "architecture is merely construction and the architect is constructive" seems logical at first, but it turns out that many aspects of architecture, as a discipline of science and art, have been neglected in its

training, an important aspect of which is “criticism”. Therefore, it must be emphasized that if we do not learn “critical thinking”, we will only see what we have been told. Therefore, the only thing that can, to some extent, fill the gap between theory and practice in our architecture education is “critique”.

The lack of sound research or criteria that can be relied on in critical discussions and analysis in the field of architecture education is itself evidence of this claim. Another reason for such turmoil can be traced to the multiplicity and extent of factors involved in the field of architecture education. The inconsistency of the efforts made in the field of architectural education has made it impossible for “critique” in the studio design process to achieve a systematic approach. Therefore, due to the lack of and shortcomings in the studio environment, this article seeks to examine and explain “critique” in architectural workshops as a method of education that can be effective in improving the learning process of students. However, we must admit that due to the importance and breadth of the subject, there has been a lot of research on “criticism” in the field of architecture. However, any research on one of the details is related to architecture education, and while examining its unique perspectives, it omits the general and main topic of “critique” in architecture education.

Critical thinking

Developing the skill of “critical thinking” is an important principle for any dynamic higher education system. The principle that empowers universities to train students with the ability to analyze more complex but logical reasoning. But there are different meanings to the definition of “critical thinking,” such as cognitive skills and techniques that increase the likelihood of achieving the desired result. These meanings include, “Formation of logical inferences”, “precise and logical development of reasons and the process of logical and reviewing thinking with the aim of acceptance”, “rejection,” or “postponement of judgment” and “self-regulation”.

Many scholars are involved in what Richard Paul calls “critical pseudo-thinking,” which is a form of rational arrogance in disguise and self-deception (Obando, 2013, 9-10). Criticism in the public mind is thought to be fault-finding, criticism, complaining, and often the purpose of criticism is to “object.” It is usually claimed that in practice; criticism implicitly refers to the discovery of weaknesses and flaws in everything but this kind of attitude to criticism is not correct (Sharif, 2009, 3)

In explaining the performance of professors in fostering “critical thinking” it should be said that the development of “critical thinking” in students should not be limited to the way teachers are taught and the way they are taught at the individual level. Thought and its content as a cognitive function are influenced by socio-cultural requirements and demands. “Critical thinking”, like other cognitive categories, requires the mental ability (for example the ability to discuss and reason, question recognition, discourse thinking, evaluating the validity of data and inference) and tendency (for example open-mindedness, reasoning, and emotion sensitivity, and knowledge of others) is. Certainly, the formation of a positive attitude and attitude towards “critical thinking” is influenced by the cultural beliefs and values of society.

Lack of a culture of questioning, a tendency to accept the opinions of others and traditions without criticizing and challenging them, and reproduction of socio-cultural beliefs and values can all provide a superficial basis for epistemological hypotheses in higher education policymakers and academics in which to challenge. The views and hypotheses presented are not considered an important principle in the teaching-learning process. Therefore, because universities have a serious mission in cultivating thinkers, critics, and innovators and, consequently, in creating change and innovation in various socio-cultural fields, fundamental changes in their educational function are necessary from the stage of goal setting to its implementation. Encouraging the scientific success of professors in the teaching and

teaching process and their initiative in creating and applying new and efficient teaching methods, such as their research innovations, promoting the scientific activities of professors in the teaching process by holding workshops on active and modern teaching methods, professors' sympathy Different departments and faculties on how to implement educational methods such as group teaching are among the issues that can be considered in the educational function of universities.

Looking at the architectural styles of the contemporary period and the 21st century, we can see signs of philosophical ideas in the field of philosophy of architecture, which has had special reflections in architecture and urban planning.

In the meantime, the generalization and expansion of Jacques Derrida's (Algerian-French philosopher) deconstruction ideas and the perception of Gilles Deleuze's wisdom have confronted architecture with a revolution in spatial composition and volumetric composition, and content-functional metamorphosis.

If new approaches can be found in architecture, including; digital architecture, virtual architecture, folding architecture, meta-architecture, and quantum architecture, with slightly older approaches such as deconstruction architecture, as the beginning of a philosophical revolution in the field of architecture and at the same time finally in the same concepts (Taghvaei, Mahmoodi Nezhad, Ansari & Pour Jafar, 2006, 7). But it seems that all these schools of thought in architecture, as the intellectual emanation of an architect, have lived a short life due to the lack of critical thinking.

The main factors of critical thinking in architectural designs

Few professors consider "criticism" to be the basis of a vision that directs students' future plans. But the fact that students and designers can explain their work is a virtue that allows designers to recognize and correct the strengths and weaknesses of their work according to their goals.

