

## CASE STUDY

### The Role of Renovation in Environmental Quality of Urban Places with Emphasis on Eco - Schools

*G. Goodarzi\*<sup>1</sup>, S.A. Razavian Amiri<sup>2</sup>*

*1- Faculty of Art and Architecture, Islamic Azad university, North Tehran Branch, Tehran, Iran*

*2- Department of Civil Engineering, Payame Noor University, Tehran, Iran*

Received 01 Jun 2020

revised 04 Sep 2020

accepted 24 Oct 2020

available online 25 Nov 2020

**ABSTRACT:** The world around us in the new age faces various environmental threats, which has led to our cities being involved. With increasing interest in the environment and the development of environmental knowledge, attention to the renovation of Urban distressed exhausted tissues has become one of the main concerns of urban management in this time. And schools as one of the most important urban places have become a place for maintaining and promoting environmental culture in terms of physical and educational. Eco-schools is an international program of the foundation for environmental education that aims to empower students to be the change our sustainable world needs by engaging them in fun, action-orientated and socially responsible learning. This article aims at introducing ECO- Schools using a descriptive and comparative method, and setting native criteria for these schools with using the AHP method to for physical renovation with environmental goals. The results of the research show that, unlike some countries, that most important criteria are environmental education and meaning, in Iran, due to lack of appropriate infrastructure, the most important criteria were the sustainable public transport system and school environment quality. Overall, the renovation of the ordinary schools and change them into ECO-school, one of the best ways to educate and preserve the environment for generations and socially oriented economy will save time and money and create efficient and sustainable urban context.

**Keywords:** Renovation, Environmental Education, Sustainable School, Eco-Schools, AHP

**RUNNING TITLE:** Renovation in Environmental Quality of Urban Places

## INTRODUCTION

In recent decades, attention has been paid to the creation and development of quality urban places, and point of view, in modern community orientation move towards creating high-quality places from an objective and mentally. The urban quality is often measured by the characteristics of its urban environments. With population growth, Urban places emerge more environment and more complex environment and different ways of urban environmental education. The main challenge for today's cities is to manage the heavy dependence

on ecosystem services, which results in the depletion of natural resources and biodiversity and the efforts to mitigate and adapt to climate change, while prioritizing public health and quality of life (In-depth report,2015). Early childhood—which is generally defined as ages three through eight—is a foundational period when children rapidly move through milestones in physical, cognitive, social, emotional and language development. Cities offer unique environments for learning because they present young children with high densities of people from different backgrounds and cultures, buildings and public spaces that may reflect hundreds or even thousands of years

 \*Corresponding Author Email: [GOODARZI.G@yahoo.com](mailto:GOODARZI.G@yahoo.com) Tel. +98 9122394660 Fax: +98 9123990294

of human history, and political systems that regulate environmental behaviors and decision making (Russ, 2016). Students usually spend between 5 and 8 hours a day on school at school. It's time that students spend more on school. On the other hand, Previous study shows that the school environment affected the students' achievement (Rudd, 2008). Schools, as one of the most important structural elements of urban design, which have a significant role in promoting urban environments, are appropriate in terms of physical and educational facilities, which can be considered as the focus of attention on educating and addressing the importance of environmental issues for students in these places. In order to facilitate the widespread use of schools through sustainability, the development and equipping of Standard and resilient educational spaces has been the priority of urban plan, and so far a large number of schools in Tehran have been renovated. This paper deals with two main aims, the introduction of ECO- schools and the development of native criteria for the identification of ECO- schools, trying to improve the city's environmental conditions and preventing economic costs and providing conditions for physical renovation with the principles of the environment. This paper tries to attract decision maker's attention to apply sustainable development fundamentals and approaches of Green and Eco-cities in planning and developing cities by new idea in school renovation

