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Original Research Article

An Investigation of the Architectural Development of Classroom Design in Iranian Primary Schools Based on Modern Teaching Methods (2001-2021)*

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Abstract

Problem statement: Children are required to continuously experience and learn, and the space of classrooms should be able to govern the sensory and mental powers of students and improve their learning ability. The research question addresses the shape and design of the elementary classroom and its effect on the quality of teaching methods to determine the most appropriate one.

Research objective: The study aims to investigate the current classroom environment of elementary schools and its influence on the quality of modern educational methods in Iran.

Research method: This is descriptive-analytical research using the content analysis method to analyze the data from library resources, and interviews from the field. The sample included four primary schools in Tehran during the years 2001–2021. The theoretical foundation of the study also points to the influence of spatial design and the shape of the classroom on teaching methods.

Conclusion: According to the results, the elementary classrooms in Iran during the years 2001-2021 have had square and rectangular shapes with vertical and linear directions; the teaching methods in these classes are mostly based on individual, lecture, and discussion methods, which among them, group discussion is considered as the most appropriate one. But unfortunately, due to the linear and axial position of tables, benches, and other equipment in elementary classrooms, this method is not often used by teachers, and the two other individual and lecture methods are more applicable. Moreover, classroom furniture, as one of the architectural components of the classroom, had a significant influence on education. Therefore, it can be concluded that the geometrical shape and the space layout of elementary school classes have a significant role in improving the quality of teaching methods to choose the best one.

Keywords: *Development, Classroom, Teaching Methods, Primary Schools.*

Introduction and Problem Statement

In recent years, the extensive need for education in Iran has led to the establishment of some schools, as along with the growth of education, the traditional methods of schools have experienced many changes

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and developments. Educational activities have always been of great importance, and education has always led to growth, improvement, and civilization in society. However, in current times, these traditional models have not found the opportunity to adapt to modern educational methods and remained rather unchanged in the confrontation of tradition and modernity. Schools, as one of the central educational spaces, play an essential role in the social and cultural structure of society. Until the middle of the Qajar era, Iranian schools were still following the traditional model, as the constitution of schools was responding to the educational needs and methods of that time. However, due to the development of educational methods, the previous models and the school constitution could not respond to the new method. Therefore, a sudden change occurred in the structure and educational content of schools, as they were replaced by the traditional ones, and a new organization and educational model appeared. Choosing the proper classroom space according to the teaching model has a significant role in the success of the educator in transferring educational content. Creativity, thinking and exploration skills, and the ability to establish social relations are among the most significant concepts which can be transferred to students through a proper teaching model. In this regard, according to published research, school facilities have a basic role in affecting the performance of students and increasing the effectiveness of instructors. Among the significant physical factors that aid in the development of educational methods are those involved in creating a comfortable classroom, such as an appropriate temperature, a quiet atmosphere, the allocation of new buildings, and the small number of students in a class.

Educational spaces are among those areas of environmental architecture that have a key role in society, as the lack of attention and knowledge in designing educational spaces, especially classrooms where students spend most of their time in school, adversely affects the quality of education. Due to the undeveloped physical structure of elementary classes in Iran, and its different direction from the past which happened for some reasons, students' learning process and consequently the quality of teaching methods decreased. However, today and in the contemporary era, although many countries have implemented successful examples of the architectural design of classrooms, teaching spaces in Iran have not yet provided a suitable, pleasant, and responsive environment for students, especially in elementary schools; therefore, doing such research is required. Moreover, due to the growth of global awareness about the creative spaces of the educational environment during the last few decades, the issue of designing school spaces has been placed in a new condition, with high consideration, and thereby the design of modern schools based on this higher concept represents that the creative organization of the educational environment can highly influence the skill of education. Therefore, it is interpreted that a better environment provides a better education. As, in line with the development of the educational system and school plans, the renovation of schools' architectural models is required, which has not yet happened during the contemporary history of schools in Iran. Therefore, reviewing teaching methods and the development process of the physical components in elementary classrooms can provide designers with better design models of these classrooms to better influence the teaching and learning process. Based on this concept, this research study aims to investigate the current classroom environment of elementary schools and its influence on the progress of contemporary modern educational methods in Iran, to describe the role of architectural design features, and then introduce the most suitable educational method for development and progress of teaching methods in elementary schools, according to the architectural space of available classrooms. Therefore, the research questions are as follows: 1) What kind of influence did the architectural elements of the classroom space have on the quality improvement of education in elementary schools in Iran during the contemporary era (2001-2021)? 2) Which of these contemporary educational methods in elementary schools in Iran have been more appropriate during this time (2001-2021)?

Research Background

In the field of this research, several studies have been carried out, as follows: in research by Nazarpoor, Heydari & Sarmadi (2021) entitled "A Comparative Study of Architectural Configuration of Public and Educational Spaces in Iranian-Islamic Schools and Contemporary Patterns of Arrangement" by using the logical reasoning method, they found that positive layout considerations in both current and traditional spaces of educational buildings can provide readable, accessible, nature-based, and flexible spaces for students in a classroom by observing a perfect visual and physical arrangement. Alhindi (2021) in an article entitled "Current Teaching Methods Used for English Language Teaching in Upper Elementary School and the Preferred Ones for the Lower Grades," and by using a descriptive-analytical method and field data collection, found that educational videos, audio-visual classes, students› participation, and using a combination method of teacher-student are among the most appropriate methods of teaching English in elementary schools and even for the lower levels. Widiastuti, Joko Susilo and Nurfinaputri (2020) used the experimental research method and collected field data to examine the influence of classroom design on the learning quality of 772 students at Muhammadiyah Yogyakarta. They found that the factors that affect students' ease of learning in the classroom are: air circulation, quiet space, cleanliness, availability of facilities, and physical elements. Barrett & Treves (2019), in their book entitled "The Impact of School Infrastructure on Learning," based on a descriptive-analytical research method, examined the physical structure, architecture, and infrastructure of 10 elementary schools in California to see their influence on students' learning levels. They found that factors such as lighting, hygiene level, and cleanliness of classrooms, together with flooring and the geometry and architecture of classes, are among the central factors that influence students' learning skills.