For others, the correction of students with the

professor is, in fact, a kind of critique of the design by the professor, which should include steps such as 1) explanation 2) description 3) analysis 4) architectural judgment according to the work. In this way, researchers believe that design evaluation is one of the stages of the design process, and one of the characteristics of the designer is the ability to evaluate the work. Due to the central role of "critiquing", it can be accepted that any research that is done to promote these meetings and critiquing, if accompanied by "criticism", has a benefit and credibility beyond the mere field of design education.

Architectural specialists divide the basic factors in critiquing into two groups, including 1. Methods and 2. Learning conditions (Table 1).

Methods can be defined as different ways that design workshop teachers use to transfer their design knowledge and skills to students. Learning conditions can also be defined as areas in which "critique" occurs. The workshop professors examine these conditions when choosing a "particular method of critique" or creating a "set of methods of critique" (Schon, 1985, 53).

Methods

• Critiquing settings: At the start of any architectural

design course, professors explain to students the subject, objectives, expectations, general processes, and evaluation criteria they use for architectural design (program description). During a semester, professors make arrangements with students, either individually or in groups, to discuss topics related to the topic and how to design them. Then, at the end of the semester, as usual, the final delivery is performed, and the professors on the jury express their opinions about the students' plans by judging and grading them. However, according to what has been said, there are several types of methods that professors use to communicate with students. Here is a list of types of "critiquing" in design education that is based on the observation, experience, and analysis of authors from architecture education:

Table 1. Fundamental factors of design critiquing: methods and conditions. Source: Schon, 1985, 53.

Factors	
Critiquing settings, teacher-student relationship, communication modalities, delivery types	Methods
Design phases, individual differences, knowledge/experiences, student response types, design artifacts, learning goals	Conditions

desk criticism (Fig. 1), group criticism, informal interaction, interim review, and formal or final review

• Teacher-student relationships

Researchers believe that the interactions between teachers and students can positively affect student learning (Schon, 1985, 54). But how should be the connection?

B 1) the relationship between teacher and student in an architecture studio is obvious. But how do they communicate is important? The academic view is that what is about science and the power of architectural design should be taught to the student. Students will learn professional topics in the arena! This view emphasizes the science and knowledge of the teacher. But the professional view believes that the design teacher must also be a professional architect to be able to use his knowledge and experience together to solve all the design problems that the student will encounter.⁷ From an academic point of view, the students will be good designers and scientists. But in the professional arena, they will be less successful. Because they lack professional knowledge. But from a professional point of view; After entering the profession, the students are not tied up and will succeed sooner. But they may not be creative and innovative in their design. Therefore, a teacher with professional experience is required.

An experienced teacher can provide helpful feedback to solve students' design executive problems and foster their creativity. Hence, in the relationship between teachers and students, teachers should have the power to control the students' work in the scientific and executive fields. In this case, it is more reassuring for students to follow the teacher's instructions. Of course, considering that students should also clearly understand their teacher's goals and feedback. Otherwise, the student may blindly follow his teacher's criticisms without challenging



Fig. 1. Desk crit; Architecture Studio Bauhaus 6 School of Architecture, Germany 2017. Source: Authors' archive.

the teacher's reaction with his own thoughts. This is a professional internship while studying, and the third thing that can strengthen and enhance the teacher-student relationship. In all prestigious architecture schools in the world, the internship of architecture students while studying is a must. Unfortunately, in Iran, due to the lack of connection between the university and the profession, the internship of

architecture students either does not take place or is incomplete.

B 2) Students' relationship with each other: In the past, students carried out their designs in workshops (studios) and design studios were active. Students became more and more familiar with the thoughts and ideas and work of their classmates. Therefore, informal debates could take place while students are engaged in critiquing each other's work. Students shared their personal experiences and perspectives with classmates who were working on a similar design problem. By observing each other's work, they came up with different approaches to designing their project. Discussing with classmates in the studio allowed students to prepare and actively participate in the studio discussions and conversations. Students learned to practice critique of their teacher's ideas and take responsibility for what they learned. In addition, this type of relationship supported participatory learning, which encouraged students to evaluate the opinions of their classmates.

But since computers were introduced, work in the studio has been shut down! This has caused students some intellectual problems and a great challenge against being influenced by each other in solving a common problem! In other words; It has weakened critical thinking among students.

It has weakened critical thinking among students. Virtual studios caused by the Covid 19 epidemic in recent years have made the situation worse.⁸ Many world-renowned teachers still believe that architectural design work should be done by hand and that the computer is merely a means of drawing.

• Communication modalities

Critiquing in design studios involves a wide range of communication modalities, including speech, written comment, drawing, and gesture.