## MATERIALS AND METHODS

### *Environmental Education*

As the world becomes increasingly urban, questions have been raised about the role of environmental education in providing experiences of nature in cities, in helping us to envision a sustainable city, and in encouraging urban residents to participate in restoring and creating green spaces and green infrastructure. In other words, the field of environmental education is exploring how it can contribute to environmental integrity and human well-being in cities (Kudryavtsev, 2013). There is a key and essential role advancing progressive urban environmental ideas in a global context for

an emerging urban environmental education. (Maddox, 2016). Urban environmental education can play a pivotal role in telling these stories by teaching about urban biodiversity, ecosystem services, and nature, and about the myriad connections between the built and natural world in cities Urban environmental education that is sensitive to its local cultural context and incorporates scientific insights from urban social-ecological systems thinking can make a significant difference, encouraging residents to care about their environment and giving them the knowledge on which to act (Russ, 2016). Visions, goals, and values, along with facts that justify them, are the essence of education, including environmental education. Urban environmental education includes any practices that create learning opportunities to foster individual and community well-being and environmental quality in cities. learning is a process that occurs in the place and varies in a variety of ways. Each place has different meanings and each has its own patterns and applications. Places in the urban from public to private places are all taught to us and our children. Schools are one of the most important tools for discovering the world around and teaching different sciences, as a place where students spend most of their time. The school reflects the values of society and, to a degree, reflects the structure of its values. Telling this critical story is the challenge to which environmental education is called in the urban 21st century. (Russ, 2016)

In Iranian urban planning, the school has always been the main element of the urban. Mohammad Tavassoli considers the school as one of the main elements of the urban center, and states that "the center of the urban consists of the main elements of the urban including the mosque, the mall, the square, the bath and the caravan-serai, and the strong connection between the elements of the collection urban center exists .Haynes has presented the list of main elements of Islamic cities: fence, gates, citadel, outside roads, suburbs, highways, mosque houses, administrative organizations, schools, markets, caravansaries and residential neighborhoods (Ahmadpor, 2014). Schools have always been one of the subjects of urban planning studies, but they are less concerned

with the role of schools in improving the quality of the environment. Changing attitudes and behaviors have influenced the place's impact on environmental education by identifying new political patterns. This movement, combined with the International conferences, documents and commitments, such as the Rio Earth Summit (1992) and Agenda 21; and the World Summit on Sustainable Development (WSSD) in Johannesburg (2002) began to promote the need to reorientate the role of education within the sustainability agenda. This shift called into question the dominant approach of educating about the environment and instead reflected the need for educating for sustainability. The latter, seeks to engage people in critical reflection of current lifestyles and actions and to be able to make informed decisions and changes towards a more sustainable world (Henderson,2004). Defining what sustainable development means to your school is the first step in developing a culture of sustainability.

#### *Approaches to Sustainable Schools*

each space depends on its function and its role in the whole set has its own characteristics, one of the important features of schools is the developments of spaces that encourage creativity in students and foster them to make the school a creative learning place. Schools are institutional spaces for communities of learners, including both students and teachers. School is an institution where the process of teaching and learning is conducted (Freiberg, 1999). The formal education sector has been a focus for change towards sustainability since the 1970s and 1980s. As mentioned previously, this focus has been driven by authoritative international documents and commitments, such as the Tbilisi Declaration, Agenda 21, the Dakar Framework for Action, and Local Agenda 21, which have advocated for educational reform or reorientation to reflect the new sustainability agenda. (Henderson,2004) Sustainability is defined by the World Commission on Environment and Development as meeting the needs of today without compromising the ability of future generations to meet their own needs. Sustainable Building is a fully integrated; "whole building" approach to design, construction, and operation. (Ramli,2012)