Akbarzadeh, Heidarnattaj, Ahmadi & Baezzat (2020), in their study entitled "The Effect of Layout on Educational Spaces Design to Improve Academic and cognitive performance" by applying qualitative research methods and gathering field data based on the content analysis, found that a combination of common models for architectural workshop classes can be useful and suggested the following: 1. observing individual spaces in connection with collective spaces and using a flexible layout that can be adapted into an individual or collective space arrangement, 2. Creating semi-open rooms for each group in the class's outskirts to personalize it and 3. Increasing interactive spaces for students by arranging them around a table next to other spaces like the exhibition and library. Nazarpoor and Noroozian Maleki (2018), in their article entitled "Identifying the effective architectural components in improving students' learning" by applying the Delphi technique and questionnaire tool together, found that having a comprehensive understanding of spaces and users, and considering the environmental components, social communication, furniture, and equipment it is possible to make educational spaces have a direct effect on improving students' learning. Abbaszadeh Diz, Rashid Kelvir and Rezaee Sharif (2019), in their article entitled "Analysis of Student Satisfaction from Physical Components of School with an Emphasis on Cooperative Learning Case Study: Boys' Secondary Schools in Tabriz," using a survey research method and SPSS tools, found that creating spaces by observing flexible and sociable geometry/ architecture and furniture, paying attention to color, visual appeal, thermal comfort, and green space are among the significant factors in creating a promising and appropriate environment for students.

Azemati, Aminifar and Pourbagher (2016), in their article titled "Spatial Layout Pattern of New Schools Based on the Principles of Islamic Schools, to Improving Students' Learning," using qualitative-quantitative survey research methods, found that observing criteria for the spatial arrangement of the school environment has a positive effect on user learning. These criteria are as follows: spatial circulation, flexibility, open and closed space per capita, the connection between inside and outside spaces, furniture, and spatial arrangement. In a similar study, Khodabakhshi, Foroutan and Samiei (2016) in an article entitled "The Evolution of

Space in Schools Architecture Based on the Role of Their Governing Educational System (Case Study: Sepahsalar School, Darolfunoon, and Alborz High School)" based on the historical-interpretive research method found that the traditional education system has been entangled with the companionship of life and education, the harmony of religious, worldly sciences, and the interactive relationship between tutor and student.

This educational system has considered the school architecture and the spatial condition of the living and educational spaces, the allocation of schools for religious activities, and the use of large spaces for schools. In the next step, the religious aspect and the interaction between the student and the tutor were taken from schools such as Dar al-Funun, however, the central courtyard was preserved in its original form, while the function of the traditional rooms (Hojreh) was changed to a classroom. To put it simply, according to the modern educational system, the architecture of schools has changed to a linear form, which has created a one-way relationship between teacher and student and separated itself from the architecture and educational space of traditional schools.

Mozaffar and Mirmoradi (2015) in their article entitled "Investigation Iranian Schools Spatial Configuration with Respect to the Connection between the Classroom and Outdoor Spaces" using the content analysis research method, based on logical reasoning found that some characteristics are significant in presenting a school design model such as direct access from the classrooms to the educational yard, having three types of spaces (open, closed and covered spaces) in the spatial organization, the existence of interior educational spaces of courtyards, the consideration of porch in the structure of school plans, and paying special attention to the courtyard as the central location for school activities.

According to the background research, it has found that the impact of the school environment on the learning and creativity of students was the main focus of their research, and in this regard, no research has been done on the evolution and development of classroom architecture based on modern educational methods in Iran. Therefore, the current research is an innovative and pioneer study in this field.

Theoretical Foundation

• The evolution of architecture and its effects on education

Evolution and development are the most significant missions in the field of architecture. Evolution is one of the most significant targets in architecture, which arises from the essence of architectural work, so it follows flexibility and development (Tunner & Kenneth, 2000, 309). Moreover, the development process of architecture is inevitably influenced by the world, where objects and subjects are continuously evolving. The outcome of architecture is ideally turning into the subject of change, and in this regard, all architectural products are tagged with 'various titles, periods, and concepts' under the influence of the transformation process (Durmus, 2012, 26). Therefore, under this concept, the issue of exploitation or consumption is considered, which forms a world in which the built models are gradually consumed and quality considerations fade under the title of "diversification.". Therefore, it could be a challenge for architecture, as in a consumption society, architecture would be exploited as a tool, and gradually become a medium (Lazović, 1988, 32). In the design of public buildings, one of the important issues is to pay attention to the design of educational buildings. Because in these buildings, education and learning systems are formed, which are the basis of behavioral, social, and, learning education. In building architecture, one of the most central issues is the design of educational buildings, as in these buildings, education and learning systems are formed that are based on behavioral, social, and learning concepts of education. The process of learning and teaching abilities includes providing information and progressive viewpoints on a subject to a specific age group and is carried out under specific conditions (Aghdasi, Kiamanesh, Mahdavi Hezaaveh & Safarkhaani, 2013, 94).

Based on this concept, the purpose of education is not simply **to** target the transfer of cultural heritage and human experiences to the next generation; instead, the mission of educational systems is to make proper changes in people's views, cognitions, and behaviors (Najafi, 2019, 61). Therefore, it is necessary for teachers to be fully aware of teaching methods and learning theories because educational spaces are recognized as places where learning, guidance, and supervision happen, and teachers have a rule of guiding and supervising here (Abbasi, Hejazi & Hakimzade, 2020, 3). Teaching methods comprise various techniques, and each has its special effects. Because the educational environment mostly targets the social and psychological needs of students and somehow ignores their basic needs, it is required to identify the individual aspects of students' needs. In this regard, the concept of evolution in the architectural design of current educational buildings is highly related to the idea of change in the discourse of present architecture, whether in the context of the social and spatial-physical environment, or technological and economic conditions. Based on this discussion, conditions such as spatial limitations, changes in the physical-spatial environment, frequent changes of users, and other related factors greatly affect the development of the architectural structure of space; it is due to this fact that an architectural work adopts its surroundings to present a more flexible context (De Marco Werner, 2017, 56). The physical context of the work, as well as its social, economic, and technical aspects, are key influencing factors in the evolution of architecture, according to the above-mentioned (Singh, et al., 2009, 41), which has been focused on in this study.