- Speech

Speech is the primary communication modality used in all critiquing settings. For example, in the desk crit that Schon described in his book (Schon, 1985), the teacher (Quist) shows how to resolve the difficulties the student (Petra) faces or indicates what

is promising or problematic in her design. Anthony (1991) notes that speech is often accompanied by other modalities, such as drawing because the teacher can deliver implicit meaning by drawing quick sketches (Ulusoy, 1999). Speech is usually used at the beginning of the semester and further to explain the program. But sometimes it also happens on tables during the critiquing.

- Written comments

Some teachers make quick notes to accompany their desk-crit sketches, and jury members are often asked to provide students with written feedback after a review. A written critique has various advantages. As students read written comments, they construct stories in their minds and interpret the text; these stories can then inspire design (Iser, 1978). At the same time, written comments can sometimes be misleading because the concept desired by the teacher is not transmitted. Hence, critiquing is often done orally and on the desk.

- Drawing: graphic annotation and image

Teachers often draw during a design studio critique as they talk to demonstrate ideas (Schon, 1985). Drawing ranges from abstract diagrams to representational forms. As the teachers discover the relationship between architectural elements presented in the student's drawings (Ulusoy, 1999), they may make a simple diagram to illustrate the relationship. To suggest other building forms, the teacher may place tracing paper over the student's drawing and occasionally draw directly on the student's drawing. The teacher may also make quick sketches on a sheet of paper to show how the design might proceed or might be done differently.

- Gesture

Teachers gesture while offering feedback on student work. These gestures are commonly regarded as a means to facilitate communication and play an important role in design thinking and collaboration (McNeill, 1992; Visser & Maher, 2011). A gesture is not only used to index, position, or prove a reference to an object, but can also cover mental issues between the parties. In other words, the

teacher's gesture can resolve students' doubts about the subject or resolve differences that occur in the communication between the teacher and the student. In addition, gestures can sometimes be thought of as invisible mental designs.

- Delivery types

The language used by the teacher is essential to the success of the critiquing session. As a critiquing session takes the form of a conversation between teacher and student, the teacher must select appropriate content, including the choice of examples and the level of abstraction to maximize the student's learning. Teachers use two response styles while critiquing: facilitative and directive.

D 1) A facilitative critique encourages a student to elaborate on reasoning and design decisions. While pointing at a specific part of a student's design, a teacher may ask, 'Why did you place your gallery here?' Here the teacher helps the student reflect on the work, discover design problems, and articulate design rationale.

D 2) In contrast, a directive critique involves direct comments from the teacher rather than a series of questions. This style reflects the teacher's judgment.

D 3) Sometimes, both "facilitative" and "directive" methods are used by the teacher. This is done when, after applying the "facilitative" method by the teacher, the students do not notice the problems of their work or do not find a suitable solution for their plan. The teacher tells or designs the solution directly for the student.

• Conditions

- Design phases

Critiques that students receive differ depending on the phase of design in which they are engaged. Uluoglu (2000) notes that teachers decide the purpose and content of a critique according to the design phase. She examined the syllabi of second-year studios at several architecture schools in the US and Turkey. She identified a common six-phase outline:

(1) Introduction/introducing studio goals and requirements;

(2) Place/space investigating fundamental knowledge (e.g., site analysis);

(3) Settlement/building early-stage designing and sketching design ideas to communicate;

(4) Building (life/space) designing by considering a building program, or concepts;

(5) Supporting knowledge by studying existing buildings and design theories.

(6) Building (systems) considering the knowledge of building systems and details. A teacher may help a student locate and form a building in a given site by asking questions and introducing alternative approaches in the third phase. In contrast, during the fifth phase, the teacher may offer relevant precedents to lead the student to look at other architects' work with similar concepts or situations.

B) Although all students in a studio have completed a common set of required courses, individual students bring unique qualities to the learning experience, including spatial ability, gender, and cultural background.

B 1) Spatial ability

In architectural design, both teachers and students often use visual representations: sketches, 3D computer graphics, and physical models. Therefore, each student's spatial ability is a factor that influences learning.

B 2) Gender: Students are different in terms of gender. Males and females Girls and boys have different feelings and perceptions of space and place, as well as the way they express their thoughts and the way they express their ideas, and teachers should consider this issue in critiquing.

B 3) Race and Culture: Some researchers believe that design studios should value student diversity. Students' race, cultural background, and ideology influence the way they look at architecture, space, and place. Understanding these values by the teacher can affect students' success in the design process.

C) Student knowledge and experiences: However, no study has attempted to establish a relationship between critiquing and the level of experience and knowledge of the student. But it seems logical to

assume that the teacher must find out what the student is doing and what he or she does not want to do in the critiquing sessions.⁹ In particular, it would be useful to understand what design experience and knowledge can be expected from a student based on their stage in the educational program¹⁰.