Sustainable schools and sustainable leadership both begin with a clear moral purpose. This moral purpose aligns to the need to preserve, protect and support the environment, as a living system, from the damage caused by modern living (Harris,2008). The United Nations has declared 2005 to 2014 to be the United Nations Decade of Education for Sustainable Development (DESD). adopted in the 1990's, whole-school approaches have come to be seen as an especially promising strategy for moving toward sustainable development. Actually, the definition of sustainability is subjective and possibly need to be framed within a specific context to hold specific meaning, although there is extensive agreement that it is about balancing and integrating environmental, social and economic elements (Ramli,2012). A school built on the core principles of sustainable development will encourage care: (Harris,2008)

- Care for oneself – our health and well-being
- Care for each other – across cultures, distances and generations
- Care for the environment – near and far

Given clear objectives in order to achieve utilization of renewable energy and Sustainability eco schools can be generalized as a model to other parts of community. that will eventually have a positive effect on city clearing. The most important approaches to sustainable schools are presented below:

#### **ENSI Eco schools**

ENSI is an international network which has supported educational developments, environmental understanding, active approaches to teaching and learning, through research and the exchange of experiences internationally since 1986. ENSI has according to the mandate given by CERI successfully supported school development and contributed innovative approaches to the teaching and learning process, providing real life experience to students and a focal point for teachers to share their lessons learnt. Today ENSI member countries are involved in establishing Eco-

school's networks and in the development of quality indicators, award and Eco-audit schemes for Eco-schools

.Each country funds its own work, ENSI provides opportunities for member states to come together in formal settings and share practice and research in EE. One of ENSI's main projects relates to research and school development work in Eco-schools (Henderson,2004)

#### **FEE Eco-schools**

Eco-Schools is the largest sustainable schools program in the world, operated internationally by the Foundation for Environmental Education (FEE). The program connects 19.5 million children, young people and educators through sustainable development education with 67 countries on all five continents participating. Eco-Schools has common structural features across all operating countries. The Seven Elements, the Eco-Schools Topics, and Assessment for the Green Flag. The Seven Elements are the same in every country, although they may have slightly different names. Eco-Schools Topic themes vary across different operating countries. FEE is a not-for profit umbrella organization which brings together national NGOs implementing programs for 'environmental education, management and certification'. These NGOs work in close partnership with their national educational authorities and the FEE International Secretariat (Henderson,2004)

#### **Green-Schools**

The aim of Green-Schools is to increase students' and participant awareness of environmental issues through classroom studies and to transfer this knowledge into positive environmental action in the school and also in the wider community. Schools that have successfully completed all the elements of the program are awarded the "Green-Flag" in Europe. This award has now become a well-recognized Eco-Label. The award has to be renewed every two years. Green-Schools is an initiative of, and coordinated on an international level by, FEE (Foundation for Environmental Education). There are currently over 23,000

schools in 43 countries in Europe, Africa, Asia, Oceania and South America taking part in the program. (Zhang,2009).

#### **LEED**

According to Gordon (2010), the U.S. green building Council initially developed the Leadership in Energy and Environmental Design (LEED) rating system to address all buildings. The project checklist for LEED for schools has seven categories, five of which have requisite goals and all of which have additional goals that award a school project various points (Ramli,2012). According to the US Green Building Council, LEED-certified and environmentally constructed schools cost less to operate—on average, up to 100,000 per year less. Studies show that carefully planned acoustics and abundant daylight can significantly improve students' capability to learn—and improve the well-being of students and teachers. Cleaner indoor air means far fewer sick days. Plus, often, innovative design provides a hands-on learning opportunities(Zhang,2009).

