Journal of Architectural Research
and Education (JARE)
Vol. 2 (2) 121-133
@Saba Hejazi, Minoo Shafaei, 2020
DOI: 10.17509/jare.v2i2.28026

THE GAP BETWEEN ARCHITECTURE EDUCATION AND ARCHITECTURAL PROFESSION IN IRAN

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Article History:

Received:	Revised:	Accepted:	Available online:
4 September 2020	21 November 2020	16 December 2020	18 December 2020

Abstract - Many graduates of architecture attracted to the job market find a profound gap between what they have learned in college and what is being done in their career in Iran. The educational problems that make architecture graduates inefficient in the job market are identified. Then solutions are offered to reduce the gap. Four types of questionnaires were distributed to the last year undergraduate students, professors of architecture schools and professional architects and their answers and suggestions were collected. The results show that there are some solutions for bringing architecture education closer to architectural profession: 1. participatory education, 2. establishment of non-governmental organisations, 3. linking faculties of architecture with architectural offices, and 4. revision of undergraduate curriculum of architecture.

Keywords: Architecture Education, Architectural Profession, NGO, Participatory Education, Social School, Professional Ethics

1. Introduction

The purpose of education is to prepare people for their lives and their future needs. This can be done by transferring knowledge, skills, attitudes and experiences. Experts evaluate the approaches to the educational process from various perspectives. Many experts have investigated the "job-oriented" education. Job-oriented education is based on the readiness of graduates to enter the job market (Fami et al., 2010). Architecture education in Iran also follows a variety of approaches. In some colleges, the orientation is towards continuing education and a theoretical approach is followed. In others, practical and career approaches prevail. However, both approaches are fundamentally different from professional architecture and job conditions in the society in some cases they contradict them (Mahdavinejad et al., 2012). Experiences from more than half a century of higher education in architectural engineering in Iran indicate that graduate students considered as the output of this system have not been successfully adapted to the job market. The field of unemployment is immense for engineering graduates. Therefore, the search for different ways of solving the problem is one of the essential necessities of higher education in the country. For this purpose, in this paper, the problems of architecture education that have caused the distance from the architectural profession are first discussed. Then, solutions are offered to reduce the gap between architecture education and architectural profession.

2. Literature Review

Some of researchers investigating in architecture education have presented some techniques of learning and others have focused on architecture education pathology in the last decade. In this study, first the history of architecture education is explained. Then, the main differences and the necessity of conjunctions of academic architecture and professional one is discussed.

2.1. The Evolution of Architecture Education in the World

Architecture education in ancient times has often been empirical. At that time, design, calculation, and execution activities were often taught in a coordinated, integrated, non-discriminatory, empirically trained manner. The origins of architectural education as part of university education can be traced back to 1671 with the founding of the Royal Academy of Architecture in France. The establishment of this school was the beginning of the end of the teacher-student system (Legény et al., 2018). After the French Revolution of 1793, all the academies of architecture were dissolved, but in 1819 the academy was renovated as a School of Fine Arts in Paris (Beoux Arts) and began to operate (Darrehzarkeshi, 2016). The school of Beoux Arts was based on a collection of ateliers. Each atelier had its own distinctiveness through the unified management that was usually taught by a teacher. The students were trained in three sections in the respective atelier. In the first section, they were taught elementary and sketch issues. In this section students were asked to design a simple architectural structure using the principles of classical architecture. In the second section, they are asked to draw a large-scale architectural decorative element. In the third section, there was a comprehensive written test that evaluated the candidates' scientific knowledge (Kianersi, 2017). In 1919, the Bauhaus School in Weimar was established. It was an integration of two institutes, the Academy of Arts and the Academy of Arts and Crafts. It is the most important art school in the 1920s and the first modern school of architecture. The Bauhaus educational space is an anti-academy space, distrustful of theory, based on practical experience and sensitive to the needs of society (Sadraei, 2012). Education in the Bauhaus was a balance between mental and manual skills. As a school guideline, there were two types of formal and practical education. Formal education is divided into three themes: design (design, colour composition and volume studies), representation (modelling, design, manufacture, and aircraft geometry studies) and aspects (nature and material studies). Practical instructions were for dealing with various types of materials, such as wood, clay, stone, textiles and glass. The lessons from Bauhaus are that there is a comprehensive process for all issues related to architecture and it weighs all of them including construction in a balanced manner with the design. Architecture students had the chance to practice what they learnt in theory and to experience the construction process by hand (Rauf et al., 2019).