• Contemporary Modern Educational Methods in Iran

According to modern methods of education, students' interests and abilities are of great importance and based on this, the teacher makes efforts to improve students' abilities. During the training process, the teacher uses many educational tools and facilities and presents effective learning to students through continuous and various activities and exercises, to involve them in achieving their goals while learning lesson concepts (Mohammadi & Ghaini, 2002, 12). This method is called the cooperative learning method. In this regard, one of the modern methods of cooperative education is brainstorming, which in addition to school classrooms is also considered in management meetings of organizations due to its advantages and special application (Hosseini Ruholahi, 2005, 92).

This method was initially presented by "Alex Osborne" (1998) to solve management problems, and is now used as one of the classroom methods of teaching (Darbeiki, 2003, 176). This learning method has two basic principles: 1) diversity of opinions that stimulates the creative part of the mind and 2) improvement of quantity that improves quality (Mirza Mohammadi, 2011, 52). Among the new teaching methods, the 'innovation method' can also be mentioned, which emphasizes more on creativity in the group. One of the founders of this educational method is "Gordon", who displaced the old beliefs about creativity with new ideas. Contrary to the conventional opinions about creativity as an instinctive thing, he believed it was a teachable matter, and the best way to improve it was through collective-group activities. Another learning method is problem-solving, which has many uses. Although it is believed to be more compatible with the individual model, its application in a collective or group setting is more effective. The indirect person-centered education method is another type of modern education method in Iran, in which learning using a counseling approach is considered a teaching-learning method; The opinions of "Carl Rogers" a person who was the founder of a special counseling method, represent effective guiding principles for learning. His philosophy and counseling techniques are based on the indirect teaching model. As one of the main applications of this method; it is mostly applicable when the class is in a "static" position and the tutor tries to involve the students in activities under any condition, which is possible through doing exercises and presenting lesson contents (Khurshidi, 2002, 92). Another educational method that is used in Iranian schools is the 'pre-organizing teaching method', in which information is transferred directly to students

through printed materials and lectures. In the educational method of discussion, there are three methods of discussion: controlled by the teacher, group, and free, and in this educational method, the role of "place" is very important (Ghorbani, 2014, 115).

In the discussion method of teaching, there are three methods 1. Discussion controlled by the teacher, 2. Group discussion and 3. Free discussion; According to this educational method, the role of "place" is very important (ibid.). Despite the presence of several teaching methods in Iran, there are still other types of educational methods that are not used, including the exploration-based, computer-based, and scientific tour methods of education.

- **The Quality Factors of the Classroom**

One of the contributing factors to increasing the quality level of education is 'diversity', which can be considered both in the furniture and in various spaces of the classroom (Ahmadi Shalmani, 2010, 51). The classroom environment is the most important space of the school, as the students spend most of their time over there and the learning process occurs in the classroom (Berry, 2012, 65). In some schools around the world, for example in American schools and New Zealand, the furniture of the classroom is designed for cooperative and group education (Fig. 1). While, in most Iranian schools at the current time, the environment of the classroom and their furniture are arranged to be compatible with seminar and lecture-based education (Turkman, Jalalian & Dezhdar, 2019), which due to the lack of ergonomic furniture (tables and benches) causes discomfort and premature fatigue (Tabesh, 2015, 12). Therefore, it can be figured out that flexible furniture is one of the significant items in the architectural design of educational classes, which, in turn, plays a central role in benefiting from the educational methods (Lotf Atta, 2008, 81). Therefore, classrooms should have the ability to adjust themselves to various educational methods (Bassey, Grant, Humsman & Johnson, 2012, 40).

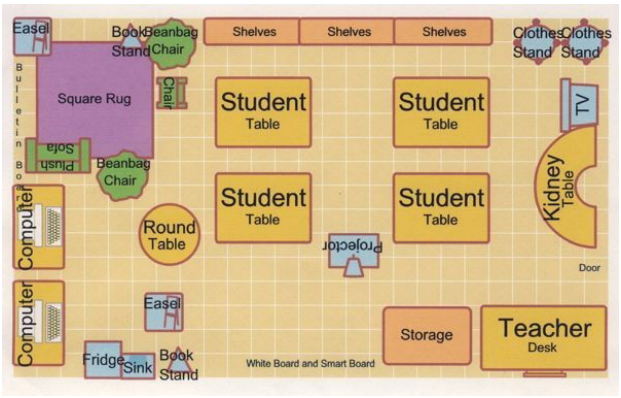
Moreover, in the architectural design of classroom equipment and furniture, the ergonomic principles and standards, and factors such as width, height, and chair covers are required to be considered to bring easy learning, comfort, and the highest efficiency for students (Armirul et al., 2013, 59).

Research Method

This study is based on a qualitative and descriptive-analytical method using content analysis. The qualitative studies were conducted as the first step by using library-documented sources and data were collected by using the note-taking method. Following this step, the collected data from the library studies were coded and the basic components and research criteria were presented. In the next step, by using a field survey of four elementary schools that were established between 2001 and 2021 (The schools of Meftah, Mossalanejad, Robabe Akbarzadeh, and Salam), some photos were taken from the classroom environment, along with conducting interviews based on the teaching methods of teachers. Finally, the research findings were analyzed using content analysis, and logical reasoning approaches. Based on a field survey of elementary schools, 15 schools were selected due to their different educational methods according to the layout and architectural elements in the interior design of the classrooms. Among these common properties, only one sample was selected, and the rest of the samples were not included in the study. In the initial part of this study, the concepts of evolution, education, modern educational methods in contemporary Iran, and the quality of the classroom environment were initially explained. In the next step, the contributing factors to the quality of the classroom environment were discussed, and finally, the architectural elements of the classroom in four target elementary schools in Iran (during the years 2001 to 2021) were examined to study the effect of these architectural elements on the educational methods of the target schools.

