Compatibility of Spaces Organization of Islamic Schools with the characteristics of the contemporary learning environment

A.M.H. Al-Moqaram¹, R.R.F. Al-Amara²
¹Architectural Engineering Department, University of Technology /Baghdad
²University of Basra, collage of engineering, Architectural Engineering Department

Abstract. Most of the Islamic schools were characterized by distinctive features, which formed a certain pattern, on space organization (building layout and spaces arrangement) and spaces relationships, as a reflection of compatibility with learning system throughout history. On the other hand, a set of characteristics of contemporary schools, both at the intellectual, social and physical level, emerged as a "self-organizing learning environment". The research hypotheses, that there is compatibility in the spatial characteristics of the learning environment of the Islamic schools with the characteristics of the contemporary learning environment, especially with the self-organizing learning environment. The research problem identifies as" The need to determine the compatibility levels in learning environment between Islamic and contemporary schools". The evaluation methodology was adopted by applying the characteristics of the contemporary learning environment like Openness and Connectivity on samples of Islamic schools, after analyzing the results, and determining the conclusions. The most important of these is that the contemporary ideas in learning, especially those related to the physical environment, have already been achieved in the old Islamic schools and their historical and intellectual origins are realized by modernity and modernity.

1. Introduction
The modern trends of learning are considered one of the most important topics on which lights are shed in the current time, due to their positive impact on the learning movement and development, which upgrade the educational process. The research attempts to find a relationship between contemporary learning and Islamic learning because of their common characteristics on one hand. On the other hand, the characteristics of the spatial organization of Islamic schools and contemporary environments are of some compatibility in terms of spatial regulatory characteristics.

2. The linguistic and terminological concept of school
A place or a site in which institutionalized study is held, a regular course of meetings between teacher (s) and students to teach with the education program. It means a group of philosophers, artists, and writers whose ideas, works and methods reflect a common origin, influence or belief. A group of opinions agreed by a group of people, forming a vision. They have a distinctive way of thinking, Follow-up approach to reach the goal, it is a necessary social institution, aims at ensuring the process of communication between the family and the state in order to prepare the new generations, and integrate them into the framework of social life.

3. the concept of school as a system
A social phenomenon with extensive components and functions. It is a complex system of organized behavior that. It aim to achieve a number of functions within the existing social framework. It forms a
vital, integrated and interactive system of elements, dynamics, events, concepts and functions that are connected according to the logic of living systems A Al Naqeeb\textsuperscript{13}

4. the history of Islamic schools
School as an architectural entity are considered as a distinctive style in the Islamic architecture after the mosques. Whereat the beginning of the Islamic Invitation, the education was performed in mosques, then moved to schools, which indicates the start of new era in the development of Islamic architecture on the one hand and the flourishing of the science movement on the other, where lessons circles are held to present and explain belief and laws (shariah) issues Al Hafsa\textsuperscript{6}. The start of Islamic schools emerged because of a number of factors:
The natural evolution of different sciences and the increased interest of people in the importance of receiving them. For this reason, the mosques were filled with several seminars, not one.

- Various sciences have emerged which have necessitated the need for continuous dialogue and discussion among the students, which is inconsistent with the characteristics of the mosque that requires space for silence and peace.
- There are other factors associated with considering education as a profession and means of support and there must be places dedicated to it to ensure the gathering of students and the necessary attendance.
- Education was also considered as a means of spending, as the dissemination of science and education is one of the doors of tunnels for the sake of God.

5. The patterns of Islamic Schools:
The patterns and components of schools have differed due to the historical periods in which they emerged, the Abbasid and Ottoman eras are considered to be among the most diverse periods in Islamic schools in terms of patterns and components. Where the Islamic schools in the Abbasid era Al Adhami were composed:
The square or rectangle layout with an open central courtyard surrounded by other school facilities, this courtyard is the largest part of the overall layout of the building. The presence of Iwans (A hall with three walls only and the fourth completely open to the air) which are overlooking the middle arena, they vary in number according to different schools, some contain one Iwan and others include more than one, sometime a school may contain four Iwans. The presence of chambers and rooms with providing large halls for teaching, additionally some schools contain a mosque, making the function of the courtyard sometimes to pray in the absence of sufficient space to pray in the mosque. In the Ottoman era, three types of Islamic schools emerged Al Haddad\textsuperscript{15}, as follows:
- The first pattern: the traditional pattern, which consists of an intermediate hall, surrounded by hallways from all sides. According to this pattern, schools were classified into two types: a type attached to the architectural complexes, where study halls are designated for study only, and the type of independent schools where halls serve as a mosque in addition to being a teaching area.
- The second pattern: the pattern that combines the square shape from the outside and the octagon in the inside, where the middle courtyard takes the octagonal shape.
- The third pattern: The classical pattern is based on its design as a part of the mosques, where the central courtyard of the school became a sanctuary for the mosque on the one hand, and study space and the gathering of students on the other.