- Student response types

Critiques require students to reflect on teacher comments. Some students may grasp the feedback they receive; however, others have difficulty relating to the feedback. Student response is also an important factor in design critiquing because critiquing is an interaction between student and teacher. According to the students' answers, the design professors also do not understand how to reconstruct their teaching method to communicate with the student. The student's response is the only important factor in accepting or rejecting his design. Because if the critiquing is accompanied by criticism, intellectual interaction occurs between the teacher and the student, and the teacher must be ready to answer the student's question at each stage. In this case, if the students' answers are different, the teacher's criticisms will also be different. Therefore, it is reasonable to assume that teachers consider student responses to reconstruct their critiquing methods.

- Design artifacts and learning goals

Design artifacts include diagrams, rough sketches, drawings, and physical models. Design artifacts are the main results of design studios and the communication tools between teachers and students. Without these artifacts, teachers cannot understand and evaluate student design solutions and offer feedback based on these artifacts. Therefore, the teacher needs to understand the student's ability to produce them. Regardless of whether they are articulated explicitly, each studio course has a set of learning goals, and to provide students with appropriate feedback, the teacher must clearly understand these learning goals.

Framework of design critiquing

Fig. 3 illustrates how a critic can use these factors in deciding on a strategy to critique a student. This framework presents relationships between the eleven factors of critiquing. The six factors on the left are usually part of the pedagogical context in which studio teachers do not control or manipulate directly. Those variables constitute the situation on which critiquing decisions are based. The factors on the right constitute the variables that the teacher determines for a particular course. Among these factors, critiquing types and teacher-student relationships can be decided as part of the course planning before the class starts. It is easy to think that teacher-student relationships might be determined by teacher profiles such as master, coach, or parent and their individual differences and characteristics.¹¹ Although it is true in critiquing practice in some sense, we put the factor of the teacher-student relationship into the group of critiquing methods. It is because we think that teachers better think about what other relationships could have with their students and (dis)advantages of individual relationships before the critiquing sessions. Studio teachers then consider having other relationships, not just insisting on their individual profiles. The other factors, modalities, response styles, and delivery styles, are decided on the spot when teachers provide their students with feedback. This framework might be useful in developing a more formal and rigorous pedagogy for design education. As mentioned above, although critiquing is the backbone of studio-based education, design educators do not learn critiquing formally, nor has critiquing been the subject of learning sciences research that could result in more effective teaching practice.

In addition, it is not mentioned in the description of design courses, so professors are required to learn and apply it in studios. However, the purpose of critique is to provide the student with effective feedback on the critiquing that will help them learn better.

A studio teacher considers critiquing conditions

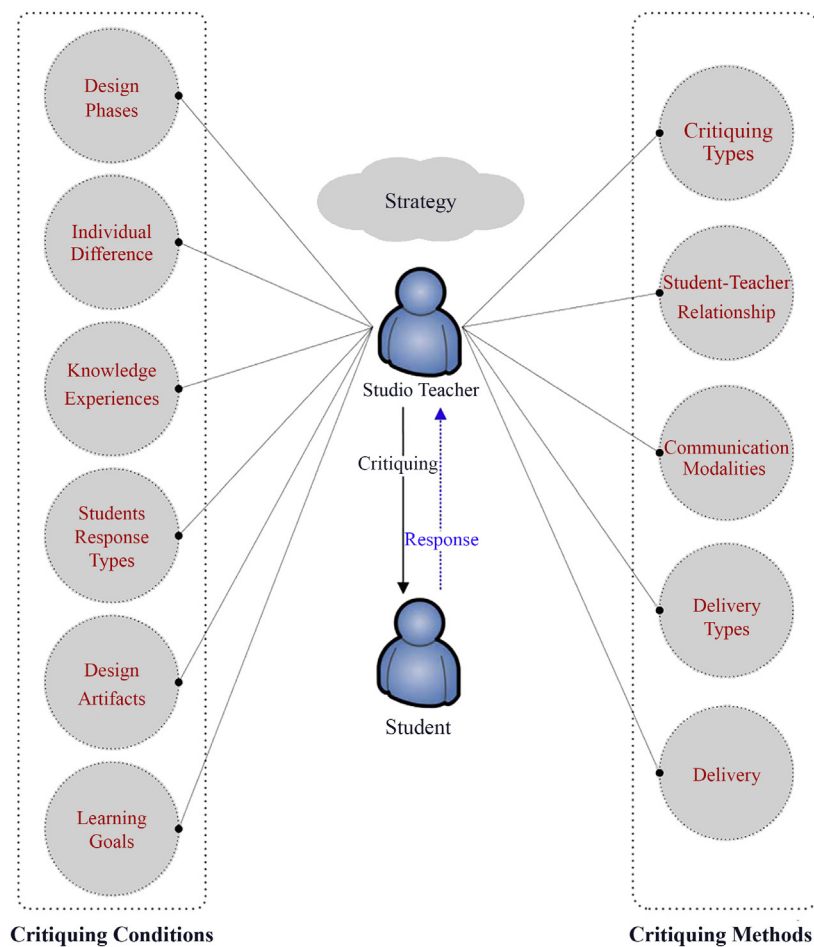


Fig. 2. A framework for critiquing practice: conditions and methods. Source: Yeonjoo & Others, 2012, 17.

and then selects a set of critiquing methods to offer feedback.