Discussion

In previous times, all spaces in schools could become suitable places for classroom environments due to their flexibility and function, which had the potential to adapt to new educational methods - but unfortunately in the present time and the contemporary era of Iran,



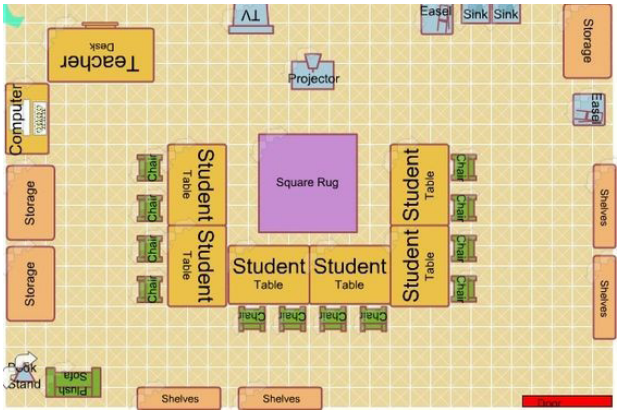


Fig. 1. The elements related to classroom Arrangement; The Swan Elementary School in New Zealand has a rectangular shape and diverse arrangement, 2020. Source: https://helpfulprofessor.com

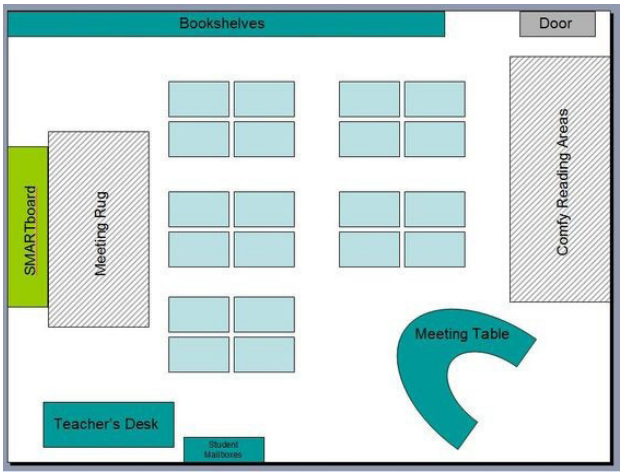


Fig. 2. The arrangement of the classroom elements; Hopi elementary school in Brazil following a rectangular shape, 2020. Source: https://www.susd.org/hopi

due to the static nature of classrooms (in terms of form and place), especially in primary schools, the spaces are highly dependent on the educational system, and hence, it is almost impossible to change teaching methods. Usually, the classroom space in educational environments consists of architectural components and physical factors that, in addition to making a suitable classroom environment, play a central role in improving the quality and performance of education. Therefore, all the architectural elements contributing to the educational factors of classrooms play a central role in changing the educational methods and in gaining a learning plan for students. So, considering the transfer of lesson contents and educational plans in most of Iran's elementary schools is based on a direct method of data communication, thinking, and creativity have no specific place in this method, and therefore these characteristics do not grow and improve in the primary steps of training, as a matter of necessity, therefore, the academic future of students faces problems.

Therefore, according to the field studies of this research on primary schools (2001 to 2021), it has been found that the form of the classes had a similar shape in square or rectangle form (8* 6 and 8* 7 meters), as their straight axis, with the position of class board on one side of this shape, and the solid arrangement of the benches (row/linear) has forced the teachers of these classes to apply only lecture-based methods and direct transfer of information for their teaching (Fig. 3). Meanwhile, a small number of teachers, based on the type of additional items in the classroom environment and their knowledge of various educational methods, can engage students in collective activities. However, in this type of group activity, the architecture of current classrooms had no impact on the quality of education in the target primary schools. So, due to the lack of educational equipment and facilities, some of the current learning methods in elementary schools require additional items in the classroom space. This is in a situation where, in the current classes of primary schools in Iran, there is no such possibility, which arises from the linear and axial arrangement of furniture in the classrooms, beside the long form of the corridors, where the implementation of such facilities is not possible (Fig. 4). Moreover, according to the form of classrooms in today's primary schools, it is not possible to benefit from group and

center-based activities or follow the educational models that require spatial separation, due to the shape of the class and its arrangement. The class furniture and the spatial arrangement in current elementary schools—using heavy metals and wooden materials for tables and benches, mosaic for floor covering, the color of the walls, and the type and height of the ceiling—are among the most significant factors that limit the possibility of teachers' using other teaching methods (Figs. 5-7). However, in most developed countries, the use of light tables and chairs, carpet floors, bright and cheerful colors for the walls, and suitable ceiling heights for children are common in primary school classrooms.

According to the examples mentioned above, in the next step, the educational methods, the classroom of elementary schools, and its components will be reviewed and analyzed to present the most appropriate solution. A classroom, along with having a material body made of walls, ceiling, floor, and other components, also has a spatial element that manifests itself in a physical body (Fig. 8). Therefore, one of the most significant factors influencing students' presence in elementary school classrooms is the teaching methods, which have a central role in determining the class shape and physical structure, being presented and staying stable in class, and improving the thinking and creativity power of students. In most countries, the classrooms are made up of movable walls to be adjustable to educational methods and solid walls to be removed, which represent the presence of students and teachers 'in' and 'out' of the class environment at the same time. Therefore, it should be noticed how much the element of being outside the classroom causes the success or failure of educational methods. According to these explanations, unfortunately, the classroom teaching methods in elementary schools in Iran, have no such features, and due to the presence of immovable walls in the classes, there is no possibility for interacting with the outside spaces. It is mostly because the windows, which can rather provide interaction with the outside environment, have also been covered with materials like curtains or vertical shutters (Fig. 9). Based on this architecture, there is no possibility for the teacher to adjust the teaching model.