The physical planning of the schools - then - was based on three basic types. The first is the Iwan system planning, which is an open or covered hall surrounded by four Iwans, the largest and deepest of which is of the (Qiblah Iwan). The second planning is the hallway around a hall or (house of the hall), it is a hall surrounded by four hallways, and sometimes the ceiling of the hallway is mediated by a dome that is rising from the rest of the ceiling and has been opened by several windows for ventilation and lighting. The third type of schools planning is one or more chamber planning, it is one of the simplest and oldest architectural methods used by man in the construction of facilities, in addition to its continuity and prevalence\textsuperscript{3}
6. The concept of the environment of modern learning:
The learning environment, in accordance with contemporary trends, is a place, space in terms of material, society or a form of action that intellectually enhances the process of learning. The physical order of the educational classes means that it is based on discipline, the organization of educational activity and how the learner is integrated into educational tasks. This place is based on providing educational services according to specific objectives and includes all aspects whether they were physical or moral, achieving the interaction of its members within a certain system H Tumusiime. It is a complicated system connected to changes surrounding the learning or contexts that affect achieving interaction among learners from one side, and how to adapt with the environment, which is represented by the educational space that supports the social and spatial interaction controlled by the curriculums followed by the responsible body on the other side. In positive learning environments, learners are encouraged to achieve their potentials, give them the capability to intake their individual needs and learning preferences and to handle sensitively with the issues arising within the groups, these environments are established through the process of self-organized learning. These environments are based on dialogue, depending on the collective property, self-organizing and the amount of attention given to the interrelated aspects with the learning process based on deep collective orientation and how to redirect them according to active and efficient work R Al-Amara.

7. Studies that addressed Islamic schools:
These studies can be mentioned in two groups: A group that addressed Islamic schools in terms of design. Where Al Omari's study highlighted the Islamic schools in terms of space organization by applying the rules of space installation by addressing a number of Islamic schools in different periods in terms of (horizontal projection, relation between spaces, open space, and spatial depth), and the relation of classrooms with the middle yard H R Al Omari. Also focused on characteristics of the Islamic schools, which were characterized by engineering, directivity and direct entrance, especially in the Abbasid era, or the open engineered courtyard, and the broken entrances, which combined engineering and membership M Ntasa.

Another group addressed contemporary learning environments. Bisset referred to the characteristics of contemporary learning environments compared to traditional environments, including space-related characteristics such as high flexibility, technology and furniture, and their impact on the concept of education and contemporary learning curricula represented by increasing the interaction between learners which was absent in the traditional learning environments Jo A Bisset. While Upitis has pointed to the importance of activation of outer spaces and their relationship spaces in order to support the interaction between learners through making them interactive systems with the educational space RUpitis.

It is concluded that studies have examined physical characteristics of Islamic schools per se, other studies addressed contemporary learning environments, their characteristics and their relation to contemporary education, and some studies compared contemporary and traditional education. However, no study has examined the relationship between contemporary education and Islamic education, their extent to which the design of Islamic schools is close to the design of contemporary learning environments considering that the idea of contemporary education was present in the Islamic thought.

- Research Problem: Lack of information about the compatibility of learning characteristics between Islamic vs. contemporary schools, in special in the learning within contemporary spatial environment and learning in old Islamic spatial environment.
- Research Objectives: determine the characteristics of contemporary learning environments within old Islamic schools, in order to identify the level of compatibility between them. This will be solved through two stages: first, Building a conceptual framework about the characteristics of the spatial organization of Islamic schools according to their degree of compatibility with contemporary learning environments, after clarifying
the concept of education and Islamic education and the most important methods in which it converges with contemporary education.

Second: Determine measurement methods and data analysis, drawing findings, conclusions, and recommendations.

*Figure 1* shows the structure adopted in the research.

---

**Figure 1.** shows the structure adopted in the research

---

8. **The conceptual framework**

The contemporary learning environments are based on the interrelation among three essential systems: social system represented by a learner, teacher, and the interaction between them. Conceptual system: represented by contemporary learning systems and its characteristics. The physical systems where it is related to the characteristics of learning spatial R Al-Amara. In order to determine the degree to which contemporary learning environments are compatible with Islamic schools, two core points are introduced due to those systems, The first axis: conceptual system: the systems of contemporary education and Islamic education. The second axis: physical system: the characteristics of the spatial organization of the contemporary learning environments and Islamic schools.

