

The Role of the Environmental Components of the Corridors of Educational Spaces in Increasing the Design Learning of Architecture Students

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Abstract

The role of architectural education environment in teaching and learning is important in terms of improving the quality of education. Informal education, as an important part of education, often takes place in spaces outside the studio. Corridors, especially on the way to the studio, can be effective on students' design thinking in many ways, one of them is to increase the visual experience. which can be effective in the design process. The importance of place in education is considered as one of the dimensions of the hidden curriculum. This research is done with the aim of knowing the environmental components in educational corridors and knowing the effects of each of them. The mixed research method is nested qualitative in quantitative. In the qualitative phase, components from semi-structured interviews with university professors are conducted in the educational environment, then the components are categorized and extracted using the open and central coding system in ATLASTI software, then in the next phase, based on the components A questionnaire with a Likert scale is compiled and provided to students. The results are entered into the JMPSAS16 software and analyzed with descriptive and inferential statistics. The results show that in the spatial dimension, the attractiveness component with the coefficient of determination (0.213) has the least contribution to students' learning, and the most related to the static space component. and movement with a value of (0.872) in the functional dimension of supporting activities with a value of (1.000) has the largest contribution to students' learning and the least is

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related to the type of furniture in the corridor with a coefficient of determination of (0.224) In the physical dimension, the bulletin board component with a value of (0.132) has the least effect on learning, and the dimensions of the corridors with a value of (0.952) have the greatest contribution to students' learning.

Keywords: Environmental Components; Corridors of Educational Spaces; Architecture Students

1. Introduction

In detail, today, how to teach architecture is the biggest problem in architecture schools, so knowing the factors that affect it is also important to improve the quality of education. The studies conducted and the evaluation of architecture students' evaluation of architectural education show some deficiencies in the architecture education system in Iran. In addition to the formulation and planning of architecture courses, non-verbal education is also effective on students (Afzal Nia, 2014: 131)

Improving the quality of architectural design education, as one of the most important courses for architecture students, especially in associate and bachelor degrees, is one of the most important goals of academic architecture education. Therefore, it is important to know and improve the factors affecting it. Numerous researches conducted in this field, which are often in the field of quantitative standards of courses such as teaching methods, teaching hours, number of course units, etc., are also often in the field of formal education of courses and less on environmental aspects and informal education, causal Despite the importance of this type of education, it has been discussed especially in decision-making organizations as well as educational spaces, and its lack is felt due to the desire to improve education and maximum productivity of educational spaces (Shahcheraghi and Pashder Abad, 2014: 121).

Also, often the designers of most of the academic spaces of architecture without paying attention to the important role that informal education plays, without creating a platform as an "event place" and without creating a "sense of place" for this type of education, in fact, without taking advantage of all They create a quality space and only in line with formal education. Therefore, proving the important role of non-formal education, a part of which takes place indirectly in the environment of architectural education, can be the basis for the proper and more targeted design of architectural education spaces in line with the quality of architectural education. On the other hand, considering the generalist view of most of the researches in the field of architectural education, despite the significant progress of the studied areas including the field of environmental psychology, especially in recent years, the effects of these studies in creating change and improving architectural education are not very noticeable. is not. It seems that due to the difference of the influencing factors on different courses, we need more effective and insightful steps in architecture courses and the recognition and analysis of the influencing factors and how to influence them in the direction of quality improvement, as well as "clear and correct" analysis in The end of the research, which can provide a clearer picture of the impact and role of the architectural learning environment on the formation of a different type of architectural education that is less considered as a complement to formal education, encourage designers and planners of educational spaces to design more purposefully and pay attention to improve the quality along with the quantitative standards that currently this defect is visible in most of the architecture teaching spaces, especially the units of Azad University (Emamipour and Shams Esfandabad, 2014: 121) this research aims to extract the environmental components of the learning corridors in the educational spaces of the university It is

for architecture students and it tries to answer the question that what are the environmental components in educational corridors that are effective in increasing learning and to what extent does each of them increase learning in architecture students?

2. Literature Review

In this research, due to the wide background of the research on the variables of the title and also to avoid procrastination of the speech and writing, it has been tried to present the contents briefly and in the form of a Table 1.

Table 1 The results of domestic researchers' research (articles, theses,..)

Researcher	Publication year	Title of the article/project/dissertation report	Results and key points
Zarei Fatima-Salimi Laden	2019	Find and hide curriculum in the body of excellent learning	It is necessary to pay attention to this aspect of the curriculum so that basic changes in the field of student education are provided
Mashahiri, Mehshad, Mirjani Hamid	2018	The body of the learning environment as a hidden curriculum	Architectural education, hidden curriculum of physical environment, learning
Asgaripour Shabnam and colleagues	2018	Explaining the role of non-toxic collective spaces of architecture schools in implicit education	Social interactions, informal collective space, architecture school, informal education
Alaei, Maral, Mahdavi pour, Hossein	2018	The effect of learning environment on learning	Education, university, physical environment, learning
Malekzadeh, Mozghan, Vasheshgaran, Ali Akbar	2018	Place as an educational technology	The place has educational technology components.
Asghari, Tahera	2018	How school architecture affects the hidden curriculum	Hidden curriculum, physical environment, school architecture, environmental psychology
Moradi, Azadeh; Et al	2017	Predicting students' happiness according to hidden curriculum components	The components of the hidden curriculum significantly explain 7.22% of students' happiness in total.
Mahboubi, Tahir; Karimi, Seyyed Bahauddin;	2015	Cultivating the creativity of architecture students in the educational environment	Unity and abundance, hierarchy between whole and part, scale and natural continuity, balance, adaptation, historical continuity, technology
Fekuryan Feflora	2013	Effective characteristics of the physical environment of architecture education for the development of	In order to design architecture schools with the aim of promoting learning and placing architecture students in a growth process in which, while acquiring professional skills,

		potential talents of architecture students	paying attention to the cultural and social expectations and values of the society in question, the ability to get rid of the physical environment is required.
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3. Theoretical Foundations

3.1. Environment

The environment has a wide scope and everyone has a definition for it depending on the context in which they work. There are different theories for the classification of the environment (Bastanfar, 2012: 26). The German Halpach, who is considered one of the founders of environmental psychology, developed about 100 years ago. He has criticized the indiscriminateness of the Wundt school (constructivist) and laboratory researches and investigated the effect of environmental conditions on behavior (Hafezian, 2012: 11). He separates environmental data into three types:

1. The natural environment, such as soil, air, light, etc., which affects man and his behavior and is changed by man.

2. The social environment, which is the subject of social psychologists.

3. Cultural environment that includes books, laws, buildings, etc. The cultural environment is created by humans and reflects history. (Khosravi, 2000: 58) Others define four types of environments:

Physical environment: including physical environments and artificial spaces

Social environment: people and groups and...