Analysis of Educational Methods in Schools

According to field studies, following the interviews and observation of educational methods in current elementary school classrooms in Iran, two specific educational methods were presented: 1) the individual education method, and 2) the modern education method, a combination of lecture-based and discussion-based learning models. Based on the observation of this research in the elementary school classrooms to target the performance of educational methods, the effect of classroom shape and the arrangement of tables and benches on the improvement of this process, it has been found that according to the model of individual education, which was known as school-houses or "Maktab-Khaneh" or based on the "learning package method" which both were common in the past, class group activities are not important as other educational methods. Therefore, the classroom environment should not be limited to a small space. As in the past schoolhouses, most of the days, the classes were held outdoors, in the yard, or even in a larger classroom compared to a single room. According to the individual-based teaching method in elementary school classes, each student creates a strong relationship with the teacher, and a double interaction is formed between them; however, in other educational methods, in addition to the presence of individuals in a group, the presence of group for each person should also be considered, which allows the class architecture to be designed accordingly. It should be noted that based on some educational methods in current primary school classes in Iran, participating in group activities is preferable to an individual activity or even to an individual relationship between teacher and student. However, in some current elementary schools, the lecture-based teaching method is used, in which there are three key elements: 1. the group, 2. the teacher and 3. the board, or other educational aids. Another significant point here is the shape of the classroom, the furniture, and the arrangement of tables and benches,

Fig. 3. Meftah Elementary School classroom with a rectangular shape and linear arrangement of benches. Source: Authors' Archive.

Fig. 4. The linear and axial arrangement of the benches in Mossalanejad Elementary School. Source: Authors' Archive.

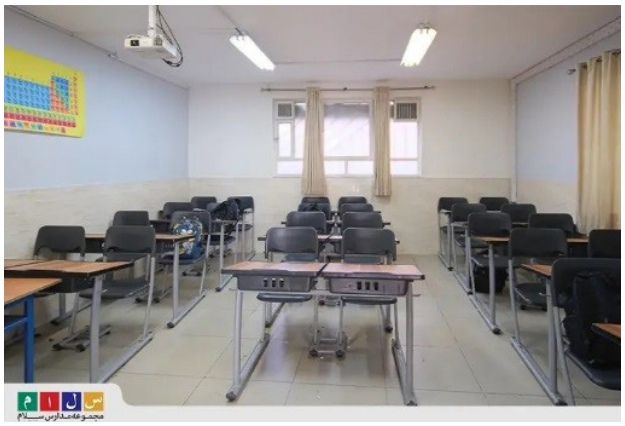


Fig. 5. The linearly and axially arrangements of the benches in Salam Elementary School. Source: Authors' Archive.

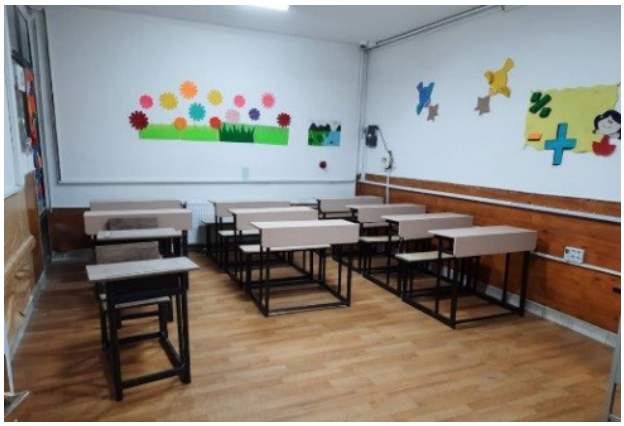


Fig. 6. The materials used for tables and benches in the classroom of 'Meftah Elementary School. Source: Authors' Archive.

Fig. 7. The materials used for tables and benches in the classroom of 'Salam Elementary School. Source: Authors' Archive.

which encourage this way of teaching; It is mostly because, in this method of teaching, there is an axis in the class between the teacher and the group of students; this characteristic together with the stretching of the class to the board, pivoted ceilings like 'single slop roof' or 'pediment roof', the higher standing position of the teacher, and the presence of the platform in the class, will strengthen the axis. These arrangements reinforce the companionship of the teacher and the group of students to promote each other, and their influence on improving students' learning is greater than the individual method (Fig. 10).

In the discussion-based teaching method, the teacher involves group activities of students as the double-sided axis of the teacher and this group turns into an axis of the teacher and individual students or even an axis between the students. Based on this model, the square-shaped classroom is the most suitable plan, and the rectangular classroom with horizontal axes- such as a flat roof and platforms - is not suitable for a discussion-based teaching model.

In the discussion-based teaching method, the teacher

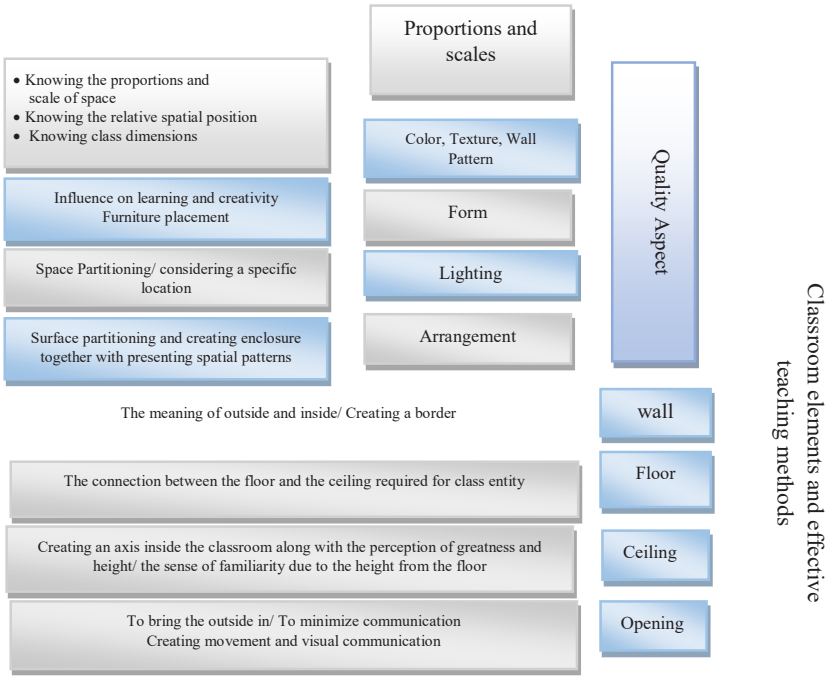


Fig. 8. The influencing factors in the interior space of the classrooms affect the teaching methods in elementary schools. Source: Authors.

