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A Comparative Study of Architecture and Content of Iran's Schools from the Traditional Era to the Modern Era

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Abstract

Education and educational spaces in any eras have had a significant role in the growth and development of communities. Schools are the best-known educational spaces, which were undergone essential changes over time in various fields including architecture. Thus, it is important to evaluate these changes during different eras. The lack of spatial qualities and replacement of other segments are our schools today problem, compared traditional schools. In other words, the qualities existing in traditional schools are absent in architecture of today's schools, and the other elements were replaced. Studies that have been conducted regarding schools to date show that less attention has been paid to architecture and content changes of schools, and their cause during different periods. Thus, it is necessary to evaluate these developments and their reasons. This paper tries to examine these developments and their causes. The aim of this study is to evaluate changes in the architecture and content of schools and the relationship between them in the traditional, transitional, and modern era in Iran, compared to each other. In this study, a comparative-analytical research methodology has been used. Library studies were used to collect data. Dodar, Chahar Bagh, and Aqabozorg schools, from traditional era, Darolfonun School from transitional era and Markar School from modern era were selected for comparative analysis purposes; then the required indexes determined for comparison and the evaluations were carried out. According to the hypothesis of this study, compared to the traditional era, architectural developments in Iranian schools during the transitional and modern eras are mostly affected by their content; nevertheless, results do not support the hypothesis and therefore, it was rejected. The results showed that the architectural changes and the pattern of Iranian schools during the transitional and modern eras compared to traditional era were associating with an abstraction-oriented imitation from the architecture of the West and the lack of traditional schools spatial qualities in the architecture of modern schools. Therefore, the same applies to the elimination of the residential section and the contents had no effect on these changes. In this way, the Iranian school has maintained the traditional pattern until mid-Qajar, but since this era onwards and with the establishment of Darolfonun and utilizing the West architecture, the architecture of schools were change. In other words, the new structures of schools during the transitional and modern eras, was a European imitation through eliminating the residential section (school-chamber) and converting to the (school-corridor-class). Thus, the spatial qualities of traditional schools were eliminated, new elements were replaced, and modern schools with new architectural were formed.

Keywords

Architecture, Content, Iran's schools, Transitional to modern era.

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Introduction

Due to its major role in the development of human societies, education and training are very important. On the other hand, changes in human life, influences the social organizations including educational facilities. Therefore, learning spaces are also subject to change. Schools are one of the important types of learning spaces, which were changed during different eras. "Schools were used as an organization for seminaries, where the Islamic sciences were taught in the vicinity of and attached to the mosques. The organization has grown slowly and with a natural rhythm. It was possibly popularized through major changes in teaching style." (Hillenbrand, 2011: 173). Therefore, studying these changes and their causes is of great importance. Previously conducted studies regarding schools have shown that less attention has been paid to architectural changes of schools and their content. Thus, it is necessary to evaluate these developments and their reasons. This paper tries to examine these developments and their causes. This study tries to evaluate changes of architectural and content of Iran's schools and the relationship between them in different eras, compared to each other. In this survey, firstly, Iranian educational system is illustrated during the three eras; then the origination of schools in Iran and combination of traditional schools were discussed and finally the pattern of transitional and modern schools were evaluated and some case examples were introduced. The required indexes were determined for comparison; and the evaluations were performed.

Problem Statement

The lack of spatial qualities in our modern schools is our schools today problem compared to the traditional schools. In other words, the spatial qualities existing in traditional schools are absent in architecture of today's schools, and the other elements were replaced. According to the studies on the subject of Iranian schools, some surveys have been conducted regarding the structure of the schools. However, this study tries to discover the relationship between

the evolution of Iranian schools architecture and their content during different eras. The aim of this study was to evaluate changes in the architecture and content of schools and the relationship between them in the traditional, transitional, and modern Iran, compared to each other.

The hypothesis of this study acclaims that, compared to the traditional era; architectural developments in Iranian schools are mostly affected by their contents during the transitional and modern eras.

The Research Method

The present study was conducted using a comparative-analytical research methodology. Library studies was used to collect data using various recourses including recourses of national library, the University libraries etc. In order for comparative evaluation of the samples, firstly, the required indexes were determined; and the comparative evaluations were performed between the samples. The results presented after analyzing the concerned items, the similarities, and differences in the findings.

Research Background

The following surveys could be noted among the various studies conducted on the subject of schools:

1. A set of studies have classified the schools as an Islamic architecture. Hillenbrand¹ (2011) is a clear example, who examined the schools as one of the elements of Islamic architecture in Islamic territories and pointed out its features and spatial-functional elements. Pirnia (2008), Pirnia and Memarian (2008) have also introduced schools in the scope of Iranian Islamic architecture and have studied its components, features and educational system.
2. Some other studies, such as Sami Azar (1997) have examined the history of the evolution of schools in Iran during different periods and according to developments of eighteenth century, the need for a fundamental change in the construction of the schools is obvious in his opinion. Khodabakhshi and colleagues (2015) tried to understand the evolution of architecture in schools based on the training ruling

system. Result of the study states that the ruling system of schools directly affects its learning spaces.