8.1. **The first axis: the systems of contemporary education and Islamic education**

This paragraph addresses the concept of contemporary education with Islamic education; the methods were adopted by the Islamic education, which converges with contemporary education and the most important characteristics it was featured by. Following those, aspects are explained:

8.1.1. **The system of contemporary education**

- This system has emerged as a result to the traditional education to enhance the level of the educational process and learner by moving him from the framework of traditional education to a contemporary learning framework, depending the contemporary approaches that depend on solving the problems. In addition to the role of an educational environment, that affects how the method of handling the contemporary approaches Midgley G. Contemporary education is identified as the framework that can be achieved by the effect of space on educational practices, this type of education depends on guided activities and following the educational methods based on self-motivation, problem-solving. Learning through discovery and practical work that require spaces that are different from traditional spaces supported by special furniture equipment and specialized teaching cadre. While traditional education system, also named the formal education, which depends on the flow and output of information from teacher to student. The effectiveness of this education depends on the transference of knowledge by introducing a various group of exercises. It is also considered as an education that is organized according to a certain structure of a specific and clear target for
acquiring knowledge along with a group of skills OECD. Table 1 shows the details of contemporary education.

| contemporary methods                        | contemporary characteristics of learning                                                                 |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Practice and practical application-based    | Acquiring knowledge and skills though enhancing the performance and learners participation.               |
| learning                                     | Enhance conversations, live discussions; develop social networks that motivate learning.                    |
| Problem-based learning, status-based        | Raise the learner’s ability to self-thinking, dialogue and self-dialogue and his self-awareness level.      |
| learning, project-based learning            | Enhance the motivation, personality and the learner’s willingness, learners use technology and investigation to deal with cases and issues related to a certain project. |
| Conversation and discussion-based learning, |                                                                                                          |
| verification-based learning,                |                                                                                                          |
| Unofficial learning                         |                                                                                                          |

8.1.2. The Islamic education system:

- The Islamic educational system in its inception is an automatic popular system. The institutions of this system did not take inflexible single form; they were plural in their forms according to the objectives of any educational institution, as Institutions for memorizing the Qur’an and to know the fundamentals of the Islamic religion. The mosque, which collected deeper and plural studies of the Islamic religion. The school were dedicated to a more specialized and specific study, that required a full-time learner, and to reside within the school. Bimaristans which were specialized in receiving medical sciences, observatories for astronomy and many other diverse educational institutions created by a social need which was taken into consideration by the Islamic government, Al-Attas Sayyid. As for education, it classifies two types of education in Islam, official education and unofficial education.

- Unofficial education is presented through social institutions like mosques, libraries, houses of researchers and literary exhibition. From the start, the mosque became the place of worship and the first in Islam; therefore, it was the main place for the spread of education and Islamic sciences. Once the mosques were developed, internal seminars were established for years and centuries in various Islamic countries.

- Official education is represented by schools, colleges, libraries, and cultural centers established for teaching.

8.1.3. Education methods of Islam

- The methods of education of Muslims have varied and differed according to the diversity of sciences and knowledge. Some of these methods were related to the most important contemporary education methods as self-learning, attendance, dictation, narration and discussion, and dialogue or debate:

- Self-learning: it is considered a very important method on which contemporary education was based; it is also the most important method in the Islamic education system. Muslim scientists showed a significant awareness for the importance of the self-learning, accordingly, they showed an attention to learn about it. Although copy machines were not available, they copied a significant number of books by their handwriting or using writers Al-Naqeeb.

- Teaching by Dictation method: with the absence of typing, both teachers and education depended on copying, where a teacher dictate students some subjects and ideas of a certain issue, which include mentioning previous opinions about it, then discussing the ideas raised and address teacher’s scientific experiments in the same issue.

- Education by preaching, advice and commandment: the basic method recommended in the Quran is through is preaching and advice. This has the greatest impact on the learner in his response to his religion, his attitude, his phycolgy and his vision about the society. A considerable amount of education is the learner’s responsibility, and this method was used for a young person’s education Ahmed M.
• Learning by dialogue and discussion method: Islamic thought encourages debate and dialogue in education; it is necessary for the learner to study and debate, where these debates take place in a scientific atmosphere characterized by the search for the truth to extract the right thing. This method was considered a good tool to exchange ideas and opinions between teachers and learners, where questions are asked to attract their attention and awake their ideas. It is to be a better method than repetition, which is one of the elements of this method. It also takes the form of a dialogue between two (or more) persons as questions and answers about a certain topic Al-Naqqeb.

• There are many procedures to make dialogue-interesting al-Khalediy, they are as follows: Stimulating feelings through including the topic in real events. Stimulating the learner to follow the discussion, which helps him to conduct a conclusion, positive dialogue, is a method to persuade some cultured men to be Muslims. This approach was found to be successful and forces the opponent to accept the proofs presented to him. This method helps to approach a new topic through an example close to learners’ understanding or within their range of experience, through laying down the example or in other words, comparative drawing. Prophet Mohammed (God prays on him) used this method and the world “Barbie” means literally “example” or “comparison”.