Fig. 9. The class Interaction with the outside environment in two elementary schools: Meftah elementary school (right) and Mossalanejad (left). Source: Authors'

involves group activities and the double-sided axis of the teacher and the group of students turns into an axis between the teacher and individual students or even an axis between the students. Based on this, the square-shaped classroom is the most suitable plan, and the rectangular classroom with horizontal axes- like flat roofs and platform shape- is not suitable for the discussion teaching model. To improve the performance of this method of teaching primary school students, it is necessary to have a circular or round shape design (Fig. 11).

Based on this concept, as shown earlier, the architectural elements such as the roof shape design, and the form and the layout of the classroom can adopt different forms based on teaching methods. Moreover, these elements together have a significant impact on the axis of the board and other additional equipment in classrooms.

Among them, the most influential element as the main axis is the class board, which, in combination with the platform shape of the class, disrupts the creation of visual connections with other features of the class. Therefore, this makes it difficult to adopt with discussion-based teaching model. It is because, the classroom environment is evaluated by these elements, which have an axial or linear arrangement

(Fig. 12). It should be noted that reducing the use of discussion methods is to provide the same condition for students to benefit from different parts of the classroom. Therefore, the most appropriate type of class arrangement (setting the table and benches) to be adopted with this educational method is a radial shape.

According to the interviews and field survey, it has been shown that the teachers do not use a single teaching method and often use a combination of the individual and lecture-based model together with the discussion learning method. Therefore, when designing a classroom, in addition to considering physical elements, the teaching methods - whether the individual, discussion, or lecture-based method – should also be included, together with the element of communication with outdoor space, and the landscape which is experienced from the interior space of the class. Therefore, the combined but integrated environment can be a proper choice for a classroom design, which can be formed based on architectural experiences and considering the main teaching methods of the classroom.

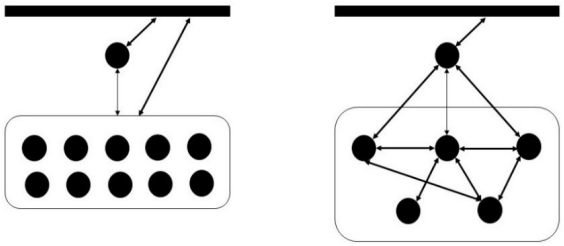


Fig 10. The group discussion teaching model (right) and lecture-based teaching model (left) in the classroom. Source: Authors.

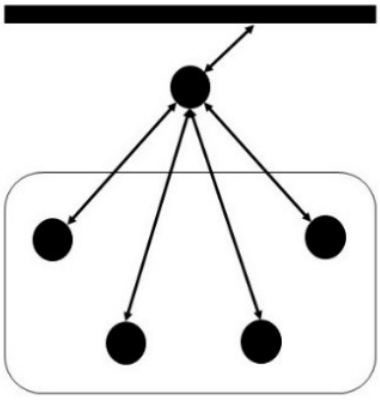


Fig. 11. The discussion-based teaching model in the school classroom. Source: Authors.

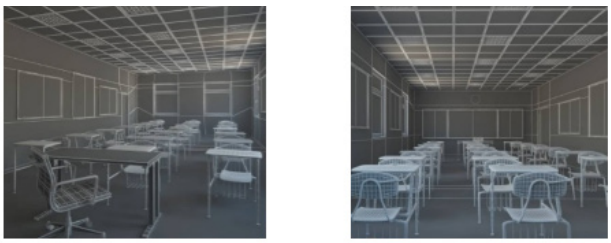


Fig. 12. The architectural design pattern of the interior space of classrooms in elementary schools in Iran. Source: Authors.

Conclusion

The school environment, especially the classroom, is considered a space where children spend most of their time. Therefore, architectural design and classroom layout, to target the special needs of elementary school students, is of great importance. The educational spaces designed for children should have the ability to improve their sensory and mental powers and provide them with better education and learning conditions. In current times, especially in Iran, educational spaces, mainly classroom environments, are likely to create boring learning environments due to having specific limitations.

However, schools must use their full capacity to prevent this occurrence. Paying attention to classroom design and architecture, as well as teaching methods, in today's elementary schools creates an environment that meets the perceptual and mental demands of the students, and thus society. Therefore, improving the classroom architecture in elementary schools within the next few years is a demanding and inevitable issue. In this study, according to the field survey and interviews with the teachers of target schools, it has been shown that the elementary classrooms in Iran from 2001 to 2021 are almost designed in square and rectangular shapes with vertical and linear axis, and the teaching methods in these classes are based on individual, lecture and discussion method; According to the physical elements of the classrooms, and the interviews in this study, it has also been shown that the group discussion method is the most suitable one, but unfortunately, due to the linear and axial arrangement of class furniture (tables, benches, and other equipment) in elementary schools, this method

is rarely applied by teachers; as the most frequent methods in these elementary schools are the individual and lecture-based methods, which are most compatible with square-shaped (individual and lecture-based method) and rectangular-shaped classes (individual method). Therefore, it can be mentioned that each of the educational methods requires its physical structure and space, and therefore, it would not be possible to achieve all the educational methods by making 'one-size-fits-all' classes. It is because some teaching methods, such as the lecture-based method, necessitate a space with a linear axis and a specific position for both students and teachers, whereas the group discussion-based method necessitates a center-oriented space to allow students to discuss close to one another.

This arrangement can be implemented by adopting a circular layout and using curved forms. Therefore, it should be noted that classroom furniture and its components as part of classroom architectural components have a significant influence on establishing and developing education. Using flexible types of furniture such as movable tables and chairs together with soft and washable floors in part or all of the school classes could be a proper choice.