Psychological environment: what happens in a person's mind.

Behavioral environment: the set of factors that a person reacts to (Rahmati, 2019: 51)

The main point of these classifications and similar classifications is the distinction between the real, real or objective world around humans and the phenomenological world that consciously or unconsciously affects people's behavioral patterns and mental reactions. This discussion goes back to the basics of Gestalt psychology. Kurt Kofka (1935), one of the founders of the Gestalt school, separates the environment into two types, geographical and behavioral. The geographical environment is used to mean the environment that exists objectively and the behavioral environment as it is experienced by the individual. A general definition of the environment refers to a set of external physical factors and living organisms that interact with each other. These factors influence the growth and development and behavior of organisms. People assume certain social roles by being placed in physical-behavioral camps (Kamelnia, 2006: 73). In other words, the environment plays a role in defining the behavioral range of people. It is worth it. In this speech, environment is a comprehensive concept of physical and physical conditions such as: lighting, cooling and heating conditions, color, dimensions, etc., cleanliness, arrangement, etc. ranging from psychological conditions such as: the way of dealing with people, the methods of presentation, the number of restrictions, the feeling of peace and security and so on. In general, man seeks to find answers to his needs from the environment, and if these needs are not met by the environment, he will not establish a sensory and emotional connection with the environment. In the case of environmental feedback, the higher the level of meeting human needs, the deeper the meaning of the environment will be in a person's mind. For example, the texture and shape of the parts of a space has a significant effect on the sensory perceptions of its users, hence specifying the type of texture in different dimensions and positions can have a very positive effect on the sensory

perception of learners. The rough and rough texture creates rigidity and dryness in the rules and induces strength in the mind, and the polished and smooth textures evoke a kind of peace and purity in the mind. The proportions and graining of texture is also very important (Gides, 1989: 114). The clearer and tangible this graining is in the dimensions of the human eye, the more sense of intimacy and friendship is evident in the environment. Forms also always have a shape and meaning, and have psychological effects on humans that can be effective in learning.

3.2. Man and the Physical Environment

Undoubtedly, daily human behavior is related to the physical environment, therefore, to explain how the physical environment of architecture education affects the behavior of architecture students, it is necessary to examine the relationship between humans and the physical environment and the effects of these two on each other. In this regard, it is necessary that fundamental concepts such as value attitudes, needs, as well as factors such as perception, learning and cognition that play a role in performing spatial behaviors, because any description, analysis, statement of theory and executive statements require concepts related to that theory (Ghafari, 2007: 14). Therefore, in order to understand how to coexist and align with the abilities or capabilities of the environment, it is necessary to pay attention to how to perceive and recognize the characteristics related to behavioral positions, as well as how to relate the environment and behavior.

In examining the desires and, in other words, the conscious needs of humans, we will encounter countless desires, in such a way that it will not be possible to examine them. A hierarchy of regular features. Maslow states that conscious and different daily desires are means to reach these focused desires to goals that are considered goals in themselves (Lang, 2012: 143). He says that certain needs lead us that we cannot go beyond. That is, we reach the satisfaction of certain needs that seem to be goals in themselves. Such needs in an ordinary person have the characteristic that they are often not seen directly but are always hidden behind a set of conscious desires.

How to learn from the human environment in the field of learning is the product of the surrounding environment. Of course, this learning is based on receiving, analyzing and interpreting environmental factors by his internal factors (cognitive abilities). But the environment has a very decisive role in learning. Even when the learner is recording his mental data that is born of thinking. He is located, this thinking and its results will take on the color of the environment. Because thinking happens on behalf of this person in a situation and the knowledge that results in learning is caused by the interaction of the learner and his situation (Mortaz Hijri, 2000: 21) It can be said that learning is the result of a person's holistic knowledge of his environment and his surroundings, and in terms of psychology, knowledge is a creative and active interaction that goes on without interruption between a person (or internal factors) and his environment. Normally, this is conscious interaction through which the environment is processed (Mortaz Hijri, 2000: 21), but learning is not exclusive to space or specific people, and in fact, it is an important part of every day-to-day activity and exclusive to the classroom. It is not school lessons. Perhaps the most appropriate opportunity even for children is the society itself, just as the best situation for a child to learn a language is at home. In fact, the mother tongue is the language that a child learns in the early years of his life. The environment teaches. What is more interesting is that the result of learning this language in an environment is much more successful than learning the languages that the child will be taught formally in the following years. Therefore, learning is an important part of every person's life and it happens even when people don't think that they are learning (like when walking in the park). Most of what a person has learned (Mahmoudi, 2005: 65), happened before he reached school age and outside of school hours and after he finished school. With such a view, man is always acquiring

knowledge based on interaction with the world around him, and as mentioned, learning should not be assumed only in the classroom. New learning methods are always involved in the issue of continuous and continuous interactions of humans with each other and with environmental resources.

3.3. Learning Environment

Man has always been influenced by his environmental factors and its constituent elements. These factors continuously affect his reactions and behaviors psychologically and physically, and the impact of environmental factors on learning can be analyzed from three fundamental aspects.