#### **Comprehensive Environmental Schools (Jam) in Iran**

In Iran, attention to environmental issues has always been taken into consideration. In the fourth development plan of the country, a complete section devoted to environmental issues was devoted to "environmental protection, land management and regional equilibrium". The Green Schools Project, with a view to addressing the environmental issues in schools, has been delayed since its adoption in the Development Plan in accordance with the Memorandum of Understanding of 2013 by the Head of Environmental Protection and the Minister of Education, the schools started their work in 2015 years. (JAM,2015). The criteria for the selection of comprehensive environmental schools have been adapted from the six categories of criteria and their adaptation to the conditions of the country. In this context, the criteria provided by the Collaborative for High Performance Schools (CHPS, 2004), the Environmental Protection Agency (EPA, 2008), Leadership in Energy and Environmental



Design (LEED, 2009), Environmental Management System (HANC & ET, 2010), FAA (2014) and Environmental Protection Agency (2013) (Mibodi,2017). Studies show that, State Organization of School Renovation has only few points in common with “LEED 2009 for school” which are all due to the branch of ‘Sustainable Site’. These points are limited to five items in outdoor space and one item in indoor space. This is while Environmental Sustainability guideline of LEED is described under seven main branches(Abbasi,2014). Urban renewal has emerged in developing countries as a response to shifting expectations that abandoned and derelict urban buildings be refurbished and reused, rather than demolished. The term ‘sustainable development’ refers to the idea of merging sustainability concepts to secure long-term economic, environmental and social well-being within urban renewal development. Therefore, sustainable urban renewal aims at improving the physical, social, economic and ecological aspects of abandoned urban areas through various actions, including redevelopment, rehabilitation, and renovation (Zhiyong.et.al, 2017)

Around the world, Education for Sustainable Development (ESD) has emerged as a cornerstone for tackling Environmental crises. Sustainable schools and sustainable leadership both begin with a clear moral purpose. This moral purpose aligns to the need to preserve, protect and support the environment, as a living system, from the damage caused by modern living. Sustainable schools combine deep moral purpose with a central focus on learning. Sustainable schools put learning first but locate this learning within a sustainable development framework. This means preparing young people for a lifetime of sustainable living, through their teaching, their fabric and through the modelling of sustainable development practice (Harris,2008). A school culture of sustainability is one in which students, staff and parents hold shared values and beliefs about the importance of taking action for a healthier, faire, more environmentally sustainable society) (Gibb,2015)The Sustainable Schools initiative in Australia and its equivalents in other countries such as Eco Schools, Green Schools, and Enviro schools (Henderson and

Tilbury,2004) There are different vision and approach for sustainable schools, but the three basic and more important indicators that can provide a better performance for these eco-schools are shown in Figure 1.



Fig. 1. sustainable schools (Harris,2008)

Leadership for sustainability requires leadership in all these spheres and therefore requires leadership practice that is purposefully distributed and co-coordinated. Sometimes head-teachers or members of the school leadership team are the leaders for sustainability. At other times they can also be other professionals, community workers, business people governors, teaching assistants, caretakers, parent and pupils. The basic point here is that leadership for sustainability requires broad based involvement of many leaders, at many levels and across different spheres of influence. (Harris,2008). Or from the point of view Gibb, a whole-school approach involves including sustainable development and climate action in all aspects of your school, which can be broken down into four interrelated areas for action: school governance, teaching and learning, campus, and community partnerships (Gibb,2015)

#### *Renovation and Eco-School*

«Buildings are, first and foremost, constructed to be comfortable and healthy. This is, in fact, their purpose. Buildings must protect their occupants from the outdoor environment and provide pleasant environmental conditions and indoor air quality etc.». (Trachte.2014) Over time buildings are distressed in terms of

physical and functional. distressed is one of the most important issues that affects the urban environment, causing disturbance in balance and proportionality in cities. distressed enters into one of the most important elements of urban space, ie, body or activity, and in turn causes the burnout of urban space (Habibi, 2002). renovation means the reconstruction of buildings, the operation or the process of eliminating signs of destruction, burnout, with the concept of rebuilding and building is now renovation (Tavassoli, 2000) In other words, the holistic process renovation in economic, socio-cultural and physical terms, aimed at restoring proper living conditions based on new relations and establishing a dynamic balance in target urban areas and neighborhoods Brings life to life.