• Teaching through Practice and Application: teaching through application method influences the soul and emphasizes knowledge. Activities and practices are connected by exchange force with all learning elements. The activities or learning cannot be separated from the content, goals, and motives, for activities are resulted from motives lead to that Ahmed M.

• 8.1.4. Islamic learning properties
• The properties of contemporary education are gathering as teaching workshops and the freedom of movement within the educational space, while in Islam the schools of Muslims were their Mosques, they used to call the students gathered around the teacher to receive a science of the sciences as (loop). ‘Figure 2’. Sciences brunched out throughout the years, and their loops expanded that each science had many loops. Most often, a scientific loop is attributed to its teacher. Following are the most important properties of this method (looping learning) I Samaneh.

- The essential point, in loop learning is the absolute freedom of the student to choose both loop and teacher, which enables him to immediately participate in the loop and learn different things in many sessions, also he can drop one loop and join another and choose another teacher.

- Over centuries, this method has been effective, where the educational structure is connected to the diversity of the educational spaces as house, mosques, and libraries and so, it was therefore limited in the form it could take.

- Loops are formed normally anywhere, the pattern of the loop can take place in any place, big, small, closed, open, square, rectangular or circular, the form of loop is the form of its interior space. Also, it can form a closed space in public environments as mosques and public libraries, despite the people’s presence in these places al-Khalediy.

- Islamic educational system plans to emphasis the multi-lateral discussion considering it as an essential base to the successful education. The goal of the system is the learner, where he is the participant in the educational process through search and discussion. Also the pattern of the loop suites the financial conditions for active and responsible participation for all students. In fact, the loop pattern allows interaction and development between a teacher and students. The nature of education at that time was exchange in order to reach the depth of topics, especially the religious ones and enhance the student’s in-depth understanding for subjects T Sara.

It can be concluded from above that Islamic education is approaching contemporary education in many characteristics (interaction, focus on the learner, freedom of research and discussion through the loop
method, an education based on constant exchange among learners, it can be held anywhere within
schools, developing the relationship between the learner and student).

Figure 2. method of contemporary and Islamic ring  

8.2. Design characteristics of contemporary learning environments with Islamic schools.
8.2.1 Characteristics that are related to spaces themselves
They are characteristics that connect environments of the contemporary learning and Islamic schools, including the characteristic of openness and multi-use or specialized use characteristic. An explanation of these characteristics is shown in the following paragraph:

- First: Openness: Openness of space means exposure and it is against closeness and has been embodied in contemporary learning environments with two aspects: The first aspect is related to the educational practice represented by giving the learner the freedom to express his opinion through the exchange of ideas and information among learners. The second aspect is related to the physical aspects of the learning environment through reducing the isolation and increasing the openness between space, which is achieved by increasing the ratio of the width of space to its height by (1<D/ H<2) that makes the space balanced between openness and the closure. Also, it can be achieved by reducing the number of walls to increase the area of space and use glass and mobile partitions R Al-Amara. As for Islamic schools: this characteristic has been related to the levels of spaces in which the learning process took place, which is classified into three levels due to the openness degree, they are: First level: open space: it represents courtyard, the open space in Islamic schools due to its design characteristic in term of openness. Many cultural, social and financial factors have come together to build the courtyard and set it as a place for non-official study loops of students. The courtyard also represents a transitional space to prepare mentally and physically for prayer, teaching and learning court due to features owned by this place as: A place for silence, away from noise and turbulence within the contemporary the surrounding context. The physical factor is strongly related to the climatic adaptations, as hot weather in the area, which was the only method to protect people of high temperatures, provide them a comfortable space for students’ gathering, and meet the religious need ‘Figure 3’. Second level: semi-open spaces: represented by the balcony, it wasn’t a place for only teaching process by teachers, instead, many training and teaching parts were preformed within the balcony through mutual learning and teamwork, the spatial dimensions and characteristics of the semi-open balcony space make it a suitable place for educational activities. Educational material and content are presented in a way that can be useful for both advanced and primary students, in order for students to freely participate in some learning groups (such as what currently named seminars) and lecture courses, the semi-open spaces as balcony (Iwan) were necessary so that students could easily join or separate them. This participatory interaction would only occur when the teaching is as a loop. That the Islamic school environment was not completely closed, nor was it restricted to the use of the public and the local population. This space was almost open to the public’s freedom, especially for
religious programs. For this reason, the balcony as space is almost open and the courtyard as open space are highly effective spaces for people who are outside the school and wish to enter and participate in educational activities. ‘Figure 4’. Third level: enclosed spaces: they are represented by chambers, small rooms, large halls in addition to rooms made for students’ residents. Some Islamic schools may contain a mosque, which is used for prayers and as a large hall for learning loops S Irvan⁴.