3. The other studies have examined the schools in a particular way. For example, Soltanzadeh (1985) reviewed the history of Iranian school from the ancient times to the establishment of Darolfonun and stated some of the characteristics of present schools or existing in historical writings. In addition, Soltanzadeh (1999) in an article entitled "Tehran mosque-schools" introduces the building in Tehran. Mollazade (2002) mentioned all Iranian schools in his book and provided an encyclopedia of all Iranian schools.

4. Another set of studies have examined the relationship between different parts of the schools. Hooshiari and colleagues (2013), examined the relationship between learning and prayer spaces in schools and finally categorized different types of combinational teaching -liturgical spaces. They provide the most complete classification of the relevant criteria under the title of Mosque - school based their results. They pointed out Hakim Mosque of Isfahan as the first combination of the two spaces and have studied the evolution of this species until the Qajar era.

5. The other set is focused on the typology of schools, and examined their architecture or components. For example, Mahdavinejad and colleagues (2013) have studied the typology of mosque-schools in Qajar era; the survey results suggest that mosque-schools are divided into three main types. The first kind of school-mosques is a single space where the mosque and school are functioning separately; the second is a single space where the functions of mosque and school are merged. The third kind is a mosque-school, which are built separately but in the vicinity of each other.

Savagheb (1994) has studied Khan Shiraz School and its properties. Zomorshidi (2009) examined the components and architecture of Sepahsalar School. Tahersima and colleagues (2015) have investigated the development of open and semi-open spaces of schools. The results of the study have shown that

the pattern of traditional schools is shaped under the active role of open and semi-open spaces and it was used as a teaching tool. While in the most of contemporary and modern schools, the training actions takes places in a confined and indoor area called "class," Consequently, the role of open and semi-open spaces has been diminished.

Bemanian and colleagues (2013) have conducted a comparative study of architectural features of mosque-schools in Qajar and Safavid eras. The results showed that the mosque- schools of Qajar era did not follow a clear architectural pattern, in contrast the schools of Safavid era are mainly consist of four or two porches. Bemanian and colleagues (2011) also conducted a comparative study of tiled motifs of the two mosque-schools "Chahar Bagh and Seyed Isfahan." The results of this study showed that the most of decorative tiling of Chahar Bagh School is abstract but more variety could be seen in decorative elements of Seyed Mosque. Khani and colleagues (2012) have conducted a comparative study of architecture and decoration in the schools of Ghiasieh in Khargerd and Chahar Bagh in Isfahan. The findings showed that among the compared physical elements, some techniques in Chahar Bagh School, has been affected by Ghiasieh School. However, the same does not apply to the spatial structure and hierarchy.

According to the conducted surveys, the previous research and studies regarding schools are mainly about the introduction of the schools and their components, and thus the developments in architecture and content of schools and the relationship between the two have not been addressed so far; so in this paper we have tried to cover these areas.

Theoretical Foundations of Research

• Iran's Educational System

Iran's educational system can be divided into three periods: first period: The period in which the educational system is fully in the hands of seminaries and the seminary students were directly or indirectly controlling the Maktabkhaneh system

(Nasiri, 2005: 122). Professors and students had the entire freedom and the aim of higher education was a better understanding of Islam. The educational courses were included three courses: primary, Sath (the second stage) and Kharej (the highest level) (Dorani, 1997: 83). "Various philosophical ideas, especially pre-Islamic philosophies, astronomy, chemistry, medicine, and music were taught in Shiite schools during the tenth century. Medical was not only taught in schools but also in mosques." (Durkheim, 1958: 311) ².

In primary schools, the course was consisted of a speech of the lecturer on a particular topic, which was followed by discussion and augments between the lecturer and the students (Kardan, 1957: 11262) ³. The second period: In the first half of the eighteenth century, important transformations have happened in Iran, one of which was to derivate modern education system from Europe and efforts of kings and particularly a number of governors to expand the system in the big cities and then in the smaller cities. This important event was formally begun with the establishment of the Darolfonun in 1852 (Nasiri, 2005). In other words, the period was begun from mid-Qajar and coinciding with the familiarity of Iranian people with the culture and civilization of the West. Third period: started since the reign of Pahlavi I and gradually spread; only the graduates of West had the opportunity to steer and operate the educational system (Ibid: 122). The first, second, and third eras are called the traditional, the transitional the modern eras, respectively (Khodabakhshi, et al., 2015).

• The Emergence and Development of Traditional Schools in Iran

Madrassa (school) was the learning space in Iranian Islamic eras. Concisely, Madrasa could be defined as an institution for higher education where the traditional Islamic sciences such as Hadith, Tafsir, Feqh (jurisprudence) etc. are taught. Madrasa was a response to certain needs of the Muslim community. Madrasa was designed to serve a quite innovative institution (Hillenbrand, 2011: 173). Training was unofficially divided between the madrassas,

mosques, and seminaries in this era. Along with the development of seminaries, madrassas were also developed and practically turned into primary courses for seminaries (Durrani, 1997: 71).