What is known today as modern architectural education in the world has largely evolved from the European model of architecture education. In other words, architecture curricula around the world generally come from the two early schools of thought, the Beoux-Arts, which was founded in France in the seventeenth century, and the Bauhaus in the early twentieth century in Germany, which primarily emphasise formal aspects of architecture and form principles (Salazar Ferro et al., 2019). Although it has proven to be of great benefit during this period, it has received widespread criticism from professionals and teachers since the 1960s. However, it can be said that there is no specific method for architecture education and professors always create their own pedagogical models (Alipour, 2019). It is often said that the conventional design studio model needs to be changed to better prepare students for the professional and emotional challenges they face in practice (Salama, 2009) (Table 1).

Table 1. The evolution of architecture education in the world.

Name of School of Architecture	Brief explanation
Ancient times	Architecture education in ancient times has often been empirical. At that time, design, calculation, and execution activities were often taught in a coordinated, integrated, non-discriminatory, empirically trained manner.
Royal Academy of Architecture	The establishment of this school was the beginning of the end of the

Name of School of Architecture	Brief explanation
	master-student system.
School of Fine Arts (Beoux Arts)	The school of Beoux Arts was based on a collection of ateliers. Each atelier had its own distinctiveness through the unified management that was usually trained by a teacher.
Bauhaus School	The Bauhaus educational space is described as an anti-academy space, distrustful of theory, based on practical experience and sensitive to the needs of society.
Today's world architecture education	It has developed and evolved on the basis of the European model of architectural education. That is to say, architecture curricula around the world generally come from the two primary schools of thought, the Beoux Arts and the Bauhaus.

2.2. The Evolution of Architecture Education in Iran

Architectural education in Iranian universities has been going on for more than seven decades like today. But the method or methods are not quite satisfactory yet, and this is the case with most architecture schools (Hedayati & Seyedian, 2014). Architecture education in Iran during the era can be divided into three eras, as follows.

2.2.1. The Era of Unification and Traditional Education

Architecture in Iran has been traditional and experimental from the beginning. This education, also known as master-student education and chest-to-chest education, goes back to the traditional architecture era. In this era of architecture, after many years of testing and error, solutions for architecture were found, replicating and complementing these valuable findings. These architects embodied architecture and exemplified their disciples (Nadimi, 2010; Hojjat, 2014).

2.2.2. The Era of Innovation and University Education

During this period Iranian architecture was influenced by Western architecture. Traditional architects have been side-lined and since the year 1992 the first students of architecture at the University of Tehran entered the academic field of this field. In this style, also called atelier style, architecture was handled in a hierarchical system, from the pioneers of modern architecture to the masters, from the masters to the senior years and from the senior years to the elementary. This is also known as hand-to-hand education (Hojjat, 2014; Moosavi & Shoarian Sattari, 2013).

2.2.3. The Era of Multiplicity and Wandering Education

In postmodern days with the help of the media, science is no longer the monopoly of the master. In this period, traditional architectural patterns are no longer of interest. In the postmodern world, "pattern" and "pioneer" make no sense, and everyone steps in his own way. At this time, the lack of defined content for education has put the educational system and the relationship of teachers and students at a disadvantage, such as the number of teachers and the size of classrooms in elementary schools. In the post-modern day, the place of education has been changed into the discussion of the teacher with his students that can occur in any small or big size place. This type of education is called shoulder-to-shoulder education (Hojjat, 2012).

Despite the fact that higher education institutions have increased in recent years the social needs of students have not been fulfilled (Beyraghi, 2018). Today, the number of architecture schools and the number of admitted students is increasing rapidly in Iran. Architecture education is not only performed in rental residential buildings but also via distant education and on-line training. This may have shown the development and use of new technologies in architectural education, but in reality indicates the collapse of the architectural discourse and personalisation of its education in Iran (Hojjat, 2012). The evolution of architecture education in the world is presented in Table 2.

