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A Quantitative and Qualitative Evaluation and Analysis of Schools and its effect on Urban Physical Planning (Case Study: Shahriar City's Schools)

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Abstract
In order to promote and improve the quality of educational spaces and achieving a comprehensive statistics, evaluation and analysis of schools neglected in most Iran's schools, while educational spaces play an important role in the social and cultural structure and population growing and schools as one of the most basic educational centers, study on this field is important. Therefore, schools evaluation (in the Shahriar city as a case sample) plays an important role in raising the scientific level of a country and development of urban physical planning in the field of education. It supposed that the schools of Shahriar city in terms of population, area and other qualitative and quantitative aspects are far from per capita and standards of the country's modernization organization, and according to this hypothesis, to what extent are schools far from relevant standards in terms of population growth, and what are solutions to fix and reform schools? This study is a descriptive - analytical and field study, to collect data, city education department; organization of schools renovation, journals and valid books and papers were used. Then, the date of Shahriar city's schools to determine its distance from per capita standard was assessed and compared. The study result shows lack of schools area in term of population and per capita standard was about 310 thousand square meters in Shahriar city that will reach to 700 thousand square meters in the future 25 years.

Key words: *schools, Shahriar city, physical planning, per capita*

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Introduction

Although, there were few schools in the past, but schools with identity and human and students had a special value. Architects built the schools as architectural building due to the static, climatic and practice issues in the past and architecture defined in term of space, dimension and function (Mofidi, 2007). Constructive education and shaping the thought and power of the society is the issue can be observed as far less Iranian modern schools and there is a lot of distance in terms of quantity and quality (size, population and the number of students, classroom, floors, heating and cooling system, implemented structural systems) in most schools of Iran. Compiling rules and standards in the field of space and equipment in different academic level, in cooperation with other relevant organizations such as Planning and Budget Organization, Organization of Renovation, Developing and Equipping Schools in countries enhancing scientific knowledge of students, raising their morale and achieve more efficient education (Molaee, 2005). The root of achieving the peaks of science and culture and shine even more in the field of science was in education and the provision of appropriate and efficient educational spaces, and consistent with the country's educational system are most important tools to achieve this issue (Mohammadi Ghazi Mahale, 2007). So school as the elementary and most basic educational centers is a setting encourage learners to collaboration and participation to problem solving, so that teachers and students together to participate in the learning process and enjoy working with each other (2008, Santrock).

As well as educational spaces play a vital role in the social, culture structure in the society. In the education system, educational content on the one hand and educational spaces on the other hand considered as two important factors contributing to the growth and development of children and adolescents (Khezr 92). After looking at the quantity and quality of education in the world and especially in the third world in recent decades, well we know that improve the quality of education, as an issue was extremely sensitive to the global crisis of education, including its symptoms (Zhalleh Halk (1992) education book: investing in the future).

It supposed that, "Are the schools of Shahriar city in terms of quality and quantity far from per capita and to what extent will be the population growth in the future years? What physical or environmental factors is need to modification in order to improve their schools and finally, what solutions have been proposed?" This study was descriptive - analytical and field study. Per capita and standards relating to schools quantitative information (number of schools and classes, student population, area), and qualitative (heating and cooling installations, structures, type of materials, compatibility with adjacent land uses), as well as accurate statistics in current situation of schools in Shahriar city (Shahriar city's schools as part of Tehran Province) collected through Organization of Schools Renovation, Ministry of Education in the Shahriar city and cities in the Tehran province, articles and educational journals and experts view; and quantitative and qualitative lack of schools to per capita and standards have been examined. In addition, this deficiency by increasing the population in childhood and adolescence student to the year 1419 has been identified and solutions to improve the quantity and quality of schools are suggested.

2. Review of the literature

1.2 Definition of concepts and variables

1-2-1 Education and Schools: Education is a continuous, comprehensive activity for all, for human growth and development, cultural richness and excellence of the community (Fiyozat, 2009). The world today is found youth education is a national investment and every country in this way trying to do more, further growth and development will be in the future. School and education environments leads to

growth and excellence of human capital in a society. The growth of children's education caused to more efficient in all areas of economic, social and cultural and community... In fact, the mission of the school, is empowering people to develop their talents and recognition of their creative capabilities (Emadzadeh, 2007).