The teaching method has a significant impact on the shape of the class, as there is a direct and double-sided relationship between these two. Therefore, the common layouts for the classrooms, which mostly have a linear shape, move education merely towards traditional education; However, by altering the arrangement form (Table 1), other new teaching methods such as discussion and group-based learning methods can be implemented and improve the creativity of students. As a result, it is possible to conclude that the method used by primary school teachers has a direct relationship with classroom arrangement (Fig. 13).

References list

• Abbasi, F., Hejazi, E. & Hakimzade, R. (2020). Lived Experience of Elementary School Teachers about The Opportunities and Challenges of Teaching in the Educational Network of Students (SHAD): A Phenomenological Study. *Research in Teaching*, *8*(3), 24-1.

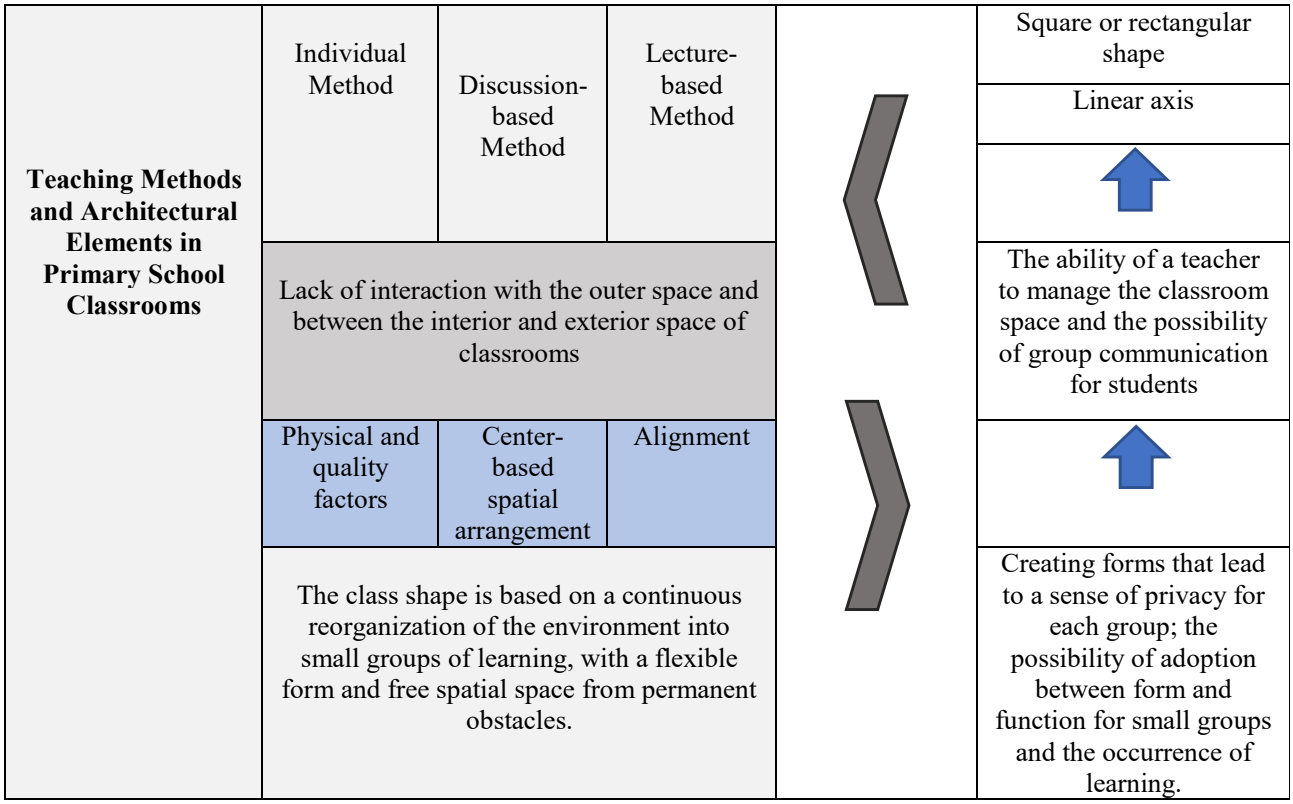


Fig. 13. Educational Methods and Classroom Architectural Elements in Primary Schools. Source: Authors

Table 1. The types of furniture arrangement, the shape of the classroom, the teaching method, and the relationship between layout, and teaching method. Source: Authors.

No.	The Furniture Arrangements in Elementary Schools	The Shape of the Class	The Teaching Method	The Relationship between the Arrangement and the Teaching Method
1	 Mossala Nejad  Meftah School	Rectangular Shape	The lecture-based and direct method	The linear arrangement method is applied by teachers to transfer lesson concepts, in which creativity in students is not promoted; it has been a common class arrangement since the beginning of school activities until now in Iran.
2	 Salam School  Salam School	Rectangular Shape	The discussion-based and group teaching method	The class arrangement for a group activity (A rectangular table for four people: two on each side) and the open space available in the middle of the class for the teacher both provide an environment for discussion and group methods specifically in the art classes (painting and calligraphy) which improve the skill of creativity.

• Abbaszadeh Diz, F., Hojatollah Rashid K. & Rezaei Sharif, A. (2019). Analysis of Student Satisfaction from Physical Components of School with an Emphasis on Cooperative Learning Case Study: Boys' Secondary Schools in Tabriz. *Journal of Architecture and Urban Planning*, 11 (23), 51-72.

• Aghdasi S., Kiamanesh A. R., Mahdavi Hezaaveh M. & Safarkhaani, M. (2013). Teacher-Student Interaction in Primary Schools Succeeding and Failing in PIRLS 2006 and TIMSS 2007. *QJOE*, 30(3), 93-120.

• Ahmadi Shalmani, M. H. (2010). *Contemporary Architecture of Educational Spaces of Ancient Iran to Contemporary World*. Tehran: Soroush-e Danesh Publication.

• Akbarzadeh, Z., Heidarnattaj, V., Ahmadi, F. & Baezzat, F. (2020). The Effect of layout on Educational Spaces Design to Improve academic and cognitive performance. *Journal of Architectural Thought*, 3 (6), 96-109.