Table 2. The evolution of architecture education in the world.

Era	Other name	Architectural education status of the era
Unification and traditional education	Master-student education and chest-to-chest education	Architecture in Iran has been traditional and experimental from the beginning. In this era of architecture, after many years of trial and error, it came up with solutions for architecture that replicated and supplemented these valuable findings. The architects of this period exercised architecture and were exemplary of their disciples.
Innovation and university education	Hand-to-hand education	During this era Iranian architecture was influenced by Western architecture. Traditional architects were side-lined and since 1938 the academic department of architecture began with the acceptance of the first students of architecture to the University of Tehran.
Multiplicity and wandering education	Shoulder-to-shoulder education	In postmodern times with the help of the media, science is no longer the monopoly of the master. The role of professor shifts from mentor to consultant, and a new era in architectural education begins.
Today's Iran architecture education		Undergraduate architecture in Iran consists of four years of undergraduate courses in which architectural design courses are taught in design studios. The traditional atelier design method, which is very common in the past, is based on practice-based training. Other courses are offered as master-based theory classes.

2.3. Architecture Profession Background in the World

In medieval Europe, like many other artists, the architect was a craftsman. In the thirteenth and fourteenth centuries, the status of an architect became more important as cities developed and urbanised. As a "technical expert familiar with geometry and some of the sciences of that era and skilled in the use of existing machinery", he was further promoted. As the Renaissance era began in the fifteenth century, the role of the architect changed. In this period artists such as architect, painter and sculptor were regarded as a prominent personality. He was then establishing the theoretical foundations of his work. During the Baroque era the role of the architect changed once again. He gained points and he lost points. The main feature of this period was the creation of the theoretical gap and giving importance to the architectural profession. During the Baroque period many works were made and the task of the architect was to unify aesthetic categories ranging from sculpture to urban design (Afsharnaderi, 1995). In the late eighteenth and early nineteenth centuries, due to the proliferation of industrial revolutions and the importance of technology and science, the engineering aspects of architecture overshadowed architecture and drove the architect out of the scene. During this period, a group of architects became historians and archaeologists. After World War II, the need for large-scale buildings led architects to contribute to urban development. In the 1960s and 1970s, especially after the 1968 movement, architects became involved in political and social issues and architecture came about with the participation of the people at this time. The architect of recent times has a strange personality. He is a superstar, just like a movie actor, and he is treated exactly the same. There are also enlightened architects, environmentalists, balanced, precise, strict and interested in art, theatre and classical music. There are also empirical architects who work for High-Tec and do not issue a joint statement (Sadraei, 2012) (Table 3).

Table 3. Architecture profession background in the world.

Era	Architecture profession status
Medieval	Architect as a craftsman
13th and 14th centuries	Architect as a technical expert familiar with geometry and some of the sciences of that period and skilled in using existing machinery.
Renaissance	The architect of this era can determine the theoretical basics of his work.
Baroque	Creating a theoretical gap and finding the importance of the architectural profession
Late 18th Century	The engineering aspects of the building overshadowed the architecture and pushed the architect out of the scene.
After World War II	Architects largely contributed to urban planning.
60s and 70s	Architects became involved in political and social issues, and architecture was introduced with the participation of the people at this time.

2.4. Architecture Profession Background in Iran

Except in rare cases, the architect in Islamic lands was not a theorist, but a craftsman, an artificer, since none of them is a treatise. So in the Islamic world and in Iran the builder and designer like medieval Europe was mostly an artificer, but there also seems to be differences between the personalities of architects, engineers, builders, professors and teachers (Hojjat, 2012). The magnificent architecture of Iran without the appearance of prominent and well-known personalities, while being very strange, may indicate a coherent predominantly oral culture of architecture with very specific rules, which has changed uniformly only over time and as a result of successive generations. Perhaps today's reality can still be regarded as a continuation of the past, because it seems that in Iran the society still regards an architect, as in the past, a craftsman. In some cases even if an architect becomes famous and builds a huge building, he will become a business man. This architect is regarded not a creative person but a solver of legal and technical problems, and people feel like they have to come to him because there are obstructive laws that the architect is informed about them. But when it comes to terms with design, the client overlooks it and dislikes the intervention of the architect. In the opposite case, some who approach the architect because of personal desire and not legal obligation, expect an extraordinary job. Denying the architect in Iranian society has a historical root. About 50 years ago no one was willing to pay to the architect and referred him to the builder for the wage because they regarded design as a part of construction (Sadraei, 2012).