• A process model of critiquing

We can describe what happens during critiquing as a sequence of steps or a process model. When the students explain their design works by showing the studio teacher drawings and physical models, the teacher listens and observes what the students present (observation). Upon noticing problematic and promising aspects of the student's work (noticing), the teacher must clearly identify the issues and why they are problematic or promising based on understanding the immediate learning goals (identification).¹² The teacher then considers the order to deliver feedback to the student (sequence). For example, the teacher may decide to begin critiquing by pointing out positive aspects, or the teacher may address critical issues first and leave other less important issues for later. After the

sequence of delivery is determined, the teacher must decide on delivery types and communication modalities. The teacher can use many communication modalities to deliver comments to the student. According to the mentioned contents, the hierarchy of critiquing steps for compiling and selecting the type of relationship is presented as follows: 1- Observation, 2- Attention, 3- Identification, 4- Sequences in critiquing. 5- Types of communication methods (discussion, underlining, book references and references, slide shows, etc.)

The place of criticism in architecture education from the perspective of architecture professors

The position of criticism in architecture education (one of the pathologies of architecture criticism in Iran) is specifically related to the conditions and culture of education in architecture schools.

A culture rooted in the education and literature of architecture can be developed and learned. Criticism of architecture needs to provide a more accurate understanding of architecture. To get this understanding of learning issues, the best space is the studio and the critique-oriented critiquing of students' works. In this way, both the culture of criticism is taught and the way to better understand the value of works and their creativity is provided. They also learn the practice of critique in the context of the formation of students' personalities, based on the knowledge that exists in the field of history and architectural theory.

In education, we have not considered how to critique and its product in the field of design and learning. Most faculty recognize the need for critique in design courses and the basis of students' future plans. Dealing with the category of criticism in teaching architectural design, due to the complexity and multifaceted nature of architecture, will raise various issues for professors and students.

Since architecture is an interdisciplinary science and its tendencies can not be considered absolutely, so to achieve a comprehensive critique of the architectural design, different aspects of architecture (artistic, philosophical, epistemological, historical, economic, sociological, archaeological, technical, etc.) criticized from different perspectives. Criticism culture should be a structural and identity component of academic communities. As it can be said; Without criticism, science and the scientific and academic community will not develop.

Most faculty consider "criticism" to be the basis of a vision that directs students' future plans. But the fact that students and designers can explain their work is a virtue that allows designers to recognize and correct the strengths and weaknesses of their work according to their goals. According to others, the critiquing of students by the professor is in fact a kind of critique of the plan by the professor, which should include steps such as 1) Explanation 2) Description, 3) Analysis, 4) Examination, 5) Architectural judgment according to the work itself.

In this way, design evaluation is one of the steps in the design training process, and one of the characteristics of a good designer is the ability to evaluate the work. Therefore, due to the pivotal role of "critiquing", it can be accepted that any research that is done to promote meetings and critiques, if it is accompanied by "criticism", has a benefit and credibility beyond the field of mere design education.

Some researchers believe that the purpose of the university is to educate academic people, the most important component of which is "critical thinking". In this regard, they have distinguished between the three categories of "critical thinking," "critical thought" and "criticism." "Critical thinking" is the process by which a person acquires a skill called "critical thinking" during the study. Therefore, critical thinking is a category focused on the individual. But "critical thought" is a different concept. Rather, it is a discourse and a current of thought that is a social phenomenon and leads to the creation of a collective identity.

"Criticism" can also be considered as a kind of understanding of the culture of "critique". Cognition will make criticism a tool for producing better thoughts and actions, rather than a means of threatening and intimidating. In other words, the type of promoter is more effective than the type of threat. In fact, some believe that criticism is a kind of culture and value that allows the production of "critical thinking." Therefore, constantly encouraging students to do "criticism" during the semester will be more effective and useful in correcting their thinking process. According to some experts in the field of architecture, students and designers can explain their work as a virtue that allows the designer to know the goals, strengths, and weaknesses of their work and correct them. Therefore, "criticism" is not a single thing, and it is not possible to say which areas are more important. Depending on the type of question we ask the student, the method of critique and critiquing will change. Thus, instead of judging, "criticism" can

be seen as a behavior. In Table 2, the positive and negative points of criticism in architecture education are given.