1- First, the entire learning process takes place in a physical environment with understandable and measurable physical characteristics. Whether sitting in a well-equipped conference room, under a tree or in front of a computer screen, people are surrounded by information. Specific subjects in the environment such as a chair, clothes and a cup of tea attract people's attention and people constantly feel the elements around them such as the light of a lamp, the smell of food and the heat of a fire, so every learning environment is full of people. It is environmental information.

2- Second, people do not passively touch, hear or see, but actively perform these actions. In any learning environment, they manage their limited perceptual resources through actively selecting environmental information for more attention and also using Experiences and existing knowledge structures are used to interpret this information in a way that they have experienced in the past.

3- Finally, the physical characteristics of learning environments can be emotionally affected with important perceptual-behavioral results. For example, most students describe learning in a very hot classroom as a problem, and on the contrary, an environment that causes positive emotional reactions can not only lead to the improvement of the learning level, but it can also turn the environment into a lovely atmosphere for learning. A place where people search for learning. It is clear that some learning environments are more convenient and suitable and help the person to focus and be careful in learning, and it is obvious that in learning environments where there are no suitable conditions, one cannot expect anything but a decrease in learning efficiency (Melabi, 2010: 29).

In fact, the experience of each person in life and the skills he acquires are related to the environmental conditions and the product of the interaction between that person and the environment in which he lives, activity as the main factor in the growth and learning of a student is a process that is related to space And the environment of the student causes his all-round growth, and the environment affects his behavior by creating opportunities and stimulating and encouraging him (Moghadami, 2005: 141).

Educational spaces are prone to becoming dry and soulless due to their specific limitations, but all efforts should be made to prevent this incident from happening. The roots of every student's interest in learning in school and being in an educational environment are formed. And if the environment is inconsistent with the individual's expectations, a sense of repulsion and lack of interest in learning is formed in the learner (Nasiri, 2004: 26).

3.4. Influence of Environmental Factor on Learning

In the architecture of educational environments, it is necessary to pay attention to the wishes and needs of students. Because paying attention to the requirements is considered as one of the effective parameters, one of the effective educational factors in modern education is how the architecture of the school space is. The teacher, book instructor, student, teaching methods, educational

management and family are among the factors that are usually effective in the learning process and are examined and explored, while in the new education and training, the physical space of the school is not only a dry environment and Spiritless Ness is not considered to have no effect on the learning process, but as a living and dynamic factor in the quality of the educational activities of students. According to education experts, at a glance, the architecture of schools and its constituent elements such as, Color, light, sound, schoolyard equipment and can leave significant effects on learners and students along with other educational and educational factors (Parsa, 2006: 36). and the inappropriate, cramped, dark, dry and soulless school will bring boredom and depression to the students, and it will have a negative effect on the level of learning and their active and cheerful presence in the school. Recognizing the needs of paying age groups, in the meantime, studying behavioral patterns in educational environments will facilitate the recognition of needs. In this chapter, the ecological psychologist believes that there is a special relationship between the physical-architectural and behavioral dimensions of the physical-behavioral settlements. Therefore, the classroom benches, the way they are arranged, will affect their behavior and learning. (Ghafari, 2007)

Physical factors affecting learning

One of the dimensions of the educational environment is the physical factors that cannot be neglected in creating motivation and passion for education.

1. Light and its related factors, such as the amount and intensity of natural or artificial light;
2. The external dimensions of the class, including the wall, door and floor, class per area and per capita space;
3. Color and its impact on education and educational environments;
4. Class heating and ventilation;
5. Voice and the factors related to it, the organization and arrangement of the class; (Nazli, 2016)

3.5. Light and its Related Variables

In general, in the learning process, 83% of learning takes place through the sense of sight, so if the act of seeing is faced with problems, there will be a drop in learning. The purpose of providing lighting in the school is to create an environment in which the act of seeing It should be done in the best way and with the least effort so that the students' energy is used to absorb the information of the learning process and not to use this energy to fight the problems they see in the dimly lit environment. Of course, we must remember that the amount of light needed is different when performing any activity. The lighting of the classroom is provided through natural light (windows, vents, etc.) with artificial light from lamps and all kinds of lights, which in any case should be paid attention to the amount, direction and quality of light. Numerous experiences have shown that the area of glass windows It should be at least one-fifth of the area of the room in order to provide the minimum illumination for reading and writing. On the other hand, you should not hesitate to take any action that will equalize the lighting for the students. The distribution of the light should be favorable and evenly distributed so that the brightness of the surfaces does not cause discomfort to the eyes, and the amount of light should be sufficient and there should be no disturbing shadows (Shariatmadari, 1987).

3.6. Appearance Dimensions of the Class

In relation to the characteristics of the surfaces and dimensions of the classroom in general, it can be said that the walls of the classroom should be dry, smooth without joints and washable up to a

height of at least 1.5 meters, and it is better to be made of stone. The floors of the classrooms should be washable, flat and seamless, not slippery and wet, these points should also be observed regarding the ceiling, the color should also be taken into consideration, and relaxing colors should be used when painting the classroom, the color of the walls is better. can be washed, so the surfaces of the wall and ceiling of the classroom should have light colors and the floor of the classroom should be dark in color. Neufert (1994) states about the shape of the classroom that rectangle with trapezoid is the best shape for the classroom. Etc. It is not suitable for acoustics. Large curved areas create focal points. It creates a big barrier for sound. 1.5 square meters of land and 55 cubic meters of air are required for each student. In other words, for a class of 30, the dimensions of the room should be 8 meters long, 6 to 7 meters wide, and 4 meters high (Taghieh, 2013: 57).

3.7. Color and its Impact on Education and Educational Environment

Color is one of the most effective spatial elements on the human mind. The color of objects makes them better known and affects the perception of human emotions and feelings. Color recognition and light intensity are the most important factors in human vision perception. Color actually contains a lot of information about the objects around us. Experiments have proven that it plays a more important role than color for recognizing the position in space and recognizing the shape of objects. Of course, for children up to the age of 11 years, color is more important than form, and it also has a significant effect on their individual personality and mental state. Children need concentration and mental peace in class, and for this reason, it is better to use green, blue and yellow colors. According to verse 76 of Surah Al-Rahman, they rely on Rafrat Khizr and Ubqari: Hassan leans on green pillows and beautiful carpets. Since Paradise is the resting place and peace of Paradise, the preparations for the realization of peace in all its details, including color, must be provided for Paradise. It can be concluded that from the Quranic point of view, green is a relaxing color, and otherwise, the Quran's emphasis on its extensive use in heaven would not be justified (Kadivar, 2014: 38).