2.5. Architecture Education Pathology

Among the up-to-date areas that need to be studied in view of the declining and declining architecture, it is worth discussing the problems of architectural education and their pathology (Sattari Raouf, 2008). Many annual conferences on architecture education are annually held in Iran to enhance the quality of architectural education in the country. The existence of numerous articles in this field also illustrates the importance of the subject. Most of Iranian researchers have conducted studies in the pathology branch of architectural education. "Traditional" and "academic" architecture teaching methods have been investigated by Hojjat (2002). Hojjat (2003) introduces different types of education and analyses their pathology. Noting that today's architectural education in Iran is facing the biggest historical crisis, beyond a change in course descriptions and year-to-year workshops, he argues that the intellectual-philosophical foundations of architectural education are understandable. Current conditions require reconstruction. He also states that given that today is the day of devotion to deplorable values and the valorous era of values, the School of Architecture should pursue the path of "architecture training" and, in three homes of "training", "education" and "wisdom" to create the "architect" and not "architecture". Nadimi (2010) has a different approach to the master's and apprenticeships in architecture education and looks at it as a new effective way in the professional training process and considers its role in the efficiency of the professional skills training process. Saghafi et al. (2015) propose a method of direct teacher and student participation in architecture education. They state that in this method, according to the teachers' assessment, students have a higher degree of success than conventional methods of

architectural education, and students are more satisfied with their learning process. According to Rodgiguez et al. (2018) and Saghafi (2015), the combination of in-person learning ateliers with virtual design ateliers will enhance students' motivation and provides access to virtual architecture ateliers. Sardashti et al. (2020a, 2020b) suggest the use of critical education. This method has the effect of increasing motivation, enhancing social skills, improving the speed and quality of the process of developing architectural ideas, creating diversity and vitality, and reducing student stress. Emam et al. (2019) have compared two approaches of architecture education, a collaborative and learner-centred approach and a teacher-centred approach in architectural design studio. Obtained results show that this method seems to be very effective in training students for design in a collaborative environment. In addition, it suggests that collaborative learning, i.e. the learner-centred approach, is an effective learning method to increase student motivation, and helps students to share knowledge and enhance learning capability using collaborative learning equipment. The approach seems to be very effective in teaching students to design in a collaborative environment.

Rifaat (2019) states that many architecture schools as an essential part of education focus on developing students' skills in the spatial and aesthetic aspects of architectural design, and make less effort to inform students of the nature of actual design. He outlines the major disciplines that are often involved in the design and construction of real projects, and emphasises the importance of informing architecture students of the complexities of real design. Finally, he proposes a multidisciplinary approach to architectural education in order to fill the gap between architectural education and professional work. Mahdavinejad et al. (2012) believe that universities should prepare professionals for the future. But there is little doubt that formal education at universities is sufficient to prepare skilled professionals. They seek to highlight the successes and failures of formal education in architecture schools and their effectiveness.

The results show that only about 25% of university technical courses have been useful to students in professional careers. Zhao et al. (2018), examining the current status of education and the architectural job market in China, argue that there is a gap between the quality of current and future job market needs and academic education in architecture schools. In order to improve this situation, they propose that architecture education be reconstructed from three aspects: 1) incorporating the emerging technology, 2) reducing unnecessary content, and 3) education with self-learning skills. Yalçın and Ulusoy (2015), by studying the views of architecture students, are trying to figure out what technical skills and individual qualifications are required for a successful architecture. They suggest acquiring these skills through: 1) taking part in more training courses for model making, perspective and drawing programs such as AutoCAD, 2) strengthening self-confidence by performing more practices in drawing, 3) improving design abilities by taking related courses, 4) increasing self-expression abilities by taking a course about techniques of presentation, and 5) taking studio courses with outstanding projects to improve imagination. Sonawane and Gokhale (2016) have studied the architecture training available in India in order to organise new strategies in the field to lead to better architecture in India. They argue that for training more efficient architects, they need education that is equipped with a “variety of resources”, “including technology”, “people, ideologies”, and so on. On the other hand, universities of architecture need to operate more than one academic institution and be like a professional architectural and think tank company.