The place of criticism in Iranian school architecture studios

To investigate the manner and position of criticism in Iranian school architecture studios, a field study was carried out by the authors. For this research, based on the ranking of universities by the Ministry of Science, universities were selected from three university levels (levels one, two, and three) as the sample¹³.

• Statistical population of study

The statistical population of the study: 1- Professors of architecture (selected universities) 2-Students of architecture (selected universities) 3- Graduates of architecture (selected universities).

• questionnaire

To examine the role of “criticism” in architectural design education, three types of questionnaires were designed and used: 1- Questionnaire for professors 2- Questionnaire for new graduates 3- Questionnaire for students.

• How to ask

The list of professors who teach basic courses such

as basic architectural design and architectural design includes the statistical community of professors. In general, about 42 professors were selected in the first stage and filled out questionnaires in two stages with an interval of 3 months. Another questionnaire was prepared for the students taking basic architectural design 1 and 2 and architectural design 1 to 5 courses and a simple random sampling method was used to ask students and 200 questionnaires were collected. After ensuring the accuracy of the information obtained, the data were categorized and SPSS software was used to analyze the data obtained from the questionnaires. The results of the data analysis were performed by the Friedman test.¹⁴

• Reliability and validity of the questionnaire

The tools used to collect data must be valid in the first stage and reliable in the second stage. In this research, the validity of the content was established and the validity of the questionnaire was confirmed by some experts.

To control the reliability in this study, Cronbach's alpha¹⁵ method was used and for all cases above 0. 7was obtained.

Statistical results of students' use of criticism sessions in architecture studios

The results of the questionnaires were analyzed

Table 2. Positive and negative points of criticism in architecture education. Source: Authors.

Need for attention	Need for reinforcement
Complexity, breadth, and versatility of architecture	Rethinking after designing and strengthening thinking
Absolute tendencies due to the interdisciplinarity of architecture	Experience conceptual areas in the field of design
Lack of sufficient background during pre-university education	Familiarity with the effective components in design analysis
Training only architectural designer	Improving the thought process
Just praise the projects	Ability to explain the effect and pay attention to goals
Principles and techniques of critique	Challenging the student's mind while criticism
Lack of knowledge and technique of technical criticism	Paying attention to history and changing the past path
Inconsistency of education with community culture and content weakness	Cultural and social context (use of all sources; cultural context, the applicability of historical information)
Do not use theoretical supports and theoretical foundations	Criticism culture is a structural and identity component of academic communities.
In architectural studios, student designs degenerate from methodical design to event design, turning critique and analysis into rhetorical quasi-critiques. It also runs the risk of leading students to praise their work, which is far removed from architectural criticism.	

using SPSS software. The results were extracted based on the views of research students, graduates, and professors.

Among all the questions, the general and main question of all the groups discussed in this article was: which critique method (positive critique or negative critique) is an efficient and effective way for students to learn in architecture workshop courses? Here is the feedback on this question among the three statistical communities:

• Bachelor of Science students' perspectives

Fig. 3 shows that 76% of students consider the positive critique method and 24% of the students consider the negative critique method an efficient and effective way for students to learn in architecture workshop courses.

E 2) Perspectives of Bachelor Graduates in Architecture: The questionnaire results (Fig. 4) show that 71% of the positive critique method and 29% of the graduates consider the negative critique method as an efficient method for learning in architecture workshop courses.

• Architecture professors' Perspectives

The questionnaire results (Fig. 5) show that about 69% of the positive critique method and about 31% of the teachers of the negative critique method are an effective way for students to learn in architecture workshop courses.

Conclusion

It seems that in the prestigious schools of Iranian architecture, addressing the issue of "critique-based" education in the design process has been relatively important, but it has not been addressed as it should be. Therefore, to increase the validity of the accurate methods of criticism and the principles of teaching in all universities, so that students see this process with a view beyond their personal perceptions, predict a course on "Criticism in teaching architectural design" in the program is needed.

At present, "critique" in the studios of architecture schools is either not done or is done incompletely.

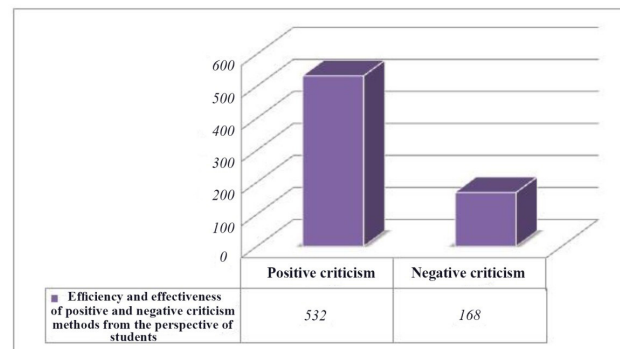


Fig. 3. Evaluating the effectiveness and productivity of positive and negative criticism methods from students' perspectives. Source: Authors.