| Table 2. The multi-use property of space type in Islamic schools |
|---------------------------------------------------------------|
| **Contemporary education environments** | **The characteristic of use** | **The spaces of Islamic schools** | **The property of use** |
| street space | Learning spaces of high openness, they are unclosed from the side of the classroom, exposed to very high traffic by learners and considered as a basic access point to other educational paces. | Internal courtyard | Used for forming science loops, the main space for movement within the school, and the gathering of students. |
| commons | Large, unclosed and semi-open area, connected to public spaces or classrooms and they are featured by the variety of educational activities. | Balcony (Iwan) | The balconies serve as teaching rooms, the ability to establish informal learning workshops, activities, events and educational programs, they are considered as a meeting place for the public to negotiate. |

**Figure 3. Method and location of students’ gathering as open space workshops, Ref: T Sara⁹**

- Second: the characteristic of multi-using or specialized use spaces: according to contemporary teaching, the contemporary environments of teaching are featured by high degree of multi-use for some spaces, especially large halls as multi-purpose halls, while some spaces are made for specialized use for which they are attached with certain means D Fisher¹⁸. Spaces in Islamic schools (open and semi-open as internal courtyard and balcony) and mosque which is considered as an extension in some schools were featured by being multi-use spaces, while enclosed study halls were featured by being used for only a single fixed function, that is teaching, to which the traditional schools lacked T Sara⁹. Table 2 shows the two previous characteristics in details:
classrooms  Semi-closed educational spaces in term or wall, their area is about (60 - 40 m²), and featured by being fully closed with flexible walls.

Classrooms (study halls)  Dedicated teaching spaces have a fixed function.

fixed functions

**Figure 4.** Method and location of students' gathering as open space workshops, Ref: T Sara⁹

- Characteristics of the relationship between spaces: The most important characteristics of contemporary learning environments and their degree of compatibility with Islamic schools are the relationships between spaces according to two characteristics: the relationship of connectivity from one hand and the ease of access among spaces on the other hand. Below an explanation of these characteristics is presented: First, connectivity among spaces: The connection between space and its relation to other spaces is related to the set of tours carried out by an individual within the system. A single tour is a movement carried out by individuals for moving from space to another space. In contemporary learning environments, connectivity was the extent to which spaces were linked to one another and its relation to the building as a whole from another side, through increasing the spatial boundaries linking them R Al-Amara⁵. The type of space relations can be determined by a set of relationships they are: Intersection relationship. This relationship is the extent of the convergence of spaces versus the degree of isolation, which is achieved by increasing the mutual boundaries between spaces, where contemporary learning environments are characterized by a high convergence between educational spaces that achieves a continuous interaction between learners R Al-Amara⁵. Convergence relationship: the relationship between two spaces through the existence of a third common space, represented by the presence of a large space surrounds and envelops a second smaller space. Adjacency Relationship: relationship of space within another space: represented by the presence of two spaces separated by a certain distance or by the existence of a third space connecting them. In Islamic schools, Iwans (balconies) appear, in addition to being teaching rooms, as spaces connecting the rooms and chambers of housing and study. 'Figure 5'. Second: Ease of access to spaces: The ease of access is related to how to move for the purpose of access to space connected with each other through spatial joints, where spatial joints are divided into two types: motor joints, which include doors, and intermediate spaces representative corridors, and visual joints, which increase the amount of visual linking and connection as windows or glass partitions. Contemporary learning environments are easily accessible to educational spaces with the presence of direct and movable glass-doors, and providing transparent slots that reduce the isolation ratio between spaces R Al-Amara⁵.
9. Practical Study
This section will identify the most important items of measurement related to the compatibility between the characteristics of the spatial organization of Islamic schools with contemporary learning environments, and determine the method of measurement, the means of measurement and sample selected for the purpose of the application.