So, most of studies in the field of architecture education focuses on a special method or teaching methods such as traditional or academic education, or learner-centred or teacher-centred training approaches. But in this study the important question is: how it is possible to reduce the gap between architecture education and the architectural profession?

3. Methodology

In the first phase of this research, focusing on the educational system of architecture in Iran, the gap between architecture education and architectural profession was studied through a descriptive-analytical method. Three categories of architects have been tested in this regard: 1) undergraduate students, 2) university professors, and 3) professional architects. For this purpose, four models of open-ended questionnaires were prepared and validated. The students and professors studied in this study were selected from three medium-level universities. Professional architects were chosen by the managers of the architectural companies according to their availability. The data collected were analysed through content analysis method. Content analysis was done by organising and evaluating data that were similar to each other in the context of

specific concepts and themes. Next, based on the results of the first step, a set of solutions have been proposed to reduce the gap between architecture education and the existing architectural profession. An open-ended questionnaire was developed to validate these suggestions and evaluate their effectiveness to be used in the faculties of architecture, and it was given the architectural experts.

4. Results and Discussion

According to the results of the questionnaires of the first phase of the research, the problems of the educational environment that caused the gap between education and architectural profession are as follows.

1. ***Lack of professional experience of professors:*** Currently, in Iran, the method of selecting faculty of architecture schools like other fields is based on one's scientific and research background. However, architecture is a discipline of a practical nature and to teach it, professors need to be familiar with the process of designing and executing architectural projects from the beginning to the end in order to educate students on the real needs of the architectural profession. Therefore, it is necessary to make corrections in the selection of the faculty of architecture so that in addition to one's scientific and research background, one's professional background should also be considered.
2. ***Lack of relationship between educational environment and society:*** During the course of study, the student's relationship with the community is completely disconnected. In fact, the university has become an isolated environment, while architecture is an interactive discipline and interactions and relationships are critical for its success. So it is necessary to open university gates to the community. Then, students can connect with existing workshops in the city, other universities, architectural offices, community members, employers, etc.
3. ***Lack of attention to the courses of the architectural profession:*** It seems that in the definition of undergraduate courses of architecture the realities of the job market are neglected. Therefore, it is necessary to make changes in the course syllabus of this field according to the needs of the architectural job market. Courses that are missing from the architecture curriculum are:
    - **a) Executive skills training:** It is clear that architectural colleges have focused most of their time on design education, however, according to the Supreme Council for Planning and Education, architecture graduates must have the ability to design and construct the building. On the other hand, given the status of the community, it is clear that those architects are successful in the architectural profession who are capable of constructing what they have designed. Therefore, it is necessary for the university to deal with the practical and workshop issues of student-designed projects as far as possible.
    - **b) Education of rules and regulations:** One of the things that architects have to adhere to in their professional work is to comply with existing laws and regulations, including municipal and engineering rules and regulations. But at universities these topics have been neglected. Therefore, it is necessary to provide specific courses to teach these rules and regulations, and students should experience at least one design course, in full compliance with the laws and regulations of the municipality and the engineering organisation.
    - **c) Interactive skills training:** The ability to interact and communicate effectively with other people such as design colleagues, clients, workers, etc. is a basic requirement of a successful architect. However, at the moment, the university is not paying attention to this issue and needs to accommodate it. So, the authors' suggestion is to organise ceremonies, seminars, galleries and finally open-gated universities.
    - **d) Professional ethics training:** According to obtained results, the main criterion of architectural companies for employment is professional ethics. However, the university does not specifically address this issue. Therefore, it is necessary for university education to pay attention to this issue and respond to it.
    - **e) Architectural software training:** One of the most important skills required by architecture graduates is working with architectural software. Architectural software today is the primary tool in this field, whereas in architecture education only 2 courses are devoted to it. Thus, students are turning to extracurricular classes to learn numerous architectural software, such as AutoCAD, 3D Max, Revit, Rhino, etc.
    - **f) Business skills training:** One way for people to succeed in the job market is to acquire business skills. Nowadays, with the large number of architectural offices nationwide, it

seems that one of the benchmarks of their success is their business competitiveness. However, the colleges of architecture have not paid attention to this.