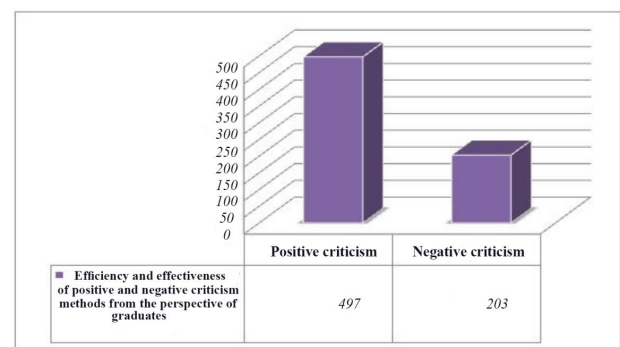


Fig. 4. Evaluating the effectiveness and productivity of positive and negative criticism methods from the perspective of graduates. Source: Authors.

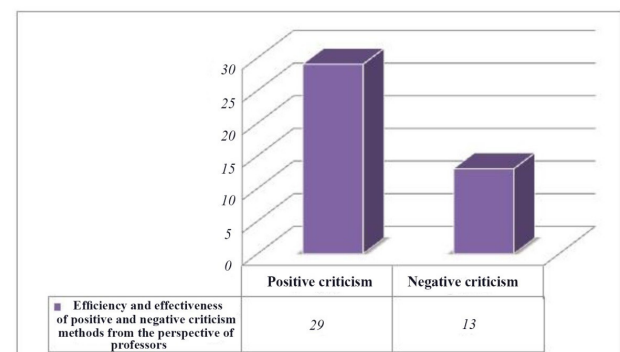


Fig. 5. Evaluating the effectiveness and productivity of positive and negative criticism methods from the perspective of professors. Source: Authors.

Certainly, without the attention and mastery of the architectural studio master of various teaching methods, especially critical methods, it will not happen to hold creative critiquing and create a space for thinking about the correct methods of critical education.

Therefore, the lack of a specialized course entitled

“Architectural Criticism and Critical Thinking” becomes even more necessary.

However, according to the study; This course is within the framework of internal authority, by some schools of architecture in Iran’s leading universities, including; Shahid Beheshti University has been added to undergraduate and graduate courses.

But this is not enough! Because the problem is not pioneers schools.¹⁶

Rather, these types of schools, due to having knowledgeable, experienced, and experienced teachers, usually establish criticism in studios with intensity and weakness. Rather, the problem is the schools that, unfortunately, have spread all over the country and lack a distinguished, experienced, and efficient teacher!

Therefore, the educational structure of architecture must anticipate such a course and make it mandatory. On the other hand, the most important theme of the critiquing sessions is the correct critique and support of the student’s work. “Criticism” is a fundamental technique by which architecture lessons can be presented more dynamically and efficiently. Criticism can also be one of the most important and effective factors in activating “critical thinking”. Creating systematic “critique” methods may be a major part of more effective architectural education methods. In this method, the teacher should be more aware of the subject and the solutions ahead and be fully prepared to face any opposing ideas and opinions¹⁷. Regarding the benefits of this method, it can be said that the students are also forced to think more. As a result, creative thinking develops them and they will not rely only on the teacher’s opinions and will not be upset and disappointed by mistakes and criticisms.

Rather, his/her mind wanders, and in this way, the student’s self-confidence is further strengthened and he/she can become an innovative designer.

Therefore, to express a definite opinion about the strengths and the need for critique as a turning point in architectural design education, it is possible to take effective steps to improve the current system by making effective changes in the subject

of architecture courses. In conclusion, some suggestions are presented:

- 1- In architecture education, the appropriate solution to create an interactive relationship between professor and students is to create “critical thinking”. To critique the students’ ideas, the teacher uses “negative critical thinking” to identify and warn the issues and problems of the students’ ideas or designs, and uses “positive critical thinking” to find better solutions and ideas to explain to students.
- 2- If architectural designs are combined with the knowledge of “critical thinking”, it will increase students’ motivation to learn and lead them to a higher understanding of the subject. As a result, architectural designs will be of higher quality.
- 3- Creating a separate course entitled “Critique methods in teaching architectural design” in the curriculum of architecture courses to familiarize, master, and motivate students is effective in their growth and creativity.
- 4- Emphasis on teaching criticism in the design process in architectural studios with emphasis on the mastery of professors in criticism and critique. As far as critique is the main method of teaching in architectural studios is going on.
- 5- Emphasis on critique in historical and theoretical foundations, as a fundamental tool to master the teacher and students’ “critical thinking”.
- 6- The obligation to provide appropriate space and conditions in all studios of architecture schools, to establish “criticism” training sessions between professors and students, as well as between students with each other.
- 7- Creating supportive environments such as extracurricular criticism sessions, speeches, seminars, etc., will seek the most learning to institutionalize “criticism” in the minds and thoughts of students.
- 8- In “Criticism” education, students should be prevented from being encouraged by external motivations such as rewards, prizes, appreciation, pressure, time urgency, and a sense of competition. Because these cases compare themselves with