Initially, Mosque was the place of training. Courses of diverse Sciences, all of which originated from Quran as vocabulary, grammar, rhetoric, interpretation, hadith, and Feqh (jurisprudence), etc. were held in mosques and were set to discussion (Pasandideh, 2006). In the early fourth century, several factors related to each other had caused an increasing new need for establishment of independent schools. This was naturally originated due to the expansion of public education and inadequacy of non – educational facilities (Sami Azar, 1997: 86). Apart from the mosques, which were an important center of education for a long time, the development of specific areas known as schools became widespread for teaching religious studies and literature in the fourth century, and Iranians took precedence over all other Islamic nations in the creation of such schools (Safa, 1959: 265). Many researchers (Hattstein⁴ and Deliu⁵, 2011: 362; Petrushevsky⁶, 1975: 101; Hillenbrand, 2011: 214, 215) have considered Khorasan and especially Neyshabur as the origins of the oldest schools in the Muslim world; they assume collections of Buddhist architecture in Eastern Iran and Khorasani Home to be as the origins of school's architecture. The culmination of school construction in Iran was under the reign of Seljuk and the efforts of Nizam al-Molk (Kasai, 1995: 93).

Nezamieh School in Baghdad, built by Nizam al-Molk was a turning point in the construction of schools in the Islamic world. Unfortunately, there is nothing left from Nezamieh School to explore their spatial structure. Khar Gerd School is the only remaining school, which is thought to be one of a Nezamieh schools as its Kufic inscriptions are in the name of Nizam al-Mulk. At the beginning, the school was a room in the teachers' house and it was designated merely to provide a space for education of students not their sleep (Hillenbrand, 2011: 236). Along With the development of education and constructing

schools for training, other elements were added to the learning environment. The functional-spatial elements of schools were included: room, teacher, library, mosque, Cheraghdar (a person who keeps or holds a light) and servant's rooms, drainage and sanitary (Kiani, 2011: 136).

Travelers who were staying at the Safavids in Iran have noted about plenty of schools.

Promoting etiquette and rules of the Safavid dynasty and its expansion was impossible without spaces provision of educational spaces or facilities and it was required the development of the educational system. Sharden has mentioned fifty-seven schools in Isfahan. The same applies to other major cities. Some of the schools had been destroyed in Qajar era and only a handful of schools with few students were held classes. Although, strengthening the economic-political relations of Iran with other countries, in many ways was to the detriment of the country but being acquainted with some aspects of European culture and civilization had remarkable impacts. Establishment of new schools, publication of magazines, and some of the cultural practices were possibly related to these acquaintances. The establishment of Darolfonun by Amirkabir was also mentioned as an example of this case (Kiani, 2012: 130- 132).

• **Emergence and Development of Transitional and Modern Schools in Iran**

Since the mid-nineteenth century, following a series of domestic and international movements, the country of Iran has undergone vast socio-political changes. The deepest and the most enduring aspects of these changes were the cultural changes. At the beginning, these changes had influenced the beliefs of first-class people and finally affected the attitudes of the demos. This trend led to take a distance from traditional patterns and to approach increasingly the Western culture, including the use of modern educational system (Sami Azar, 1997: 243). Novelty-seeking tendencies in the fields of architecture and education have formed the groundwork for the emergence of modern schools (Ivanov, 1977).

In the early years of the twentieth century, the situation was very susceptible to change, and eventually led to a new era of public education. The new education system had two basic characteristics that made it totally different from the traditional education system: 1- being away from religious roots, 2- having a Western approach (Mahboobi Ardekani, 1975). In addition to historical roots, various stages and the trend of these movements are of great importance since they led to the emergence of new architecture in schools. Approaching to the modern education was initially limited to the use of new sciences, but also it gradually turned into the use of modern methods. Along these lines, the first official efforts took place in Darolfonun School (Admiat, 1969).

Combination of Traditional Schools

After the mosque, schools are the most important public buildings in the city. In fact, educational spaces in Iran have only included madrassas and schools. Madrassas had no a particular location. There was a lush yard along with chambers and porches been around in the school. The places of seminars in schools and porches in front of the chambers have been also debated. Madras is the place of courses in which the teacher had been teaching in school (Pirnia, 2008 A: 91-93).

The first floor chambers were designated for the students of Kharej courses (the highest courses) who had less communication with seminary students. The porches of first floor in front of the chambers had turned into the corridors and toilets were behind the porches. Chambers have had a significant role in the formation of educational spaces compared to the other spaces in the schools and thus they could be considered as the most important architectural units of the schools (Soltanzadeh, 1985: 438). School could be concisely defined as an institution for higher education where the traditional Islamic sciences such as Hadith, Tafsir, Feqh (jurisprudence) etc. are taught. Madrasa was a response to certain needs of the Muslim community. Madrasa was designed to serve a

quite innovative institution (Hillenbrand, 2011: 173). Training was unofficially divided between the madrassas, mosques, and seminaries in this era. Along with the development of seminaries, madrassas were also developed and practically turned into primary courses for seminaries (Durrani, 1997: 71).

Along with the development of education and constructing schools for training, other elements were added to the learning environment. The functional-spatial elements of schools were included: room, teacher, library, mosque, Cheraghdar (a person who keeps or holds a light) and servant's rooms, drainage and sanitary (Kiani, 2012: 136).