• Azemati, H., Aminifar, Z. & Pourbagher, S. (2016). Spatial Layout Pattern of New Schools based on the Principles of Islamic Schools, to Improving Students Learning. *Naqshejahan*, 6 (2), 16-23.

• Alhindi, S.(2021). Current Teaching Methods Used for English Language Teaching in Upper Elementary School and the Preferred Ones for the Lower Grades. *Education and Linguistics Research*, 7 (1), 35-52.

• Armirul, N. J., Che Nidzam Che, A., Yahya, A., Mohd F. N., Lee, A., Adnan, M. & Noraini, M. (2013). *The Physical Class room Learning Enviroment.* International Higher Education Teaching and Learning conference, Malaysia.

• Barrett, P. & Treves, A. (2019). *The Impact of School Infrastructure on Learning.* Washington, DC: International Bank for Reconstruction and Development.

• Bassey, D., Grant, P., Humsman, S. & Johnson, T. (2012). *Get active: Remaining Learning spaces for student success Eugene.* United states of America: ISTE, International society for technology in Education.

• Berry, M. (2012). *Healty school environment and enhansedeucational performance.* Washington DC: The carpetand Rug Institute(CRI).

• Darbeiki, B. (2003). *Thoughts Education Organization* (sazmane Parvareshe Afkar). Tehran: Islamic Revolution Documents Centre.

• De Marco Werner, C. (2017). *Transformable and transportable architecture: analysis of buildings components and strategies for project design*. Master Thesis, Barcelona: Universidad Politécnica de Cataluña.

• Durmus, S. (2012). *Change and Transformation in Architecture.*

On the Concept of Zeitgeist. Karadeniz: Technical University.

•

• Ghorbani, A. (2014). Phenomenological analysis of teaching methods and their impact on the designation of architectural space of classrooms. *Educational Innovations*, 14 (3), 113-138.

• Khodabakhshi, S., Foroutan, M. & Samiei, A. (2016). The Evolution of Space in Schools Architecture Based on the Role of Their Governing Educational system (Case Study: Sepahsalar School, Darolfunoon, and Alborz High school). *Bagh-e Nazar*, *12*(37), 61-74.

• Khurshidi, A. (2002). *Ravesh-ha va Fonoun-e Tadris* [Teaching methods and techniques]. Tehran: Yastoroun.

• Lotf Atta, A. (2008). Ta'sir-e Avamel-e Mohiti bar Yad-Giri va Raftar dar Mohit-ha-ye Amouzesh-i (Ebteda-yi) dar Shahr [The effect of environmental factors on learning and behavior in educational spaces]. *Quarterly Journal of Urban Planning*, (21), 73-90.

• Hosseini Ruholahi, A .(2005). The effects of cooperative learning on psychologiacal and social traits among undergradute students. Social Behavior & Personality: *An International Journal*, 36 (6),89-102.

• Mirza Mohammadi, M. H. (2011). *Teaching Methods and Techniques.* Tehran: Pooran Pajoohesh Press.

• Mozaffar, F. & Mirmoradi, S. S. (2015). Investigation of Iranian Schools Spatial Configuration with Respect to the Connection between the Classroom and Outdoor Spaces. *Armanshahr Architecture & Urban Development*, *7*(13), 93-105.

• Najafi, H. (2019). Comparing of the effect of Blended and Traditional teaching on Learning. *Research in Medical Education (RME)*; 11 (2), 54-63.

• Nazarpoor, M. T., Heydari, A. & Sarmadi, S. M. (2021). A Comparative Study of Architectural Configuration of Public and Educational Spaces in Iranian-Islamic Schools and Contemporary Patterns of Arrangement. *QJOE*, 37 (2), 147-176.

• Nazarpoor, M. T. & Noroozian Maleki, S. (2018). Identifying the effective architectural components in improving students' learning by emphasizing on the open spaces of schools based on the document of fundamental transformation of education. *Quarterly Journal of Education and Learning Studies*, 10 (2), 165-193.

• Tabesh, M. (2015). Desired School: investigating the factors affecting students' and teachers' sense of attachment to the school and learning spaces with regard to its architecture and furniture. *Roshd-e Moalem*, (299), 10-12.

• Turkman, M., Jalalian, S. & Dezhdar, O. (2019). Madrese-ye Delkhah, Barresi-ye Avamel-e Mo'aser bar Hes-e Delbastegi-ye Danesh-Amouzan va Mo'aleman Nesbat be Madrese va Faza-ha-ye Yadgiri ba Tavjoh be Memari va Mobleman-e An [Elaborating the Role of the Educational Spaces' Environmental Factors in Facilitating the Learning by the Primary School Students]. *Shabak*, 2(11), 1-14.

• Hosseini Ruholahi, A .(2005). The effects of cooperative learning on psychologiacal and social traits among undergradute students. *Social Behavior & Personality: An International Journal*, 36 (6),89-102.

• Lazović, Z. (1988). *Prototip i njegov značaj u arhitektonskom projektovanju.* IMS`88-tehnologija projektovanja i građenja, Beograd: IMS SR Srbije, str. 129-158.

• Mohammadi, K. & Ghaini, Z. (2002). *History of Iran Children Literature.* V. 4. Tehran: Children Research Institution.

• Singh, V., Skiles, S. M., Krager, J. E., Wood, K. L. & Jensen, D. & Sierakowski, R. (2009). *Innovations in Design Through Transformation: A Fundamental Study of Transformation Principles.* Journal of Mechanical Design, 131 (008), 81010-1-18. NY: American Society of Mechanical Engineers (ASME).

• Tunner, C. & Kenneth, K. (2000). The Influence of School Architecture on Academic Archivement. *Journal of Educational Administrations,* 38(4), 309-330.

• Widiastuti, K., Joko Susilo, M. & Nurfinaputri, H. (2020). How classroom design impacts for student learning comfort: Architect perspective on designing classrooms. *International Journal of Evaluation and Research in Education,* 9(3), 469-477.

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