In addition to green, blue and yellow colors, to create mobility and attractiveness, their complementary colors should also be used in limited dimensions. In fact, complementary colors are a kind of contrast that demand each other and complement each other when viewed. Of course, when using this combination, it should be kept in mind that one color should always be the dominant color and the complementary color should be used as an accent color, for example, in the class, the dominant color should be green and the complementary color should be red in small dimensions and sizes and to create A sense of movement should be used, creating a tone contrast can also help the colors shine in the class and make them more expressive. The tone contrast is created by using pure colors without mixing with black or white. When these colors are placed next to each other in a composition, because they are different from each other due to their color difference, they can create a tone contrast. Using black and white next to pure colors can create a tone contrast and intensify the effects of dark colors. or clear to help; Because black, due to its darkness, when it is used as a background or in the vicinity of colors, it can greatly increase their brightness and shine, while white makes the colors appear darker and more emphasized. Regarding the class, we can make the main background white. Or consider milk to make it look more transparent by reflecting light, and show key and emphasized elements such as blackboards, class library cabinets, and teaching aids with colors such as green, blue, and yellow to emphasize them. and appear darker and deeper in the eyes of the viewer (Azimi, 2017).

3.8. Classroom Heating and Ventilation

Another factor affecting learning is the appropriate equipment for producing heat and cold, which lack of attention can cause learning and injuries. It is necessary for that, if the ambient air is too hot, pressure will be placed on the body's thermoregulation mechanism and the efficiency of physical and brain activities will decrease, so it can be seen that the temperature in the class is a factor that affects how the learners work and as a result It affects their learning (Afzal Nia, 2014: 131), besides, the air in the classroom should usually be changed three to five times per hour because the air in the room should not contain more than one percent of carbon dioxide.

In Figure 1, shows the summarized concepts;

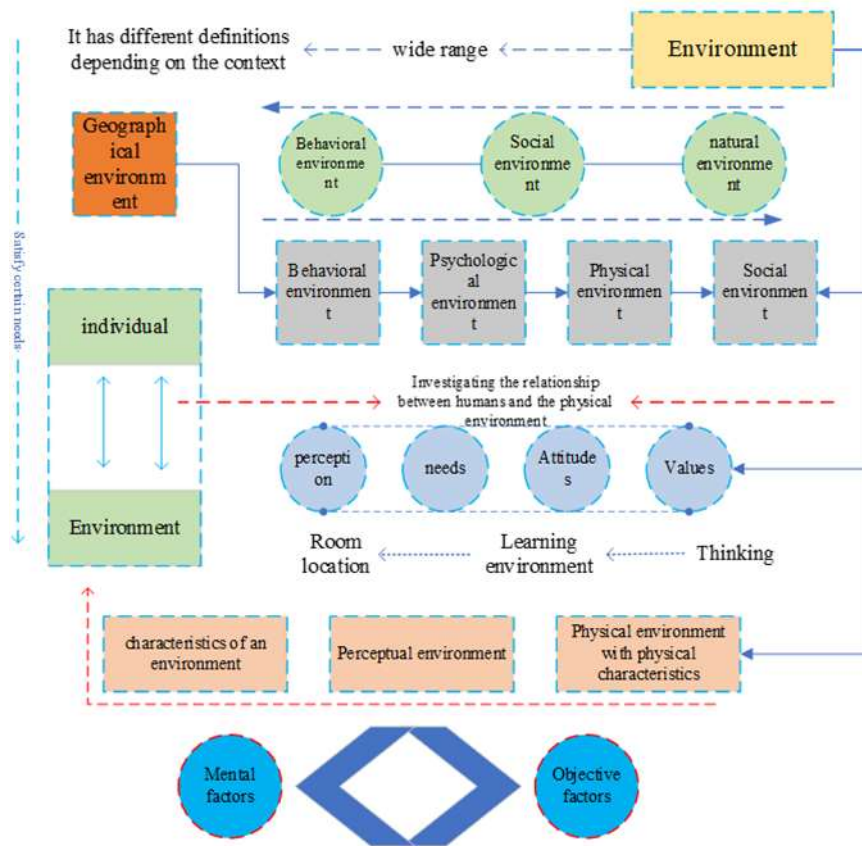


Fig 1 Summary chart of basic concepts

4. Research Methodology

The research method in this study is based on the developmental-applied type and in terms of the nested hybrid method approach. In the qualitative phase, a semi-structured interview is used to extract the environmental components of the educational corridors, and the results are entered into the ATLASTI software to reduce the texts and open and central coding with a code letter system and easier labeling. Sampling is for semi-structured interviews with snowball experts with the criteria of entering the research. Interviews are conducted until theoretical saturation, 34 people are interviewed, and repetition happens from 28 people. Delphi is used for the reliability of the results

and the correctness of the instrument (correctness of the items). Questions are formulated based on basic concepts in theoretical foundations. After extracting the components, a questionnaire with a Likert scale is compiled based on each component and is provided to the final year undergraduate students. This is the beginning stage. The results are entered into the JMPSAS16 software and analyzed with inferential and descriptive statistics. The sampling is random and cluster and the upper limit of the Morgan table is used to calculate the sample size. And the number of 384 people is selected. To check the validity of the research, the CVR formula is used, which is 0.71 for 20 experts, and Cronbach's alpha is used for reliability, which is 0.81.