4. Lack of attention to the development of personal characteristics*:*

- **a) Lack of motivation of students:** According to the results of the professors' questionnaire, the motivation of architecture students to learn and acquire skills has decreased each year.
- **b) Lack of perseverance of students:** One of the factors that influence students' academic and career success is their perseverance. According to the results of the professors' questionnaire, the perseverance of architecture students has decreased each year. However, given the wide range of topics in architecture, students need a lot of perseverance to succeed in this field.
- **c) Graduates' lack of confidence:** Confidence is one of the criteria for academic and career success. In the field of architecture, as people involved in the field interact with different people, they need to have the confidence to succeed in the field.
- **d) Students with no target:** Targeting is one of the factors that plays an important role in the level of effort and progress of people. Targeting means having goals that give direction and meaning to one's life. There are many architecture students today who do not have a specific purpose related to their discipline and future career.
- **e) No hope for a career in the future:** Unemployment is a major problem today in many countries, including Iran. Nowadays, given the economic status of society and unemployment among the graduates of architecture, their career prospects seem hopeless and in a state of uncertainty. Architecture students are aware of this and have given up on their foggy future career prospects.

5. Overwhelming acceptance of architecture students and the saturation of the job market: The overwhelming admission of architecture students, in addition to diminishing the quality of education, has also led to a large number of graduates and a saturation of the job market. The reason can be found in the establishment of different universities that admit architecture students without entrance exams. In addition, many people in construction market are not graduates of architecture.

6. Short education time: Undergraduate degree in architecture like all engineering disciplines in Iran is four years. But since the field of architecture is so vast, it seems that this time is not enough to prepare graduates for success in the job market. In the past, architecture has been taught for 6 years of continuous education. Graduates of that system appear to have been more successful in the architectural job market than today's graduates.

Based on the results obtained from the first phase, the following strategies are proposed to reduce the gap between education and professional work (Table 4):

a) Reforms in the selection of the faculty member of architecture so that in addition to the individual's scientific and research background, his or her professional background is also taken into account.
b) Transforming architectural schools into "social schools"
c) Use of participatory training
d) Undergraduate architecture curriculum revision
e) Linking architecture faculties with architectural offices
f) Establishment of NGOs for informing the public about the architectural profession
g) Using practical tests and interviews to attract architecture students to universities
h) Use of the continuous education system

Table 4. Problems in the learning environment that have caused the gap between architectural education and profession and suggested solutions.

Factor	Suggested solution
Lack of knowledge and professional experience of professors	Reforms in the selection of the faculty members of architecture
Lack of relationship between educational environment and society	- Transforming architectural schools into social schools - Establishment of NGOs
Lack of attention to the architectural	Use of participatory training

Factor	Suggested solution
profession in architectural education a) Executive skills training b) Education of rules and regulations c) Interactive skills training d) Professional ethics training e) Architectural software training f) Business skills training	Undergraduate architecture curriculum revision Linking architecture faculties with architectural offices
Lack of attention to the development of personal characteristics of architecture students a) Lack of motivation of students b) Lack of perseverance of students c) Graduates' lack of confidence d) Students with no target e) No hope for a future career	Undergraduate architecture curriculum revision
Overwhelming acceptance of architecture students and the saturation of the job market	Using practical tests and interviews for admission
Short education time	Using the continuous Master's education system

In the second phase of the research, according to the suggested solutions, a questionnaire was provided to the architects to evaluate the usefulness of the proposed solutions and the way to be used in the faculties of architecture. Obtained results are as follows.

a) Participatory education: According to the experts of participatory education for architecture is one of the best educational methods. They propose ateliers for participatory education in the faculties of architecture, with the presence of several professors, students of different years, and teaching different courses at the same time. The presence of professional architects can also be used in some of these sessions. At a wider level of participatory education, the ateliers among different universities can be mentioned. In this case, the cooperation of the universities will be increased. On the other hand, these ateliers allow students to interact with more students. Finally, at the broader level of participatory education, the ateliers among students of architecture and other related disciplines can be considered.