The alignment of its spatial-functional elements was in a way that they surrounded Myansara (central courtyard) in four directions. The form of Myansara was like a drawn rectangle or a square (with right angles) is. The School's entrance is located in a side of axis, which passes through the center of the two sides and the rectangle. The space laid on the other side of the axis was often used as functions other than chambers (such as dome, mosque-school, Madras, library, or a large porch using as a mosque or school. Another group of schools has four porches of which, two porches are laid on the vertical axis. Another group of schools has two distinct areas with larger entrances than their chambers on both sides rather than having two porches on the vertical axis of the entrance. The mentioned spaces (sometimes including a porch) were allocated to a classroom, a library or occasionally to the mosque (Ibid: 138).

The Pattern of Transitional and Modern Schools

Construction of traditional school was suddenly stopped at once and new forms of schools were built with the aid of Western architecture. Therefore, a new definition of educational space and its physical characteristics were presented and design of schools followed a new rule (Sami Azar, 1997: 150). The first official efforts in order for the use of new topics took place at Darolfonun school for higher

specialized education (Ibid: 243). The main physical transformation in the history of Iranian schools building was the replacement of corridors with the central courtyard in the school of last century in Iran. In fact, this development was the end of the traditional school and the beginning of a new way of designing schools. This change is considered as the decline of the concepts of introversion in the central courtyard and traditional hierarchy in the organization of schools (Sami Azar, 2000: 109-110). At the beginning of current century, the pattern of a school was like this: the straight and uniform rows of classes in design, straight and uniform rows of windows on the façade and straight and uniform arrangement of desks in the class (Sami Azar, 1997: 244).

The Introduction of the Samples

We tried to select samples among the index building of each era, which are definitely belonged, to that era. For this purpose, the three schools of Dodar, Chahar Bagh and Aghabozorg from the traditional, Darolfonun from the transitional and Markar were selected from modern era.

The Introduction of the Samples of Traditional era

• Dodar School in Mashhad

The school is one of the most beautiful and original examples of the architecture in the Timurid era. The school was built on 1439 by Amir Yusuf Khan – one of the rulers in the reign of Shahrukh Mirza – thus it was known as Yusufiyeh and recently is known as Dodar since it has two entries in the East and the West of the school. The courtyard of the school is square-shaped and with the dimensions of 20*20 meters (Khazayi, 2009: 66). The said school occupies 600 square meters, of which 10*20 square meters belongs to the infrastructure. The school has 32 upper and lower chambers. The School is a perfect example of ninth-century architecture, which is important in terms of decorating, tiling, various lines and designs. The school has four porches and the distance between the upper and lower chambers,

Table 1. The introduction of the samples. Source: authors.

The name of school	Era	Date of establishment	Location
Doudar	Timurid	1439	Mashhad: Sanctuary complexes, East of Republic courtyard
Chahar Bagh	Safavid	1704- 1713	Isfahan: between the east side of the Chahar Bagh street and Abbasi Inn
Aghbozorg	Qajar	1834	Kashan: Kamalolmolk Square, Mollahabib sharif Street
Darolfonun	late Qajar	1851	Tehran: Naser Khosrow Street
Markar	Pahlavi I	1934	Yazd: Markar Square, Mashhad Carpet Alley

was the students residence (Fazel, 1971: 1661- 1663).

• Chahar Bagh School in Isfahan

The School of Chahar Bagh was built in the reign of Shah Sultan Hussein. The building is located in the East of Chahar Bagh Street. From the north, it is limited to the Boland (high) arcade male and the (Madarshah) King's mother public place in the East (Pirnia, 2008, B: 330). The construction of the building has begun in 1834 and lasted until 1713. Domes, minarets, altars, pulpit, nave, and porches are all testimonies and evidences that suggest this place was a mosque at first place (Bemanian, et al., 2013: 21). The chambers of Chahar Bagh School were built in the four sides of the courtyard and on two floors. It has wooden windows, doors, sills, and Lath (Mollazadeh, 2002: 52). The area of the school is about 90*95 square meters (Khani, 2012: 40).

• Aghabozorg School in Kashan

Aghabozorg mosque-school, is located in the city of Kashan, the street of Mollahabib Sharif, and Kamalol molk square and belongs to the second era of Qajar monarchy. The building was constructed with the investment of Haji

Mohammad Taghi Khanban for prayer, study, and discussions of his groom, "Molla Mehdi Naraqii II known as Aghbozorg (Hajjighasemi, 1998: 150). The Construction date of the building is mentioned to be in 1834 (Mahdaveinejad, et al., 2013: 9). The building has head, forecourt and large octagonal Kryas. Two upper and lower yards, the chambers of the scholars, a magnificent brick dome, and glaring minarets on both sides could be seen after entering the mosque-school. The Courtyard of the mosque-school was built on two floors, the first floor, or the ground floor having a pool and a garden is allocated to the school. In three sides of the mosque-school, there are twelve rooms with an inventory and an individual hallway with a school larger than the chambers of the middle and several warehouses at the corner (Golijanimaghdam, 1999: 547-563).

The Introduction of the Sample of the Transitional era

• Darolfonun School

The idea of derivation of new education from the West has started since 1810 along with sending students to

Europe, and this time it has found a new aspect with the establishment of a Western-style higher education institute. In fact, Darolfonun is the first appearance of new education system in Iran (Naseh, 2007: 5). The school was designed by Mirzareza Mohandesbashi in 1849 (Qobadian, 2013: 68). Therefore, its establishment in 1851 is a major turning point in Iran’s educational history (Banimasoud, 2009: 115). The building plan had been predicted to be a one-floor quadrilateral building consisting of fifty rooms with a length and width of 4 and an area of 16 square meters. Vast porches and numerous columns were erected in front of the school. On the north side, a wide area and several small rooms were embedded in order for the Military and music sections.