2-1-2- Population: The population is the fundamental basis of any planning in each country. Therefore, attention to demographic factors and criteria and apply them at planning dimension can play an important role in sustainable planning. In addition, given the increasing population growth and the problem of space and educational facilities in Iran, estimating and calculating of the population is necessary in the future years. According to Census 2011, the Seventh General Census of Population and Housing on 2th November 2011 was conducted throughout the country. The census using questionnaires and census executive procedures are based on summarizing the experiences of the two-stage final test in the Census Headquarters approved (General Population and Housing Census 2011). Thus, according to country's 25-year horizon and population growth, especially in childhood and adolescence that formed the student population, population growth based on linear and exponential model by the year 1419 determined in this study.

1-2-3 Area: the area classified into 3 parts Lords, field and outdoor spaces; field area refers to total land area and area refer to parts where construction located on it.

1-2-4 per capita and standards: standards particularly in education guarantee best practice, and deviate from them removing efficacy. In other words, standards to ensure the required utility is available in and for this purpose task must be performed by them. Standardization of human resources and education used to promote the quality and the efficiency of the education system (Shafee 2003).

2.2 Review of Literature

In recent decades, many studies especially in relation to schools conducted in developing countries and appropriate solution were also presented. In one of the latest, research "Seyed Davood Hosseini-Nasab", "Yousef Adib" and "Leila Omrani" (Spring 2013) investigated the current situation of physical space and educational equipment in general secondary schools in Tabriz with respect to standards and criteria of country development program in the academic year (2010-2011). The research results showed that the average per capita school educational spaces was lower than per capita standard and schools in term of status and architectural characteristics in the categories of library and, auditorium, prayer room and sports fields weak and unfavorable reported. "Mohammad Mehdi Hosseinzadeh et al in a study entitled" Evaluation of educational user space and its per capita: case study elementary and secondary schools in Chalus city in 2011" concluded that all schools in city center with per capita outdoor space for each student is undesirable and in terms of physical conditions such as walls and building life is unfavorable. So many schools are over 30 years old. It also referred to the lack of classroom space in Chalus schools.

In conclusion, "Gorbanali Yazdanpanah" investigates the status quo educational spaces in elementary schools in cities of Mazandaran province, outdoor spaces and schools area was higher than desirable standards of education in the province. In contrast to other spaces such as classrooms and service spaces and facilities are much lower than standard and generally essential spaces had poor condition in the province.

"Soheila Molaei" in her master's thesis by supervision of "Seyed Davood Hosseini-Nasab" in 2006 examines the elementary schools in Tabriz using country's standards where it has concluded that indoors and outdoors in elementary schools of Tabriz was higher than the per capita standards and in terms of the

auditorium and library in a rather unfavorable condition assessed. The results "Bakhtiari Nasr Abadi" in 2001 show elementary and secondary schools in Isfahan city in terms of outdoor spaces compared with per capita and standards has not favorable conditions.

"Abbas Bazargan" in the book "Educational Evaluation", defined standard as; Standard is high-level indicators that specify "quality criteria". Standards is document including rules, guidelines or characteristics for activities (ISO) and their results are for public and repeated use that provided through consensus and by the known organization is approved and its purpose is to achieve the desired amount of the order and (improving quality) in a particular field. In Iran, Organization of Schools Renovation several years help to the city and province education, to gather information from all the school and such related standards to reach the space desirability of schools has identified as well. In this respect, experts have determined per capita for this educational field. In this study, a quantitative and qualitative analysis in Shahriar city's schools as part of Tehran province, which is developing major capitals, will be discussed.

3-2 Population: According to the latest population and housing census in 2011, Shahriar city population was 624,440 people, city urban population was 539,042 people and city rural population was 85,398 people.

In Table 1, the population of students, number of classes and the number of city schools has been identified.

According to the Country's Civil Registration

	Elementary schools	Secondary schools
Number of students	69373	50404
Number of centers	111	93
Number of classes	1163	1256

Table 1. Demographics

	Field	Lord
Total area schools	42/683662	76/283331
Average area	2864/3351	8811/2009
Elementary schools area	77/341107	6/117117
Secondary schools Area	65/342554	16/166214

Table 2. Area of schools in Shahriar city

in term of population age, elementary students with secondary school students must be equal in 2011, and it is intended students in schools to be approximately equal to 20% of the population in the city, (about less than 126 thousand people).

4-2-Area

Shahryar city with an area of 320 square kilometers is one of the 12 city of Tehran Province is located in the West Tehran Province. Area city schools are listed in Table 2.