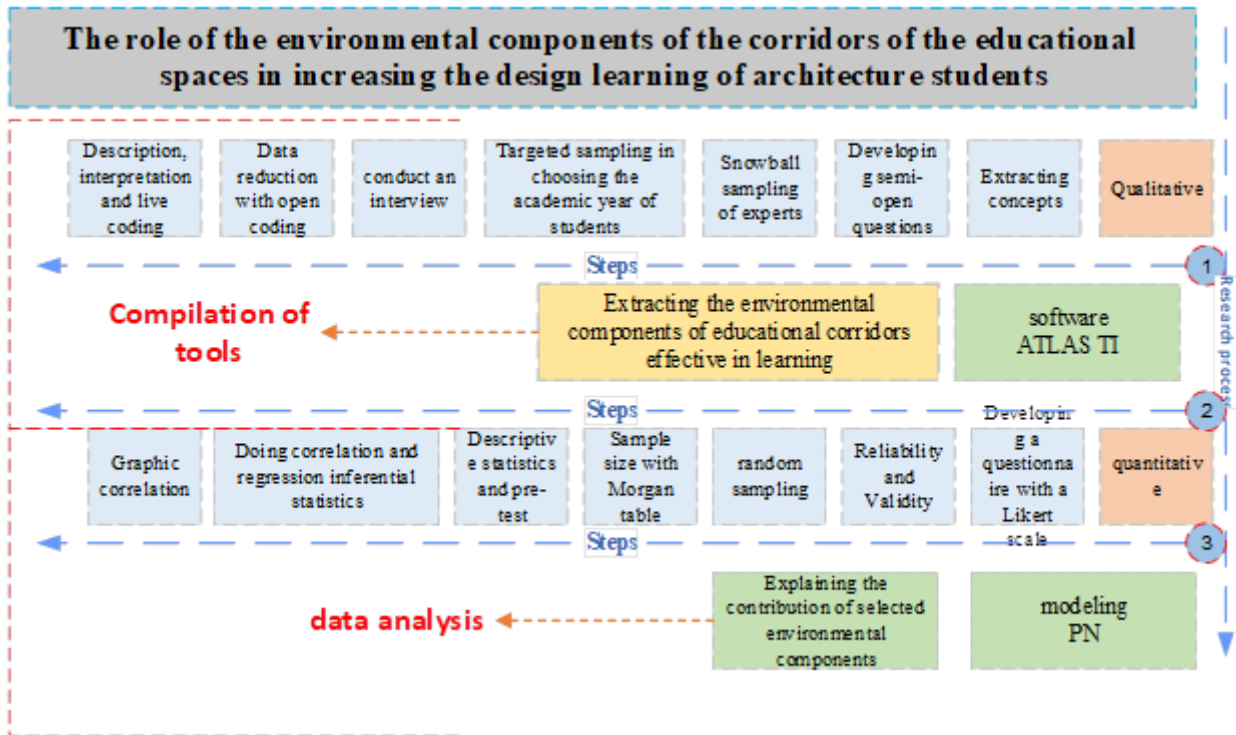


Fig 2 The process of the research method in this research

5. Qualitative Findings

The interviews were continued until theoretical saturation and data repetition of the texts, for this reason, 46 people were interviewed, and the results of the 36 interviews were repeated. At this stage, the interviews are converted from spoken to written in text format and entered into ATLASTI software, and labeling is started based on three approaches, description, interpretation and live coding in the open coding stage. Then, based on the components, the expert panel starts to code the components based on the central format (themes, concepts). At this stage, a general axis is used to connect the components with each other, and that is how the components are used in the environment.

In the coding phase, 38 codes were extracted first, and after summarizing the data based on the main categories and concepts, the number of codes reached 34. The most prominent is related to the component of multi-functional spaces with 29 and the least repeated is related to routing with 7.

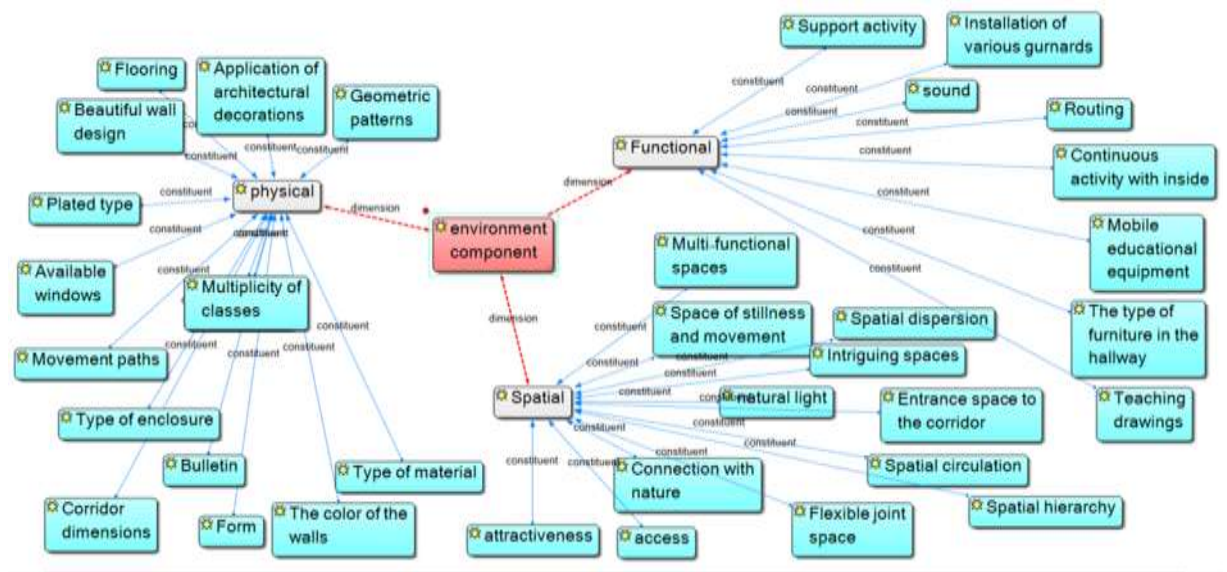


Fig 3 Selected components from the open and central coding of interviews with intellectuals in the ATLASTI9 software.