In addition, the classrooms, candles and armaceutical workshops, and printing sections had been holding in the backside (Ibid: 118). The plan of Darolfonun School was similar to the pattern of central courtyard in Iran’s old schools but West architectural elements and symbols have been used in the facade of the school. Thus, the design and the physical body of the school is a combination of Isfahani and neoclassical West styles (Qobadian, 2013: 70).

The Introduction of the Sample of the Modern Era

• Markar School in Yazd

Markar complex is one of the famous buildings of Yazd that includes school, orphanage, and the clock tower. The School of the complex was built with a modern style and quite different from the traditional schools in 1934 in the reign of Pahlavi I, and is a perfect example of modern schools. Existence of classes in a row, corridors, and benefiting a new educational system are of characteristic of this school (The Encyclopedia of Iranshahr architecture history, 2011). The school building contains 18 classrooms and a hall with a capacity of 800 students. The Roof of all parts of the building is made of mere clay and mud. Facades of the all parts are made of bricks, except the small caretaker building which is made of thatches. The school has three football, volleyball, and

basketball pitches (Kazemi & Nazari, 2015: 47-49). A primary comparison is shown In Table 2.

Table 2. The primary comparison. Source: authors.

•	•				Entering a new education system	The reason of establishment	
		•	•	•	Competition of Religious political competition		
		•	•	•	Development of religious resources		
	•	•		•	Without an Endowment	Financing	
•			•		Endowment		
•	•				High school-University	Types and periods of the courses	
		•	•	•	(Kharej unlimited)		
		•	•	•	Sath (3-6 years)		
		•	•	•	Primary 4-7 years	Unlimited	
•	•				New system of teacher-centered	Educational system	
		•	•	•	Discussion		
		•	•	•	Lesson Halghe		
					Prayer room	Regional space	
		•	•		winty		
		•			summery		
		•	•	•	Gnbdkhanh		
	•		•		Library	Components of the school	
•	•	•	•	•	Yard		
•	•				Class		
		•	•	•	Gnbdkhanh		
	•	•	•	•	Porch	Madras	
		•	•		Nave		
		•	•	•	Madras		
		•	•	•	Chamber	Type of the educational space	
•	•				Higher education		
		•	•	•	Kharej		
		•	•	•	Sath		
		•	•	•	Moghadammat		
					Madrassas		
Markar	onun	Darolfonun	Aglibh ozorg	Chahar Bagh	Dokdar	School	Index

• A Comparative Study of Architecture of Schools

In this section, the concerned schools were examined using the parameters listed in Table 3.

The similarities in Terms of Architecture

- The use of yard and desired space can be seen in all schools.
- The use of natural elements is evident in schools.

- All five schools have architectural space commensurate with their educational purposes.

The Distinctions in Terms of Architecture

- The three schools of Dodar, Chahar Bagh and Aghabozorg are considered as Iranian traditional schools. Since the late Qajar, with the establishment of Darolfonun, Iranian schools were developed and the residential sections (chambers) were removed.

Table 3. A comparative study of architecture of schools. Source: authors.

Markar	Darolfonun	Aghabozorg	Chahar Bagh	Dodar	School Index		Architecture	
Pahlavi	Late Qajar	Qajar	Safavid	Timurid	Era	Features		
Pahlavi I	Tehrani	Isfahani second era- 2 porches	Isfahani first era- 4 porches	The second era of Azeri- 4 porches	Style and method			
Class, Corridor, Yard	Class, Corridor, Porch, Yard	Chamber, Madras, Nave, Porch, Gnbdkhanh, Yard	Chamber, Madras, Nave, Porch, Gnbdkhanh, Yard, Library	Chamber, Madras, Porch, Gnbdkhanh, Yard, Library	Components of the school			
Symmetric	Symmetric	Asymmetric	Symmetric	Asymmetric	Plan			
Rectangle	Rectangle	Rectangle	Rectangle	Square	Geometry plan			
1	2	2	2	2	Number of floors			
3	1	3	1	1	Number of yard			
100000 m ²	7200 m ²	7000 m ²	8550 m ²	600 m ²	Area			
-	-	12	121	32	Chamber			Count
18	32	-	-	-	Class			
Classes rows along the corridor	Classes rows along the corridor and yard	Four directions around the yard	Four directions around the yard	Four directions around the yard	Location of functional – spatial elements			Functional
School	School	Mosque-School	Mosque-School	School	Functional			
Through the corridors	Through the corridors and yard	Through the yard	Through the yard and porch	Through the yard and porch	Communication and access			
Desired open space	Desired open space	Communication center of the –complex desired open space	Communication center of the complex – enforcing discipline – desired open space	Communication center of the complex – enforcing discipline – desired open space	Yard			
Extroverted	Introverted	Introverted	Introverted	Introverted	Introversion - Extraversion	Perceptual		

- By imitation of west architecture, transitional and modern schools had changed from introvert and traditional to the extrovert and modern.
- Traditional schools include chamber, hall, courtyard, porch, and dome, while the Modern schools are include classrooms, corridors and courtyards.
- Porches have played an important role in traditional schools as the educational spaces, while these spaces were removed in the modern schools.
- The role of courtyards has diminished to an open space since the late Qajar.
- The yards and porches have a communication role in traditional schools, while corridors are replaced in modern schools.
- Dodar and Chahar Bagh schools have four and Aghabozorg School has two porches, while the modern schools have no porches.
- Qajar schools are the continuation of the educational system in the Safavid era in terms of architecture and content.
- The first transformation has occurred in Darolfonun, which offered a semi- traditional model.
- Safavid Schools are more developed than the Timurid schools, but nothing has changed from Safavid until Qajar eras. A major change has been made in the pattern of schools since the mid-Qajar.