9.1. Items of measurement
Two main terms were selected with their indicators, the openness, the item of connection among spaces (spatial depth) and the item of the relation among spaces as explained in the table 3, below: (the items of the practical framework):

| Table 3: items of the theoretical framework |
|---------------------------------------------|
| Main items | Secondary items |
| intellectuaI system | The compatibility of contemporary education systems with Islamic education systems |
| Freedom of dialogue and discussion among learners | A1 |
| Relying on the ring assembly method | A2 |
| Self-reliance in obtaining information | A3 |
| The freedom to choose the place for informal learning sessions | A4 |
| Continuing communication and communication between the members of the group after the completion of the seminar | A5 |
| Developing the relationship between the learner and the teacher | A6 |
| The learner worked in a seminar on a specific subject, depending on individual and collective work in that one | A8 |
| Properties associated with space | Levels of opening in spaces versus their degree of closure |
| Open space | The ratio of space width to height |
| Semi-open space | |
| Close space | |
| Multi-use space or specialized use | The possibility of changing the physical space according to use |
| C1 | |
| Possibility to control the type of functional use of space | C2 |
| Some spaces have a fixed function | C3 |
| Provide support technology to control space functions | C4 |
| Some spaces hold more than one episode and educational theme within a single space | C5 |
| Properties are related to the relationship between spaces | The relationship between spaces |
| No space joint | |
| There is a space joint | Interference relationship |
| Interference relationship | |
| Direct relationship | |
| Semi-direct relationship | |
| Adjacent relationship | |
| Type of space joint | Entries (door) |
| Corridors | |
| Communication between spaces | Number of nodes leading to space |
| Optical Axles | |

9.2. Measurement Method
It is based on two criteria: The first criterion is the direct indication of the characteristics achieved in the characteristics of the Islamic schools, both materially and intellectually compared to the characteristics of contemporary education. If (1-2) characteristics are achieved, the compatibility is
The measurement of openness variable according to ratios in the table: The measurement of relation among spaces (spatial depth). This measurement is made through numbering the spaces starting the basic space with the value (0) to other space with values (1-2-3-0000), whereas the value approaches (1) the relationship among space is considered strong, and as the value increases the relationship becomes weaker with depending (100%) for very strong relations, (75%) for strong relations, (50%) for medium relation and (25%) for weak relation. In order to evaluate the measurement of each characteristic in an Islamic school and to which extent they are compatible with the characteristics of contemporary learning environments.

- Measurement of communication between spaces: connectivity means the extent of convergence of spaces versus their isolation degree. The equation ((no. of nodes – 1)/ the motion axes) is depended, where the value is between (0 – 1) where (0) means that no connection is available among spaces and (1) means that there is high connection among spaces and results in the ratio of (100%). If the equation result (0.4) it means the ratio (40%) and so on.

9.3. Criteria of sample selection:
- Choose a group of Islamic schools of a system that reflects clearly the characteristics of Islamic schools.
- Measurements samples: a set of samples were selected, they are in Iraq Mustansiriya School, Sharabiya School and Sharabiya School in Aleppo.
- Mustansiriya School: it was established in the era of Abbasid caliph Al-Mustanser Bellah, on the Tigris River in (631 HJ – 1233 A.C). Its horizontal projection has a rectangular shape, with a rectangular courtyard, surrounded by Iwans, halls, and rooms. These rooms and chambers are divided into two floors, and there are rooms and halls between the main Iwans, some of which are dedicated for teaching and the other are for students’ residence Al Adhami. They are depended as a sample (A) in measurement. Table 5. ‘Figure 6’

- Sharabiya School: it was established in the era of Abbasid between (528 HJ – 1233 A.C), it is of a square-shaped horizontal projection. It surrounded by small chambers before which, corridors on the eastern, western and northern sides take places with a large Iwan in the middle, while the southern side is occupied by a large hall opens to the courtyard with three holes represent the school mosque, seven chambers overlook the from the east above which a
second floor is built, the second floor is similar to the chambers dedicated to the students’
residence. Behind the chambers, large study halls with two floors overlook on a long lobby.
This is depended as a sample (B) in measurement. Table 6. ‘Figure 6’.

- **Table 6. Details of the Mustansiriya School:** Source
  |
  | Sharabiya School | The middle courtyard | Iwan | Great halls | The mosque | Source |
  | Width | 20m* 21.50m | 5m * 8.50 m | 3.7m*8.4m | 4.5m*12.8m | Mahmoud13, 1989 |
  | height | Continuous openness | 9m | 12m |

- Dahabiya School: it was established in the Ayyubid dynasty as it was called (Dar Al-Akiki). It was built in Aleppo in the year of (606 HJ – 1219 A.C.) and was dedicated for the Shafi’i doctrine as well; it has occupied a rectangular area of (38 m * 29 m). It consisted of a rectangular courtyard surrounded with many rooms and halls from the eastern and western sides for students, at the end of these chambers, the entrance is placed in the middle before the entrance there are small rooms and halls, ‘Figure 6’. This is depended as sample (C) in measurement.