others, which is a detrimental factor and could be an obstacle to students' mental creativity in design.

9- In architecture education, achieving the result and the final product does not necessarily have a solution and can have different solutions and different results. But the prerequisite for achieving the optimal solution is the dominance of "critical thinking" over architectural studios.

Endnotes

1. In some cases, it has been observed that when the teacher allows the student to discuss and criticize himself, it is considered the teacher's weakness. This perception is due to the unpreparedness of the atmosphere and atmosphere of the studio, which is also due to the absence of criticism in the educational program!
2. If there is such an atmosphere, it exists on a case-by-case basis in prestigious and experienced schools with experienced teachers! Unfortunately, today, in the country, there are so many architecture schools that there are not enough quality teachers for all these schools!
3. This means that contentless debates take place. Because in the critique-based teaching method, the teacher must have a complete study and knowledge of the profession of architecture and, in addition, have the necessary knowledge of the critique method. The student must also have sufficient capacity to accept criticism of their work and the necessary knowledge to participate in the discussion.
4. Every student of architecture should know that the conversations between him and his professor about the design process only deal with certain aspects of the process, and he himself should be able to do this on his own at the end of his studies. Because there is no difference between self-criticism and self-criticism, and even self-criticism can be helpful.
5. Even the old schools are not in good condition due to the retirement of the most experienced teachers!
6. The Bauhaus was the School of Architecture and Applied Arts in Weimar, Germany, which trained artists from 1919 to 1933 under the direction of Gropius and played an important role in establishing the link between design and art. Its teachings before and after the dissolution of the school became known as one of the symbols of the modern era and had followers in later years. Eventually, these teachings took the form of an artistic movement (modern art and architecture) that is one of the most important and influential currents of the twentieth century.
7. Of course, the "professional experience" of a design teacher is not in the criteria for selecting a teacher, and this is a major flaw in the selection of a teacher of architectural design training..
8. Not only are students less familiar with each other's ideas, but they often do not know each other by face.
9. The student's mental condition is effective in his understanding of the subject, solutions and ideas, and it is the intelligence, knowledge and experience of the teacher that can understand the student psychologically and guide him according to his mental condition and to the term comes with him.
10. At the beginning of each semester, it is necessary for the professor to study the student's academic records, especially the design experiences, and to ask her/his previous professors.
11. Due to the close intellectual relationship between the teacher and the student, in correction sessions, which sometimes express the student's feelings and emotions, a friendly and sincere relationship is often established between the teacher and the student. This intimacy contributes to the student's learning. Of course, the opposite sometimes happens when the teacher and the student have two opposing thoughts and there is no proper communication, in which case learning usually happens.
12. We separated the identification step from the noticing step because identifying problematic or promising aspects of the student's work

requires some deliberation, whereas noticing may be done intuitively.

13. Among the universities of architecture, from level one; Tehran University - Shahid Beheshti - Science and Technology, from level two; Isfahan Art and Art Universities and from level three; Urmia University and Islamic Art University of Tabriz were purposefully selected.

14. The Friedman test is a non-parametric statistical test developed by Milton Friedman. Similar to the parametric repeated measures ANOVA, it is used to detect differences in treatments across multiple test attempts. The procedure involves ranking each row (or *block*) together, then considering the values of ranks by columns. Applicable to complete block designs, it is thus a special case of the Durbin test.

15. The reliability of the questionnaire is a statistical test that results in a coefficient called Cronbach's alpha.

16. Of course, the number of veteran and experienced universities is very limited and does not even reach the number of fingers on one hand. However, these universities are also being peeled off, which means that experienced and knowledgeable professors are retiring due to the negligence of the Ministry of Science and defective laws. On the other hand, the approach and attitude that governs the selection of professors in the relevant ministry has also prevented literate and privileged people from entering universities, and therefore, veteran and experienced universities are being emptied of wise professors!

17. This is a challenge for the current professors, because due to lack of knowledge and sufficient literacy to perform critical sessions in critiquing of architectural design studio, they cause the lack of proper compilation of the architectural education system or are not able to implement it!

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