Many of the city's schools in two shifts and some are common for girls and boys, and even in elementary and secondary schools are established in a school. So in appearance, especially in the area of school there is required standards but in fact with a resolution of 204 school buildings that statistics are really received and their distance determined from favorable standards and per capita.

5-2- Per capita and standards

Per capita and standards used in this study is derived from the standardization rules of the Organization of Renovation, Developing and Equipping Schools in Tehran and Ismail Shieh book an introduction to the basics of urban planning. Per capita, qualitative and quantitative standards presented in Tables 3 and 4.

3. Research Methodology

The study consists of documentary and field parts and it try to collect data in connection with the subject material through resources such as books, student theses, papers, magazines and Internet sites. Thus, data collected from 204 schools in the city including Planning and Budget Organization, Organization

schools	Per capita elementary	Per capita secondary
Field Area	1.5 square meters per urban resident	0.9 square meters per urban resident
Lord Area	4 square meters per student	5 square meters per student
Outdoor area	5 square meters per student	7 square meters per student
Number of floors	one floor	One to three floors

Table 3. Per capita and quantitative standards

Structural system	lack of use old materials, use of modern lightweight materials resistant, non-flammable materials, resistant to earthquakes, sediment and other destructive factors
Roof Coverage	Light and heat-resistant coating
Cooling installations	Water cooling installations
Heating installations	Central heating installation
Building dating	New and strong
Type user	Educational use buildings

Table 4. Per capita and quality standards

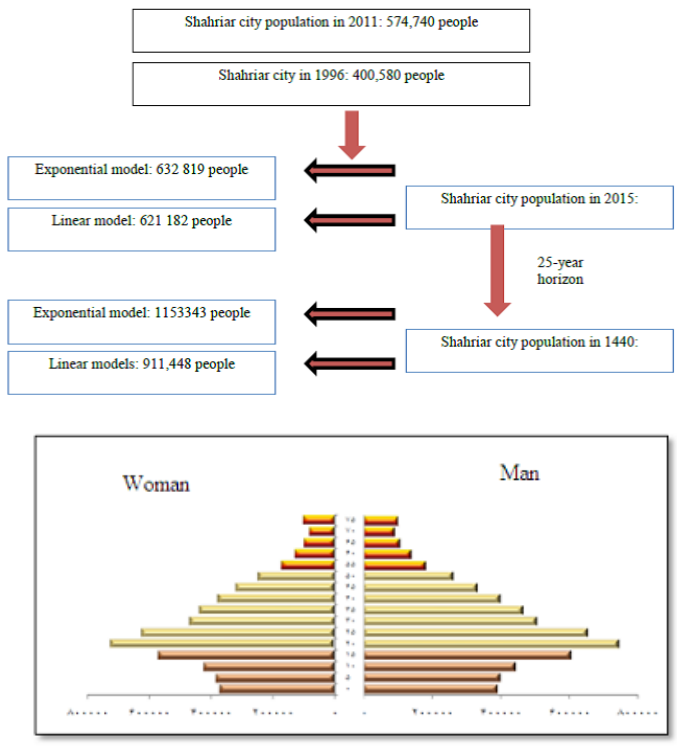

Fig 1. The age pyramid of the population of Tehran in 2011

of Renovation of School, Department of Education in the Shahriar city, Department of Education of cities in Tehran province, Organization of Renovation of country's schools and schools of Tehran province, people are aware of the schools of the city. As well as other sources qualitatively in the form of rules and School Renovation Organization standards and Ismail Shiite as scholars in urban areas, and comparison of current situation and

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Schools		current situation	Ideal condition	Shortage
Elementary	Field arena	341107.77	949228.5	608120.73
	Lords area	117117.6	277492	160374.4
Secondary	Field arena	342554.65	569537.1	226982.45
	Lords area	166214.16	252020	85805.84

Table 5. Evaluation of schools lord and field area

distance from per capita and considering the information obtained will be and finally offered solutions to fix it.

According to exclude secondary schools in the Iran's education system, schools is divided into two elementary and secondary schools, each period is 6 years, accordingly the schools of Shahriar city analyzed and assessed.

4. Evaluation of Shahriar School

1.4. Quantitative Evaluation

1-1-4- Population

With regard to the country's prospect of 25 years, population of the Shahriar city, according to the exponential model to reach 1,153,343 people in 1419. The age pyramid of the population of Tehran province in 2011, almost 20 percent of the population are 0 to 15 years old and the population in 1419 to reach 230,669 students. In this case, an area of 2005011 square meters is necessary for schools and in this case, it is match with schools standards that per person urban living is calculated.