6. Quantitative Findings

According to the results obtained from the descriptive statistics, 256 people (66.6%) of the sample size are men and 128 people are women (33.3%) in the age group of 20-30, 30-40, 40-50, 50- It has been 60 years. The working method is such that for the effect of each criteria on each of the environmental components of the educational corridors, a question is formulated and provided to the space users. Each question has an answer between 1 and 5 (very little to very much). The sum of the scores of the indicators of a component means the score that each person gave to the desired quality, so the score that can be obtained for each quality is between 1 and 5. So, their frequency range is between 384 and 1920 for each component in each circle. The results show descriptive statistics and data distribution. The highest frequency is related to activity support with a value of 1901 and the lowest is related to existing windows with a value of 1011. The support of the data distribution of the moving average emphasizes the high accuracy of the extracted environmental components in the measurement of learning.

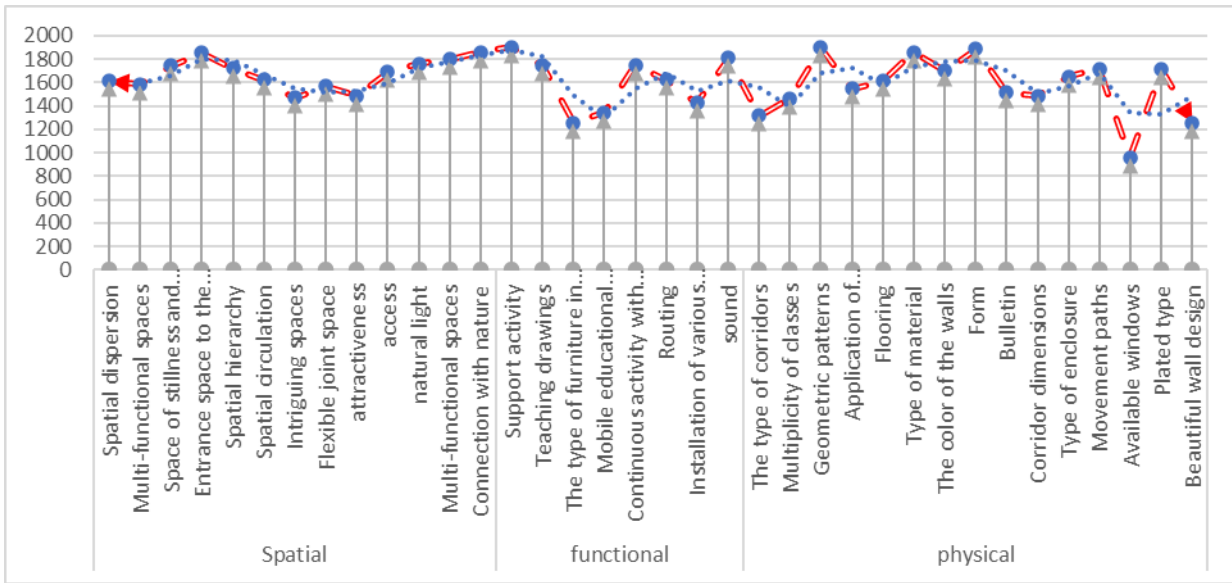


Fig 4 Frequency chart of environmental components of educational corridors

7. Inferential Statistics

In this stage, after choosing the selected variables in the qualitative stage, a questionnaire is compiled and randomly distributed among the users of the space who are final year architecture students. The questionnaire is shown. The results are entered into the JMPSAS16 software, predictive relationships (regression) and correlation relationships are used for analysis. Two-Sample Kolmogorov-Smirnov Test is used to check the parametric and non-parametric type of data.

Table 1 Kolmogorov-Smirnov test to check the normality of the variables of environmental components of educational corridors

Variable	Average	Standard Deviation	Z Kolmogorov Smirnov	P
Environmental components of educational corridors	21.32	11.6	0.417	0.194

As can be seen in the above table, the Kolmogorov-Smirnov test for the score of the environmental components of the educational corridors is significant ($p=0.194$) and therefore their internal and external output do not have a normal distribution and non-parametric analysis should be used for it. Based on the results of inferential statistics in the Spearman correlation stage, it is determined that the highest correlation between the activity support component and other components is with the value of 0.941 and the lowest correlation is related to the bulletin board with the value of 0.162. The significant amount and low value of the components indicate the high influence of the components on each other.

Table 2 Spearman correlation of environmental components of educational corridors

Dimensions	Variable	The correlation coefficient	The significance level	Degrees of freedom
Spatial	Spatial dispersion	0.762	0.001	383
	Multi-functional spaces	0.372	0.004	383
	Space of stillness and movement	0.872	0.011	383
	Entrance space to the corridor	0.685	0.012	383
	Spatial hierarchy	0.597	0.008	383
	Spatial circulation	0.436	0.008	383
	Intriguing spaces	0.852	0.006	383
	Flexible joint space	0.665	0.005	383
	attractiveness	0.813	0.017	383
	access	0.425	0.014	383
	natural light	0.414	0.021	383
	Connection with nature	0.421	0.022	383
	Functional	Support activity	0.941	0.002
Teaching drawings		0.615	0.001	383
The type of furniture in the hallway		0.424	0.004	383
Mobile educational equipment		0.423	0.011	383
Continuous activity with inside		0.454	0.012	383
Routing		0.341	0.011	383
Installation of various gurnards		0.578	0.013	383
sound		0.514	0.014	383
physical	The type of corridors	0.542	0.012	383
	Multiplicity of classes	0.541	0.011	383
	Geometric patterns	0.654	0.014	383
	Application of architectural decorations	0.221	0.013	383
	Flooring	0.521	0.021	383
	Type of material	0.522	0.001	383
	The color of the walls	0.524	0.004	383
	Form	0.619	0.011	383
	Bulletin	0.162	0.012	383
	Corridor dimensions	0.812	0.008	383
	Type of enclosure	0.532	0.008	383
	Movement paths	0.852	0.006	383
	Available windows	0.725	0.005	383
	Plated type	0.711	0.017	383
	Beautiful wall design	0.762	0.014	383

To use the type of linear or multivariate regression, the internal correlation matrix diagram of the variables is used. After drawing the correlation matrix diagram, it was found that the factors have no linear relationship, so it is correct to use multivariate regression.