- **Table 7. Details of the Dahabiya School:** Source: The researchers
  |
  | Dahabiya School | The middle courtyard | Iwan | Great halls | Source |
  | Width | 15*18 | 6m*6m | 3m*6m | Bahnasi |
  | height | Continuous openness | 12 m | 5m | 2004 |

**Figure 5.** Islamic schools as measurement models. Ref: https://www.albawaba.com

10. Results, Conclusions, APPENDIX and Reference

10.1. Results

According to the theoretical framework, the results are divided into two types:

- The results of the conceptual system: due to the characteristics of contemporary education addressed in the table of the theoretical framework, the Islamic education achieved (75%) of these characteristics, which means high compatibility between Islamic and contemporary education, table (8).

- **Table 8. Results of measuring the property of the intellectual system**

| Property type | Characteristics of Contemporary Learning | Degree of compatibility |
|---------------|----------------------------------------|-------------------------|
| Islamic learning | A1 A2 A3 A4 A5 A6 A7 A8 | 75% |

- The results of the physical system: represented by analyzing the schemes on two levels (space characteristics level) and (the relation among spaces level).
  - Results of openness characteristic: this characteristic varies between high in the sample (A) and medium in samples (B and C), which indicates that ample (A) is compatible with contemporary learning environments more than samples (B and C). The obtained results are shown in ‘Figure 7’, Table 9.
Figure 6. shows the planned analysis of the internal dimensions accounts openness property, the three schools.

- The results of multi-use or specialized use: the multi-use characteristic of Islamic schools corresponds with the contemporary learning environments by a medium ratio. Concluded results are shown in table 10.

Table 10. The results of the multi-use of Islamic schools, source: the researchers

| Property type          | Multi-use or specialized use of contemporary learning environments | Degree of compatibility |
|------------------------|---------------------------------------------------------------|-------------------------|
| Islamic schools        | C1 | C2 | C3 | C4 | C5                      | 60%                           |

- The results of the relation among spaces (spatial depth characteristic): according to this characteristic, the results ranged between very high for samples (A and C) and medium for sample (B). Figure 8, 9, 10. Table 11

Table 11. The results of measurements of space depth property, Ref: The researchers

| Property type          | Measurement of the relationship between space (space depth) | Degree of compatibility |
|------------------------|----------------------------------------------------------|-------------------------|
| Entrance & courtyard   | Entrance & Iwan                                           | Mosque & halls          |
| Sample (A)             | 100%                                                      | 75%                     |
| Sample (B)             | 50%                                                       | 100%                    |
| Sample (C)             | 75%                                                       | 100%                    |

- The result of connection among spaces: these results varied between high connectivity in the sample (A), medium in the sample (B) and low in sample (C). Which indicates that sample (A) is more compatible with the contemporary learning environments. ‘Figure 11, 12, 13’. These results are illustrated in the table 12.

Table 12. Measurement results for measuring communication properties, Ref: The researchers

| Property type          | Measurement of communication between spaces = (number of nodes -1)/ Axes | Degree of compatibility |
|------------------------|--------------------------------------------------------------------------|-------------------------|

Table 9. The results of measuring a property of openness

| Property type          | Openness property (Width / Height) | Degree of compatibility |
|------------------------|------------------------------------|-------------------------|
| Sample (A)             | The middle courtyard 75% Iwan 50% Classrooms 75% | 75%                     |
| Sample (B)             | 100% 25% 25% 50% 50%               |                         |
| Sample (C)             | 100% 75% 25% 66.6% 66.6%           |                         |
The results of the physical system can be reached: Contemporary educational environments are highly compatible with Islamic schools in terms of the characteristics of the physical system, especially at the level of the relationship among spaces. ‘Figure 14’, table 13.

Table 13. The results of physical characteristics to the degree of compatibility of contemporary environments of Islamic schools. Ref: The researchers

| Property          | Characteristics of the physical system of contemporary learning environments | Degree of compatibility |
|-------------------|--------------------------------------------------------------------------------|-------------------------|
|                   | Properties are related to space | Properties are related to the relationship between spaces |                         |
| type              | Variable B | Variable C | Variable D | Variable E |
| Spatial characteristics of Islamic schools | 64%       | 60%       | 82%       | 54%       | 65%        |

Figure 7. Diagram of variance ratios in Islamic schools

11. Conclusions
- The contemporary education corresponds with Islamic education in terms of the intellectual system in several aspects including
- Adopting the method of loop gathering that gives the learner the complete freedom to express an opinion, and grants the ability to gather in any space within the Islamic schools.
- Paying constant attention to teacher during the discussion and dialogue on one hand, and to the educational topics on that are mostly limited to researching the relationship of humankind with God on the other hand.
- One of the most important characteristics of modern learning and its compatibility with Islamic learning is the reliance on self-learning. Self-learning in Islam aims to research deep topics that answer many religious and worldly questions, for developing the learner behaviorally and emotionally.
- The educational spaces in contemporary learning environments support contemporary learning based on the interaction among members of loops, as seen in Islamic schools. The middle
The courtyard and Iwans support the gathering of educational loops in different places within them, which makes them compatible with those in contemporary environments.