2-1-4- Lord and field area

According to Table 5, lack of field area in elementary schools in the city was about Six hundred thousand square meters. But because most of the Shahriar city's schools, particularly at elementary school will be held in two shift, field area per two shift schools was 855,892.2 square meters in this case the lack of area to standards and favorable per capita is less than one hundred thousand square meters. In secondary school, here are about two hundred and twenty thousand square meter shortage in field area but hold Shift 2 shift schools field area in this level per 2 shifts was 506783 square meters in this case distance from standard and per capita was about one hundred and fifty thousand square meters.

3.1.4 Number of floors

Investigating the information of the Shahriar city's schools at elementary school was about 50% of primary schools in the city are in accordance with the relevant standard of a single floor and about 30% of the two-floor schools somewhat was close to the standard and the rest are beyond the existing per capita. In secondary schools, the majority of schools are consistent with standard and one or three-floors and about 30% of four-floor schools are beyond per capita. The number of schools consistent and inconsistent with the standards listed in Table 6.

4-1-4- Number and size of class

Each class size per person according to the standardization rules of Organization of Renovation, Developing and Equipping Schools in the country is 1.2 square meters. Investigating many of the classes in city schools, we realize that this law has not been observed and the best-equipped and newest city schools eventually reaches 1.1 and average of this number is about 1 (Renovation Organization of the country, the Bureau of Investigation and Research) which is about 0.2 square meters with a satisfactory standard.

The number of classes also number of classes should be proportional to the number of students in each Shahriar school and the average number of students per class is 25 students according to per capita and standards, this figure in the Shahriar city's schools is almost equal to terms and the difference is that many schools held for two shifts.

Schools	Compliant with standard	Incompliance with standard
Elementary	54	57
Secondary	63	30

Table 6. Evaluation of school floors

Structural system	Structure (metal or concrete)	Semi- structure (metal or concrete)	Building materials and without structure
Number of Schools	115	15	76

Table 7. Evaluation of school structures system

Type Roof Coverage	Light Roof (expanded polystyrene)	Heavy Roof Coatings (barrel vault, clay blocks, concrete slab)
Number of Schools	13	191

Table 8. Evaluation of schools roof coverage

Heating installations		Cooling installations	
Central	Heater	Water installations	Fan or gaseous air conditioning
118	86	134	70

Table 9. Evaluation of schools roof coverage

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2.4 Quality Evaluation

2-4-1 structures system and roof coverage

In the case of the structural system of schools, steel or concrete structure must be used and the use of structures accordance with materials per capita and standards of Organization of Renovation, Developing and Equipping Schools is outdated. Evaluation of structure system and roof coverage in the Shahriar city's school in tables 7 and 8 has been reported.

In the Shahriar city about 25 percent of schools were built with materials and should be taken as soon as possible in order to fix them. School steel and concrete structures often traditionally run and has long pass and strengthen them and use new structures (non-flammable steel and reinforced concrete) is necessary. The structural system the barrel vault ceiling in schools should not be used (due to very low resistance against earthquakes) that according to information from the Shahriar schools, most schools do not meet the above requirements and most from benefit barrel vault system.

2-4-2 heating and cooling installation

Most cooling installations of Shahriar School due to warm, dry climate have air conditioning, fan as well as gaseous air conditioning less used. Heating system in schools is very important because if they are not considered bring many life threatening.

Fortunately, in the Shahriar city, more than 90 percent of schools have benefited from Central System and radiators or heater but the rest of the schools have been used oil and gas heaters. In accordance with the standards of Organization of Renovation, Developing and Equipping Schools, the use of them due to flammable and gas cramps danger, with or without the chimney flue is outdated and should not be used in schools. Evaluation of

Quality of building	Firm	Need of repair	Destruct
Number of Schools	50	81	73

Table 10. Quality schools building

heating and cooling installations in schools of Shahriar city is listed in Table 9.

2-4-3 quality and efficiency of schools

In terms of quality buildings, about 24% of the schools are strong and in ideal condition, and the rest need to be reconstructed or destroyed and must be replaced by a new building. As well as 204 school buildings, 4 buildings are not appropriate for educational application and school educational environment.