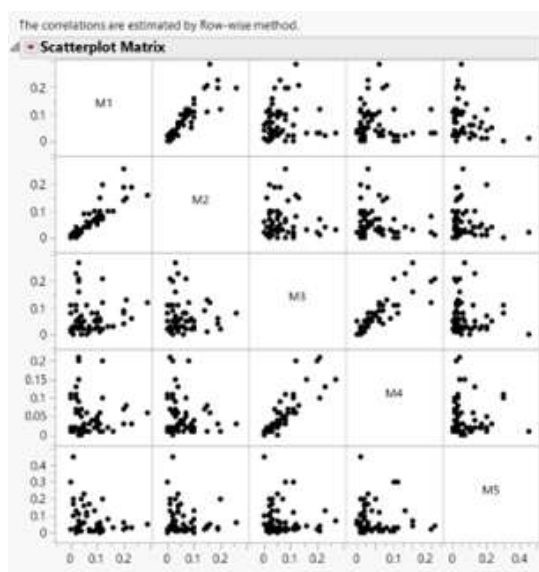


Fig 5 Diagram of correlation matrix of factors

In the spatial dimension, the attractiveness component with the coefficient of determination (0.213) has the least contribution to the students' learning, and the most related to the space component of stillness and movement with the value (0.872) in the functional dimension of supporting activities with the value (1.000)) has the largest factor contribution in students' learning and the least is related to the type of furniture in the corridor with the coefficient of determination (0.224). In the physical dimension, the bulletin board component with the value (0.132) has the least effect on learning and the dimensions of the corridors with the value (0.952) has the largest factor contribution in students' learning.

Table 3 Multivariate regression of environmental components of educational corridors effective in learning

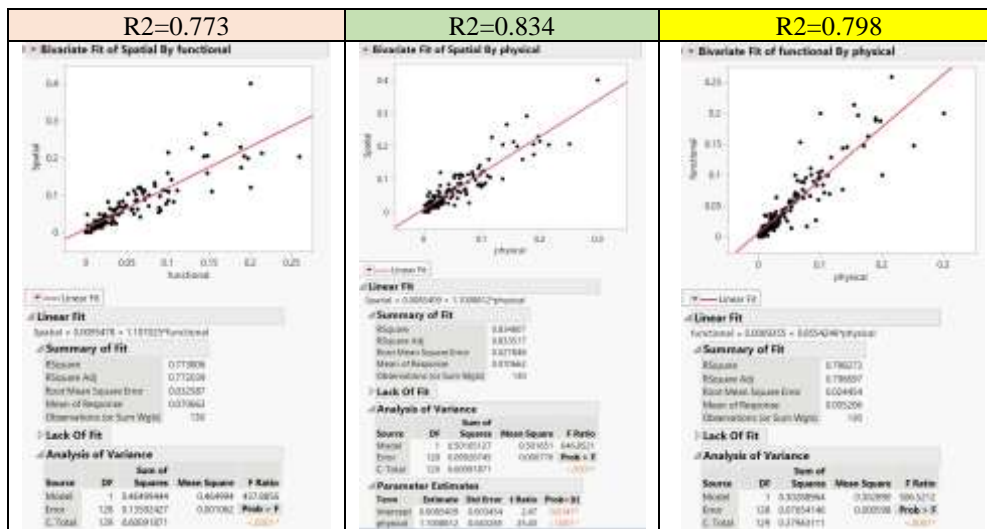
Dimensions	Variable	Coefficient of determination	The significance level	F	β	t	Degrees of freedom
Spatial	Spatial dispersion	0.762	0.001	342/411	0.741	571/44	383
	Multi-functional spaces	0.372	0.004	446/444	0.429	365/31	383
	Space of stillness and movement	0.872	0.011	752/985	0.623	255/31	383
	Entrance space to the corridor	0.685	0.012	223/211	0.685	479/58	383
	Spatial hierarchy	0.597	0.008	773/225	0.621	982/21	383
	Spatial circulation	0.436	0.008	681/653	0.652	134/11	383
	Intriguing spaces	0.852	0.006	654/724	0.612	425/24	383

	Flexible joint space	0.665	0.005	621/741	0.381	132/23	383
	attractiveness	0.213	0.017	325/512	0.484	121/48	383
	access	0.425	0.014	748/276	0.464	963/47	383
	natural light	0.414	0.021	125/302	0.421	564/43	383
	Connection with nature	0.421	0.022	034/519	0.631	448/49	383
Functional	Support activity	1.000	0.002	125/521	0.124	214/15	383
	Teaching drawings	0.915	0.001	258/149	0.311	216/22	383
	The type of furniture in the hallway	0.224	0.004	214/315	0.325	552/22	383
	Mobile educational equipment	0.723	0.011	371/458	0.425	354/18	383
	Continuous activity with inside	0.884	0.012	695/325	0.223	341/32	383
	Routing	0.841	0.011	937/621	0.529	324/23	383
	Installation of various gargards	0.778	0.013	210/521	0.679	839/28	383
	sound	0.714	0.014	312/520	0.628	581/48	383
physical	The type of corridors	0.542	0.012	382/752	0.542	566/48	383
	Multiplicity of classes	0.541	0.011	317/645	0.574	698/29	383
	Geometric patterns	0.654	0.014	235/456	0.456	214/32	383
	Application of architectural decorations	0.221	0.013	125/423	0.202	807/16	383
	Flooring	0.521	0.021	405/121	0.301	458/13	383
	Type of material	0.522	0.001	415/161	0.517	458/36	383
	The color of the walls	0.524	0.004	325/512	0.603	542/20	383
	Form	0.619	0.011	748/276	0.518	310/39	383
	Bulletin	0.132	0.012	125/302	0.361	725/28	383
	Corridor dimensions	0.952	0.008	034/519	0.919	811/26	383
	Type of enclosure	0.532	0.008	125/521	0.765	231/23	383
	Movement paths	0.852	0.006	258/149	0.338	128/21	383
	Available	0.741	0.005	325/512	0.716	821/65	383

	windows						
	Plated type	0.931	0.017	748/276	0.985	316/55	383
	Beautiful wall design	0.862	0.014	125/302	0.326	411/43	383

In the next step, graphical correlation with curve fitting is used to predict each dimension by other dimensions. The results show that the dimensions have a high correlation with each other, and by addressing one aspect, other dimensions can be influenced and controlled. The order of the high degree of relationships is shown in the Table 4, which includes first (spatial and physical) with a value of 0.834, then (physical and functional) with a value of 0.798 and finally (functional and spatial) with a value of 0.773.