The benefits of this method are:

1. The presence of students of different years makes it possible for junior year students to take advantage of the business of senior year students and skilled students.
2. Course composition helps students understand their relationship to each other and use different courses at the same time.
3. Through the presence of professional architects, students can acquire some of the skills required by the architectural job market.
4. Combining the architecture of different universities in addition to filling in the weaknesses of each university can introduce different students to each other.
5. Combining different disciplines in architecture studios makes it possible for architecture students to acquire the knowledge they need from other disciplines.

Through answering this question, experts also point to the conversion of architecture schools into social schools so that architecture schools open their gates to the community so that in addition to students and professors, clients, professional architects and so can have presence in the university environment.

The benefits of this method are:

1. Clients can communicate directly with architecture students.
2. Outdoor architectural ateliers (architectural offices) and university ateliers can communicate with each other and, in some cases, be combined to help each other.
3. The relationship between the community and the university is established and the architecture student understands the needs of the community more.

b) NGOs: According to a limited number of professors, due to the existence of numerous universities and architectural companies, there is no need for NGOs to reduce this gap, but

rather themselves are able to reduce the gap. On the other hand, most experts consider the NGOs to be effective and believe they can be used in various ways to reduce the gap between education and professional work. These ways include the following:

1. Awareness for the community context: One of the fundamental problems in the field of architecture is the problem of understanding the community of architecture. That is, people in the community do not have an understanding of the work of an architect and what impact it can have on one's life and in many cases they consider the work of an architect to be a matter of taste and an unnecessary discussion. NGOs can take responsibility for informing the people about the architectural profession.
2. Creating a subjective background in architecture for students before entering university.
3. Accompanying architecture graduates to enter the job market: These organisations can create an environment where the simultaneous presence of architecture students, architecture graduates, architecture professors, professional architects and even personal, governmental and non-governmental clients is possible. Then, in addition to education, it is possible to recruit companies and even to form student groups and attract the first professional project.

c) Linking architecture schools and architectural offices: In the first case, to establish this link, it is necessary to revise the overall curriculum for undergraduate architecture education, so that the student, after spending a few semesters in the university environment and acquiring the necessary skills, will spend one or two semesters of training in a particular architecture office approved and supervised by the university to develop the necessary skills of the professional architectural space. After completing this training, which may also be called an apprenticeship, the student returns to university and continues his studies at the university.

The benefits of this method are:

1. The student is introduced to the professional environment of architecture, and encouraged to try more and find how hard he/she may work to be skilled for professional environment.
2. Because the discipline of architecture is inherently practical, education in the academic environment is not enough. In this way students can be trained in the real environment in a practical way.
3. Students find connections to pursue a professional career at the same time as a student.

In the second case, universities can establish architectural offices under their privilege. In this case, universities can get real projects from both private and public clients such as the School Renovation Organisation and Municipalities and train students in real-time academic projects.

The benefits of this method are:

1. Generating funding for the university through architectural projects
2. Training students with real projects
3. Reducing costs for clients who go to the university architecture offices

d) Adding additional courses (1. Executive Skills Training, 2. Education of Rules and Regulations, 3. Interactive Skills Training, 4. Professional Ethics Training, 5. Architectural Software Training, 6. Business Skills Training) to the undergraduate architecture curriculum: According to experts, courses on executive issues called "Building Courses 1 and 2", "Technical Design", etc. are included in the curriculum, and the problem is in teaching of the professor and subject selection. On the other hand, since these courses are taught in theory, they do not have the necessary quality while they are required to be taught in construction workshops.

As for the courses on architecture software, the unit also exists in the curriculum, but the focus is low on it, and most architecture professors do not master the architecture software. As for the other suggested courses, they say that the absence of these courses is obvious, but how to get them into education requires an overall revision of the undergraduate curriculum.

Proposed solutions to reduce the gap between architectural education and profession are presented in Table 5.

Table 5. Proposed solutions to reduce the gap between architectural education and profession.