A Comparative Study of the Contents of Schools

In this section, the concerned schools were examined using the parameters listed in table 4.

The Similarities in Terms of Content

- According to table 4, the content of traditional schools is quite similar, while the content of transitional and modern schools is also similar to each other.

The Distinctions in Terms of Content

- The method of education in traditional schools is mainly discussion-based while in modern schools, it is based on direct learning and new educational system.
- The purpose of traditional schools was religious but

modern schools have aimed the needs of the state.

- Studying courses are categorized as religious in traditional schools, in contrast some of new sciences were taught in modern schools.
- The number of educational periods (or semester) is unlimited in traditional schools while they are limited in modern school.

The Analysis of the Tables

- The Traditional Era: The traditional system of education, a style of master and disciples, and an emphasis on simultaneous education were of the factors of formation of Madrasas, chambers, and spaces designated for dialogue and multifunctional purposes in traditional schools, which were a place of rest, life, or education. Religious aspects were present in the content of the courses and the schools were also mosques at the same time. A variety of open (courtyard), semi-open (porch) and closed (chambers, Madras, etc.) spaces could be seen in traditional schools. Chambers were often used as a living, studying and teaching spaces in traditional schools. The placement and position of spatial-functional elements, was in four directions around the central courtyard (Myansara). The yard shape is usually rectangular or nearly square.

The entrance of the school is located in one side of an axis that passes the center of two sides and the rectangle.

A group of traditional schools is including porches; some of them are binary (Dodar, Chahar Bagh), and some are quaternary (Aqabozorg). The characteristics of architecture of traditional schools are similar to architecture of the mosques, and some of their decorative elements are exactly the same.

- The Transitional and Modern Eras: A school in transitional era is an institute, which enforces the rules of modern education system, by imitating the architecture of West and by intellectuals and reformists. There was no traditional interaction between “Master and disciple” or relationship between living and studying space, in these schools. Similar to traditional schools, the introverted and Myansara (middle-hall) shaped structures have been

preserved in the architecture of Darolfonun but some spaces with new shapes and functions have been created. Instead of chambers, there are classrooms with rows of seats and there are new spaces created, such as workshops and laboratories. The layout and the dimensions of spaces have been changed and the use of educational tools such as blackboards has changed admitting light.

Unlike in the past where the students had a direct access from the courtyard to the Madras, in this era, the access is through courtyard into the corridor and then to the classrooms. During the modern era, the culmination of imitating from the architecture of the West and the ascendancy of the modern educational system are clearly apparent. Plans and architectures are unlike the traditional schools, and

Table 4. A comparative study of the architecture of the schools, in terms of contents. Source: authors.

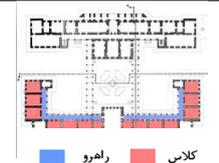
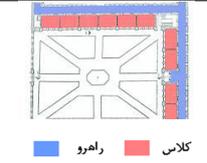
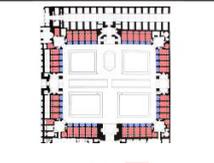
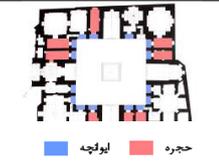
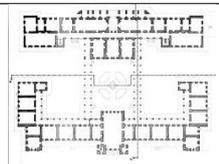
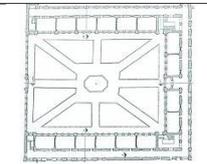
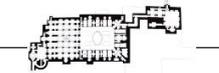
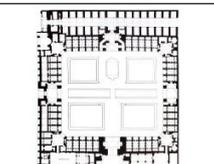
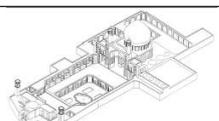
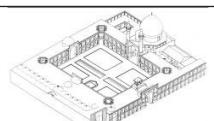
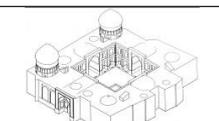
Markar	Darolfonun	Aghabozorg	Chahar Bagh	Dodar	School Index	Content
-Teacher - centered -Classrooms - Secular attribute	-Teacher - centered -Classrooms - Secular attribute	-Lesson Halghe -Discussion -Religious attribute	-Lesson Halghe -Discussion -Religious and secular attribute	-Lesson Halghe -Discussion -Religious attribute	Method of education	
-To satisfy the needs of government -To obtain Professional skills and social character	-To satisfy the needs of government -To obtain Professional skills and social character	Religious and spiritual objectives	Religious and spiritual objectives	Religious and spiritual objectives	Purpose of education	
- Differentiation of sciences -New topics in military, engineering and medicine	- Differentiation of sciences -New topics in military, engineering and medicine	-There is no separation -Persian and Arabic literature, logic, jurisprudence, principles and sometimes philosophy	-There is no separation -Persian and Arabic literature, logic, jurisprudence, principles and sometimes philosophy and modern sciences of non-religious	-There is no separation -Persian and Arabic literature, logic, jurisprudence, principles and sometimes philosophy	Lessons	
High School (limited course) and the arrival of education system taken from Western countries	Higher education (limited courses) and the arrival of education system taken from Western countries	Moghadammat - Sath – Kharej course (unlimited courses) The traditional system of education	Moghadammat - Sath – Kharej lesson (unlimited courses) The new system of education	Moghadammat - Sath – Kharej lesson (unlimited courses) The new system of education	Levels and educational system	