- The physical characteristics of contemporary learning environments are compatible with Islamic schools in many aspects, including:
  - The ratio of the width to height of educational spaces in Islamic schools varied from more open and open spaces (open courtyard, Iwans) to balanced opening (classrooms dedicated for teaching) and there are no very closed spaces due to their width to height ratio, thus they correspond to contemporary learning environments.
  - Educational spaces in Islamic schools are characterized by a multiplicity of activities within a single space. The open courtyard, Iwans, and the mosque are featured by more effective interaction between the effectiveness of education and the prayer and gathering to perform the educational activities and programs. While a school includes spaces that are dedicated to teaching only, this made it of a single function, which distinguished the contemporary learning environments.
  - Relationship among spaces is one of the most important characteristics of contemporary learning environments, especially the relationship between classrooms dedicated for formal education and other halls of non-formal education, while the relationship between spaces within Islamic schools varied between very powerful and powerful (the courtyard and the Iwans), (Iwans, class halls) (The mosque as a multi-purpose hall, the courtyard), and medium between the entrance and the rest of the other spaces, which means the degree of compatibility is high among the environments of contemporary learning and Islamic schools according to this characteristic.
  - Increasing the connectivity among spaces causes an increment in the ratio of convergence of them against the degree of their isolationism. The characteristic of connectivity is considered medium among spaces, where some spaces are transitional in most samples of schools represented by the connecting corridors, which reduces the degree of communication on the one hand. On the other hand, the design of the classrooms in some Islamic schools is isolated from other spaces (yard and Iwans), which results in a low degree of connection (high isolationism).

**Appendix:** Search for the following "figures 8-13"

**Figure 8.** How to extract the results of the relationship between spaces (the spatial depth), the school of Mustansiriya
Figure 9. How to extract the results of the relationship between spaces (the spatial depth), the school of Sharabiya

Figure 10. How to extract the results of the relationship between spaces (the spatial depth), the school of Dahariya

Figure 11. shows how to calculate the communication between the spaces, the Mustansiriya School
Figure 12. shows how to calculate the communication between the spaces, the School Sharabiya. Ref.: Researchers.

Figure 13. shows how to calculate the communication between the spaces, the School Dahariya. Ref.: Researchers.

Reference
[1] http://www.dictionary.com
[2] http://www.diwanalarab.com
[3] http://midan.aljazeera.net
[4] Al-Khalediy, Khaled Education and Methods of Teaching in Islam in the Era of Az-Zarnooji, Published research, 2011
[5] AL-Amara, Riyam Rajab Self-organization in Architecture, Compatibility between self organized learning environments with the local learning environment, Unpublished Master Thesis, University of technology, 2017
[6] Alomri, Hafsa Variation of Styles in Islamic Architecture and Effects it on The Changing of The Spatial Configuration of Madrasat Buildings, Published research, Published research, 2012
[7] Rena Upitis Complexity and Design: How School Architecture Influences Learning-book: 2009
[8] Jo-Anne Bisset " The Move to Modern Learning Environments in New Zealand Secondary Schools: Step Forward or Smokescreen?,2014
[9] Tahersima Sara, Behbahani Homalrani " Determining of the transformation of Iranian school-Regarding the comparative investigation on traditional vs contemporary schools", Indian Journal of Fundamental and Applied Life Sciences 2015
[10] Ahmad, M. (1989). Ta'alim al-Muta'allim The Instruction of the Learner: Method of Learning, Cairo: Maktabat an-Nahda
[11] Samaneh Irvani," History of School Architecture in Iran", Published research, 2010
[12] Mahmoud, Ntsar Fahd, Diversity of school models in Islamic architecture, Unpublished Master Thesis, University of Baghdad, 2003
[13] Al-Naqeeb, Dr. Abdul Rahman Education institutions in the Islamic eras of prosperity, Lecture published,2008
[14] Attas, Sayyid Muhammad Naqib THE CONCEPT OF EDUCATION IN ISLAM, Published research, Kuala Lumpur: Higher Institute of Islamic Thought and Culture, 2000
[15] Al-Haddad, Mohamed Hamza Islamic architecture in the Ottoman Europe Book published,2002,p 220:227
[16] OECD Organization for Economic Co-operation and Development , CELE Organising Framework on Evaluating Quality in Educational Spaces,2006
[17] Harriet Tumusiime, Learning in architecture: Students’ perceptions of the architecture studio-Faculty of the Built Environment, Uganda Martyrs University, Uganda , 2013
[18] Kim Dovey & Kenn Fisher , Designing for adaptation: the school as socio spatial assemblage-The Journal of Architecture, 2016