Solution	Methods of using the solution	Explanation
Participatory education	Common ateliers	Mix of different students, professors, courses, faculties

Solution	Methods of using the solution	Explanation
		and disciplines.
	Transforming architectural schools into social schools	Presence of clients and professional architects in the university.
Establishment of NGOs	Awareness for community context	Informing the public about the architectural profession.
	Creating a subjective background of architecture for students before entering university	Informing students before entering the field.
	Accompanying architecture graduates to enter the job market	Providing work space, marketing, and getting projects from clients.
Linking architecture faculties with architectural offices	Apprenticeship	Presence of students in architecture offices.
	Establishment of architectural offices under the privilege of universities	Taking real projects from clients and training students in the academic environment.
Undergraduate architecture curriculum revision	Pay attention to the following courses: 1. Executive Skills Training 2. Education of Rules and Regulations 3. Interactive Skills Training 4. Professional Ethics Training 5. Architectural Software Training 6. Business Skills Training	Courses lacking in the architectural curriculum.

5. Conclusion

In general, due to the problems in architecture education that have created a gap with the architectural professional environment, the following solutions are suggested to reduce the gap between academic and professional architecture.

1. *The use of participatory education:* In participatory architectural ateliers, in particular, the simultaneous education of students of different years and the mix of courses are considered. These ateliers consist of several professors with students, including different courses and students of different academic years. In these ateliers professional architects can attend as skilled persons in some meetings. A more comprehensive look at participatory architecture education can combine the architecture ateliers of different universities and different disciplines.
2. *Transforming architectural schools into social schools:* In order to bring the architectural education environment closer to the community, it is necessary for the schools of architecture to be transformed into a community school environment, so that to open their gates to the community and to enable the presence of students and professors, clients, professional architects, etc. in the university environment.
3. *Establishment of NOGs:* Establishing NGOs responsible for liaising with the architectural offices, the job market, and clients. Because NGOs come from the heart of society, and because architecture schools need to communicate more effectively with people and society, the role of NGOs is important in connecting architecture education with its professional job. Therefore, the creation of such organisations that mediate the architecture faculties with the community, such as trade unions, is suggested. These organisations can be useful to the architectural community in several ways:
    - *3.1. Community Awareness:* One of the fundamental problems in the field of architecture is the difficulty of understanding the community of architecture. That is, people in the

community do not have a viewpoint of what an architect's activity is and what impact it can have, and in many cases they think that the architect's work is a matter of taste and an unnecessary argument. NGOs can take responsibility for informing the public about the architectural profession.

3.2. Creating a subjective background of architecture for students before entering university.

3.3. Accompanying architecture graduates to enter the job market: These organisations can create an environment where the simultaneous presence of architecture students, architecture graduates, architecture professors, professional architects, and even personal, public and non-governmental clients is possible.

4. *Linking architecture faculties with architectural offices:* To establish this link, it is necessary to revise the overall curriculum of undergraduate architecture education. So that students spend a few semesters in a particular architectural office approved and supervised by the university. After acquiring and developing the necessary skills, they continue the final semesters.
   In addition, universities can set up architectural offices under their privilege. In this case, universities can get real projects from both private and public clients, such as the School Renovation Organisation and Municipalities, and train students in real-life projects in the university environment.
5. *Undergraduate architecture curriculum revision:* The revision of the undergraduate curriculum according to the needs of the architectural job market is one of the obvious needs of this field. Since curriculum revision requires a thorough research, this study has identified only the courses that are lacking in the architectural curriculum. These courses are: a) Executive Skills Training, b) Education of Rules and Regulations, c) Interactive Skills Training, d) Professional Ethics Training, e) Architectural Software Training, and f) Business Skills Training.
   In addition to the above,
6. *It is necessary to amend the method of selection of architecture faculty members* so that in addition to the individual's scientific and research background, his or her professional experience is also taken into account.
7. *Practical exams and interviews should be used* in admitting an architecture student.
8. *In order to increase the duration of study*, the continuous Master's education system should be used.

Competing interests statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability statement

All data, models, or code that support the findings of this study are available from the corresponding author upon reasonable request.

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