Distressed in urban schools is one of the challenges facing urban management, which is trying to Resolve this problem in each period. The risks of physical exhaustion in schools, with regard to the length of time students attend school, is a necessity the main solution to this crisis. On the other hand, distressed out schools will destroy the sense of creativity and belonging among students, making space a heavy and unbearable space for students. In recent years, attention has been paid to the renovation of schools in the outline of urban development plans The Law on the Establishment of the Organization for the Rehabilitation and Renovation of Schools of the Republic of Iran, approved in 1975, was renewed by the School of renovation in terms of physical and equipment.

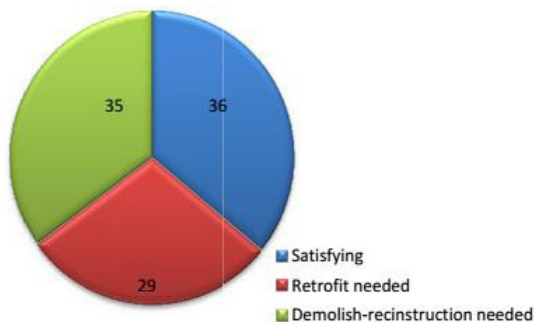


Fig. 2: Initial results of the technical certified of school building (Mahdizadeh,2011)

In Tehran, more than 25% of schools have a high age and relative distressed, with the implementation of some renovation projects school that from renovation schools and sometimes to destruction and reconstruction. According to the Tehran Municipality report in 2017, the number of exhausted schools is 550 schools, most of which were located in Tehran's worn and unsteady texture. renovation can be categorized in a variety of sustainable schools:

- Renovation in the structure
- Renovation and retrofitting
- Renovation in school infrastructure and facilities

Dick (2007) stated that a green building also known as sustainable building is a structure that is designed, built, renovated, operated, or reused in an ecological and resource-efficient manner. Green buildings are designed to meet certain objectives such as protecting occupant health, improving employee) (Ramli, 2012). Productivity in the renovation organization should be the basis for achieving more, more resilient, more beautiful, more suitable and cheaper schools. More schools to respond to population growth, more resistant schools, with a view to increasing the useful lives of schools, and more schools to deal with accidents, more beautiful schools with a motivation to respond to students' mental and psychological needs, and to create a fascination with science education and techniques, more suitable schools for adapting the construction process to educational programs, cheaper schools, in order to reduce costs and make optimal use of credit and economize actions (Ghazizadeh,1994). The schools which are environmentally renovated will be environmental education centers. At these centers, students can learn environment issues and local people also learn ecological and comfortable way of life as these centers will act as social educational centers. (ZENYOJI,2005). Recently, in countries such as Malaysia and China, sustainability-based renewal projects are taking place, and at the same time, the renovation of schools and the conversion of schools to environmental schools are taking place. This projects have two

aspects. “Eco-school Physical renovation of school buildings” and “environmental renewal on using buildings”, Namely, renovation of schools occurs simultaneously with the thinking of eco- schools .This projects also applies a “participatory approach”. Therefore, these projects need to collaborate simultaneously on different trends, such as civil engineering, urbanism, and environmental engineering, as well as participation among local residents and governmental officials shall participate in the project at relevant stages. In many Renovation project, often studies include checklist of physical facilities until the environmental education. For example, the Tokyo Ministry of Education highlights the most important points about rebuilding the environment:

- The environmentally conscious renovation is set at an affordable level, tailored to the present condition of each existing school facility.

- The combination of greening of the schoolyard and walls with night purging is working effectively. It is a good example of hybrid renovation. It is easy to start in existing school facilities and its effects are easy to understand.

- For greening projects, it is necessary to carefully investigate beforehand whether the school can continuously work on the maintenance with the help of the community

( Ministry of Education.2010)

Gough (2005) economic, educational, environmental, and social outcomes in Australian schools are featured in detailed checklist (Gough,2005). in the USA, environmental review Checklist count as a “completed” audit when applying for a Bronze, Silver, or Green Flag award that includes different parts like, education for sustainability, energy, water, schoolyard habitats and etc.