have a rectangle form. In this era, the introversion transforms to extroversion, and the central courtyard is replaced by the linear mode with two lateral wings.

The Comparative Study of Schools Images

In this section, the concerned schools were examined using the parameters listed in table 5.

Table 5. The comparative study of images. Source: authors.

Markar school	Darolfonun school	Aghabozorg school	Chahar Bagh scool	Dodar school	
 <p>Museum of history and culture of Zoroastrian (Markar)</p>	 <p>Organization of Research and Planning</p>	 <p>(Authors)</p>	 <p>(Ministry of Defense and Armed Forces, 1995)</p>	 <p>(Khazayi, 2009: 66)</p>	View
 <p>(Kazemi & Nazari, 2015: 48)</p>	 <p>Organization of Research and Planning</p>	 <p>(Authors)</p>	 <p>(Ministry of Defense and Armed Forces, 1995)</p>	 <p>(Khazayi, 2009: 66)</p>	The yard and the presence of natural elements
—	—	 <p>(Authors)</p>	 <p>(Khani, 2012: 43)</p>	 <p>(Alizadeh, et al., 2013: 9)</p>	Residential section and the chambers
 <p>کلاس راهرو</p> <p>(Authors)</p>	 <p>کلاس راهرو</p> <p>(Authors)</p>	 <p>(Authors)</p>	 <p>حجره ایوانچه</p> <p>(Authors)</p>	 <p>حجره ایوانچه</p> <p>(Authors)</p>	Communications
 <p>Yazdneqar</p>	 <p>(Sami Azar, 1997)</p>	 <p>(Pirnia, 2008: 343)</p>	 <p>(Herdeg, 1997)</p>	 <p>(Alizadeh, et al., 2013: 9)</p>	Building plan
 <p>Yazdneqar</p>	 <p>Organization of Research and Planning</p>	 <p>(Pirnia, 2008: 343)</p>	 <p>(Haji Ghasemi, 2000)</p>	 <p>(Haji Ghasemi, 2000)</p>	Mass and space

Findings

According to the comparisons, the new structure of schools in transitional and modern eras has a School - corridor - classroom pattern and they follow an imitation of the architecture of the West rather than the contents meaning: (the method and objectives of education, lessons, and levels and educational system). Oppositely, the structure of traditional schools has a pattern of school-chambers, which shows the residential function of the traditional schools.

The method and objectives of education, the religious and non-religious content, and the educational levels had no impact on the structure of the schools, as the lesson Halghe could be taught by scholars in the modern structure while secular modern sciences were taught in Chahar Bagh in addition to lesson Halghe. In other words, the new structure of schools during transitional and modern era is an imitation from Europe as the residential space was removed during Darolfonun and the (school-chambers) pattern has transformed to the (school _ corridor _ classroom) that has little to do with the content of modern courses and being teacher-centered. The lesson Halghe was also teacher-centered which was taught in transitional and modern schools only by the use of blackboards etc.

Therefore, the criterion for the final structure of schools is involved with having a residential section with school – chambers structures in traditional schools or being deprived of a residential section with “Madras- corridor- classroom” structure in transitional and modern schools. However, the latter is caused by imitating the architecture of the West.

Discussion

Iran’s educational system can be divided into three periods: first period: The period in which the aim of higher education was a better understanding of Islam and the educational courses were included three levels: primary, Sath (the second stage) and Kharej (the highest level) (Dorani, 83: 1997). The second period: In the first half of the eighteenth century,

important transformations have happened in Iran, one of which was to derivate modern education system from Europe which was begun with the establishment of the Darolfonun in 1852 (Nasiri, 2005). Third period: started since the reign of Pahlavi I and gradually spread; (Ibid: 122). The companionship of indoor and outdoor places is evident in traditional schools and there is a strong interaction between the two, while this is not the case in contemporary schools (Tahersima, et al., 2015). The construction of traditional schools was set aside and new forms of schools were built with the aid of Western architecture in the modern era (Sami Azar, 1997: 150). School buildings with the traditional pattern set aside and a new school was built with the aid of Western architecture (Sami Azar, 1997: 150). The replacement of central courtyard with a corridor was the most important physical transformation that was occurred in the history of Iranian school building, in the last century schools (Sami Azar, 2000: 109-110).