Conclusion

In examining the schools of Shahriar city and considering the fact that there is any comprehensive studies on these schools, collecting information and comparison between the status quo and how did you come to ideal terms and accordance with per capita and standards of Organization of Renovation Schools are information as follow. Results obtained from the field and lord area and outdoor spaces of school indicate that the elementary school is more desirable than secondary school so that the status quo in the outdoor spaces and Lords area in elementary schools was in accordance with standards. The important thing in not only the schools of Shahriar city, but also country's schools is that schools held in two shifts, this means that any two students in one in the morning and another in the afternoon use the possibility of one student; of course, these statistics sometimes show three shifts in a school. According to these figures, the situation looks pretty good if investigate the actual number of existing buildings, schools, the favorable in 2 elementary and secondary schools turn to unfavorable situation so that despite 209 elementary schools and 144 secondary schools in the Shahriar city, only 111 buildings for elementary and 93 buildings for secondary is intended. The number of high school students, especially boys, about 20 thousand less than elementary school indicates a reduction in the desire to continue studying in this school which should be through the establishment of cultural and education backgrounds to families and teens as well as improving the economic situation in society prevents people from leaving school at the secondary school. In terms of quality, structural systems and roof schools are less favorable conditions and while the above 70% schools structures is concrete and metal but should be strengthen and retrofit traditional practices against earthquakes and other natural and unnatural condition to have the necessary strength. It also built schools and barrel vault with materials that are completely outdated and need to be demolished and rebuilt. Today, in the majority of heating systems of Iranian schools, the radiator is used for heating school classes while in this type of control system heat distribute uneven in different parts of class and the need to fix the problem and dissemination of fair and balanced heat in the class, heating methods used to disperse and floor heating. Finally, with regard to the countries prospects of 25 year by 1419 and growing population in Iran, attention to the school as a cultural hub of the country is essential. As a result of quantitative and qualitative conditions of schools in the country, Tehran province as the cultural and economic center of the country and Shahriar city as part of Tehran province, must have the process forward to achieve the desired standards and per capita.

The results of the location and proximity of schools:

According to Table 11 and per capita Organization of Renovation and Equipping Schools in determining the rules and locating and reviewing the Shahriar School in the map GIS the following statistics has obtained:

Proximity user compliance with city schools include: 72% residential user, 22% cultural user

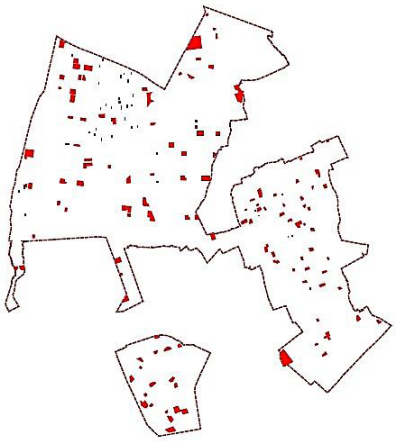

Figure 2. Location of schools in the Shahriar city

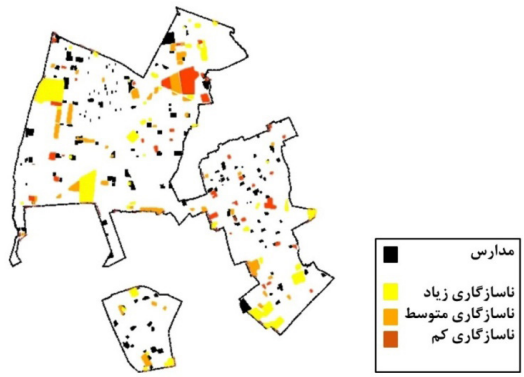

Fig 3. Locating incompatible proximity to educational spaces in Shahriar city

User	Fully compatible	Fairly consistent	Indifferent	Relatively incompatible	Totally incompatible
Residential	-	✓	-	-	-
Commercial	-	-	-	✓	-
Cultural	✓	-	-	-	-
Religious	-	✓	-	-	-
Health	-	-	-	✓	-
Sport	✓	-	-	-	-
Administrati	-	-	-	✓	-
green space	✓	-	-	-	-
Industry	-	-	-	-	✓
Transport terminals	-	-	-	-	✓

Table 11. Compatibility with other users and educational users

and 57% with green spaces. Proximity user schools incompliance with the city schools include: 28% of businesses center, 33% health centers, 13% transport terminals and 9% industrial user.

Incompatible proximity with campuses in Figure 3 is known.

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