Table 4 Correlation of the environmental components of educational corridors effective in the learning of architecture students



Because it is not possible to use all the components together, in order to increase their efficiency, it is necessary to find out which one of them increases the learning effect. In PN modeling, it is found that the use of components in the following categories increases learning by 80%, 65%, and 43%, respectively:

- 1- Spatial hierarchy, spatial dispersion, multi-functional spaces, continuous activities with the interior, supporting activities, embedding diverse functions, curious spaces, form, -----(80%)
- 2- Embedding various functions of access, color of walls, attractiveness, multiplicity of classes, use of architectural decorations, type of corridors, spatial distribution, -----(65%)
- 3- Flooring, types of spatial circulation materials, multifunctional spaces, connection with nature, natural light----- (43%)

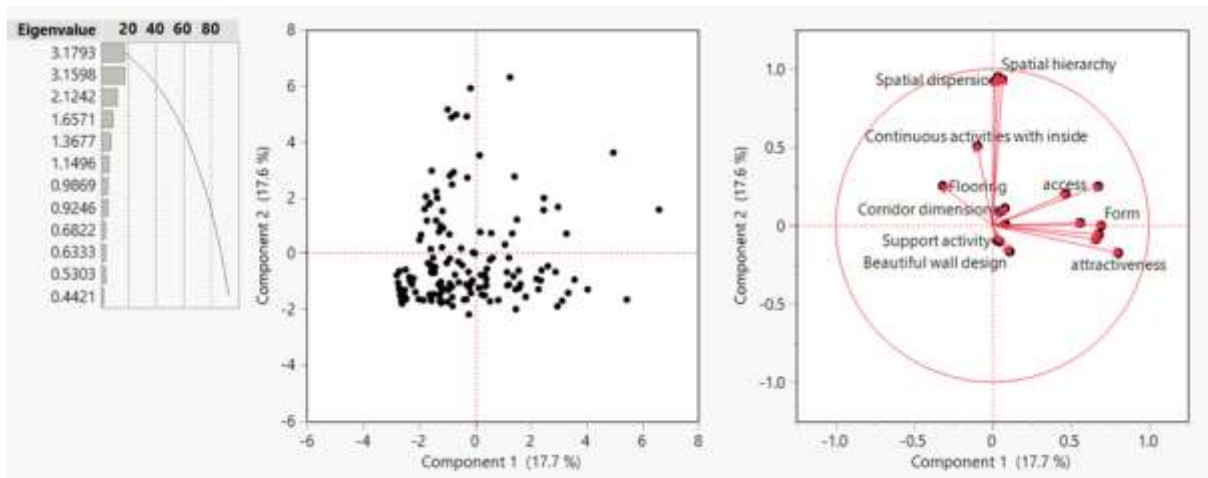


Fig 5 Modeling the environmental components of educational corridors effective in learning

8. Discussion

In this research, it was found that 38 codes are extracted and 34 codes are selected. The emphasis of the experts is on the multi-functional aspects of the space. This gives the space the ability to transform into different educational situations. These spaces emphasize various aspects that include three general functional, spatial and spatial dimensions. To make it easier to recognize the type of effective components, we put them in these three categories, the results of descriptive statistics are inconsistent with inferential statistics, and the results of inferential statistics should be paid attention to for accurate inference. The moving average support of the data distribution shows the accuracy of the tool and makes the results more accurate. The component of supporting activity in space can increase the learning of final year architecture students in such a way that if an activity is defined in space, all spatial and physical aspects should support it. According to experts, physical and spatial aspects have more components than functional ones, but based on the averages of inferential statistics, the largest contribution is related to performance. Spatial components can create more correlation with other components individually, and by using them, other components can be improved in order to increase students' learning. But contrary to popular belief, the objective components that have an objective aspect in the space have a lower average and the bulletin board component has the least effect in improving other components. Also, the dimensions and size of the corridors, support for activities, the combination of stillness and movement have an important role in the formation of the learning of final year architecture students. Based on the graphic correlation model, with the accurate application of one of the dimensions, other aspects can be improved in order to increase learning. This case can lead to the revitalization of educational spaces using development stimulating projects. Also, with the method of extracting a limited number of components, it is possible to significantly improve the learning rate by applying the components accurately.

9. Conclusion

The educational environment and its constituent elements can lead to an increase or decrease in the level of education in individuals as a restraining force and as a facilitating factor. Academic

spaces in the field of architecture are not limited to walls, rooms, or their physical elements. The educational corridors in these spaces can carry a message for students and impose customs and habits on them as transmitters. The educational environment is always a place where learning takes place. It happens and it should be designed in such a way that young people and students can separately understand the environment in line with education. This research showed that environmental factors in educational corridors can be classified into three functional, spatial and physical categories. And according to the findings, it is clear that the type of performance in these spaces can improve the students' learning more. In this research, the spaces that support the type of activity in the space give the students the knowledge that they should consider the benefits of it at the same time as designing a diverse space. should be taken that can be supported based on the body. The following solutions can be provided for the design of the environment in the educational corridors;

- Designing multifunctional spaces in educational corridors to achieve various activities and create spatial diversity
- Using flexibility indicators in fixed and movable furniture in different spaces to create different uses
- Creating space enclosure and continuity between intermediate spaces and educational spaces by using the combination of inside and outside space.
- Creating spatial rhythm by using spaces of stillness and movement and creating spatial hierarchy by using rhythm in space

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