Schools of Traditional Era

The structure of traditional schools has a pattern of school-chambers. The presence of multipurpose spaces at different scales and the presence of open, semi-open, and closed spaces are of the distinctive characteristics of schools this era. The components of a traditional school include chamber, Madras, porch, dome, courtyard, and library where the placement of these components is in four directions around the yard. Resting, living, and studying takes place simultaneously in these schools, which show the residential function in the schools. The courtyard is the central access in the complex and the communications were being performed through the yard and porches.

Schools of the Transitional and Modern Era

During the transitional era, the imitation from the architecture of the West was in agenda, which could be seen with the establishment of Darolfonun; since this time there was a change in the architecture of schools and a new structure was created. We can say

that the new structure of the schools were a European imitation through eliminating the residential section (school-chamber) and converting to the (school-corridor-class). The traditional interaction between “Master and disciple” or relationship between living and studying space, no longer exists in the schools of this era. The introverted structures have been preserved in the architecture of Darolfonun but instead of the chambers, there are classrooms along the corridors. Communications were being performed through the corridors and little by the courtyard. The presence of the central courtyard is a semi traditional pattern in this school. The components of this school include classroom,

corridor, porch, and the yard.

Unlike in the traditional schools where the access was from the courtyard to the Madras, in Darolfonun, the access is through courtyard into the corridor and then to the classrooms. During the modern era, the same imitation continues from the architecture of the West and the introversion transforms to the extroversion. Classes are varied and numerous and the central courtyard is no longer exists and the schools are turned to the linear mode with two lateral wings. The classroom and the corridor are the main components of the school. Classrooms in a row and along the corridor and having access through the corridors are of the distinctive features of the schools of this era.

Conclusion

The formation of educational facilities has been changing from the beginning and has changed in every eras based on the requirements such as educational contents, political and social system etc. The aim of this study was to evaluate changes in the architecture and content of schools and the relationship between them in the traditional, transitional, and modern Iran, compared to each other. The hypothesis of this study acclaims that, compared to the traditional era, architectural developments in Iran’s schools are mostly affected by their contents during the transitional and modern eras.

This hypothesis was rejected by the reviews, comparisons and studied samples and it does not match with the information obtained from the “Results and Discussion.” Since the new structure of Iran’s schools during the transitional and modern eras (school- classroom), are abstract imitations from the architecture of the West comply rather than complying with the contents. The method and objectives of education, the religious and non-religious content, and the educational levels have had no impact on the structure of the schools. In other words, the new structure of schools during transitional and modern era is an imitation from Europe as the residential space was removed during Darolfonun and the (school-chambers) pattern has transformed to the (school _ corridor _ classroom).

In traditional era, schools have an entire traditional architecture. Dodar, chahar Bagh and Aqabozorg schools are examples of this era. The pattern of these schools consists of a central courtyard with several chambers around which have an educational- residential structure. During the transitional era, Darolfonun is a starting point to imitate the West architecture. In the architecture of this school, the introverted style had retained and communication was possible through corridors and the residential section (chambers) was removed. The imitating from the West architecture and the removal of residential sector still continues in the modern era. The new schools, such as Markar, had turned from introverted into the extroverted.

The central courtyard has been eliminated and replaced by linear mode. Therefore, the lack of spatial qualities of traditional schools in the architecture of modern schools and the addition of new elements to the new schools compared to the traditional schools implies that these are arising from the imitating from the architecture of west and Europe. It is also implied that the final structure of schools is involved with having a residential section with school – chambers- yard structure in traditional schools or being deprived of a residential section

with “school- corridor-classroom” structure in transitional and modern schools. However, the latter is caused by imitating the architecture of the West. In this way, the Iran’s schools has maintained the traditional pattern until mid-Qajar, but since this period onwards, a change has been occurred in the architecture of schools with the establishment of the Darolfonun and applying of the architecture of the West. Therefore, the developments of Iran’s schools architecture are simply an abstract imitation from the architecture of the West rather than complying with their content. In this way, the modern schools with new architecture and pattern were formed by imitating the architecture of the West. The suggestions for future research are to conduct a comparative analysis based on the other examples of the modern era.

Endnote

1. Robert Hillenbrand, the professor of Islamic art department at the University of Edinburgh, Scotland, started to teach since 1971 at the department of Fine Arts of the University of Edinburgh after completing his studies at the University of Cambridge and Oxford, he chaired the Department of Islamic Art at the University in 1989. He has more than a hundred articles written in the areas of Islamic art and architecture.
2. David Émile Durkheim, the great French sociologist of nineteenth century. According to many of scholars, Durkheim is considered the founder of sociology. Durkheim was the first person to be able to establish a professorship of sociology.
3. Ali Mohammad Kardan, Iranian educationalists and psychologists, he was selected as “Chehre mandegar” (lasting- figure) in 1382 in psychology and educational sciences. The Membership in the academy of sciences, pioneering in psychology Institute of Tehran University and of the Faculty of educational Science was some of his activities.
4. Markus Hattstein, a freelance writer from Berlin who had studies in the field of sociology, philosophy, and religion. He also has written books about architecture and art history.
5. Peter Deliu, the professor of history and sociology at the University of Witwatersrands, Johannesburg, South Africa.
6. Ilya Pavlovich Petrushevsky was born in 1898 in Kiev. He finished his academic educations at universities of Azerbaijan. Petrushevsky has conducted studies about the Muslim world.

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