In the IRAN, the school charter JAM mentions that these schools are required to spend a week in the natural environment each week to spontaneously understand the environmental experience to touch normal features without direct training. The purpose of these schools is to teach students and teachers how to

use the sciences they learn to preserve the environment. Regarding the given definitions about sustainable development, the best way to construct schools’ buildings is through applying sustainable architecture principles. In this way we may get closer to the objectives of sustainable development. On the basis of sustainable development model: society - Economics –environment, we can categorize the objectives of sustainable school in each of the following sustainable development factors(Dianat,2015). Regarding the aims of the article, in order to achieve the exploitation of renewable energies, it is possible to consider eco and friendly schools as a main goal in school design, and the conceptual model of a project to convert ordinary schools into environmental schools into The following is suggested.

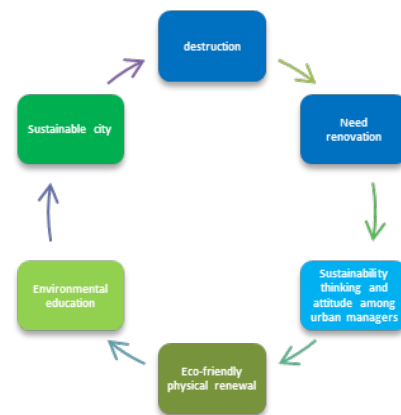


Fig. 3. renovation cycle

In the above cycle, the problem begins with identifying a destruction school, and it is presented in the workgroups to identify the renovation to prevent physical burnout. Then, if the managers’ thinking and attitude are consistent with the principles of sustainable development, and the necessary environmental education for managers and institutions and executive devices in the past, we can have the idea of building physical and environmental renewal simultaneously with the principles of sustainable development and the principles of eco-schools for a destruction school. Obviously, this cycle is so effective that all its components include citizens, children, students, officials, teachers, etc. are committed to the principles

of sustainability and to follow their goals. Also, after the renovation, it is important to verify the utilization and achievement of the eco-school for environmental education and to reflect the results in future renovation plans.

## **RESULTS AND DISCUSSION**

Using quantitative and qualitative criteria is a common and tested method for identifying environmental schools and selecting schools. These criteria have been raised at the level of a global guidelines for global organizations, and each country is undergoing localization. This research is aimed at introducing eco schools with a practical purpose and research method in two sections. First, by means of a descriptive and literature review, the standard criteria required for the assessment of environmental schools are proposed and then, the questionnaire was forwarded to the experts. In line with the quantification of the extracted criteria, the professional comments of the experts were collected and then analyzed using AHP, consistent with the research method and type of variables. The data were analyzed in Expert Choice.

### **1) Compilation of criteria**

The criteria of green school guideline in Collaborative for High Performance Schools (CHPS) are similar to USGBC LEED, but it was developed specifically for schools. CHPS began in California in 1999. (Ramli,2012). principles of green buildings which was in fact a response to the importance of construction industry with environmental problem-solving approach including global climate change, non-economic and wrong use of natural resources and developed threats to human health (these regulation is running in 41 countries, including the US, Canada, India, UAE and Offering LEED license to the building is in fact a movement in line with maintaining sustainable development in the construction industry and the concept of green buildings) (Dianat, 2015). Some standards in order to introduce a sustainable as follows:

- Sustainable Sites
- Decreases the burden on municipal water and wastewater treatment
- Materials and resources
- Encourage recycling
- Indoor environmental quality
- A regional Priority
- Promote habitats protection
- ...

Also Criteria for Malaysian Green School Design Guidelines The criteria are indoor air quality, thermal comfort, acoustic, day lighting, water efficiency and energy efficiency (RAMLI,2012) .According to the guidelines and the Charter of the Jam, 8 major criteria with 17 sub-criteria are presented below:

- Conserves energy and natural resources
- Improves indoor air quality

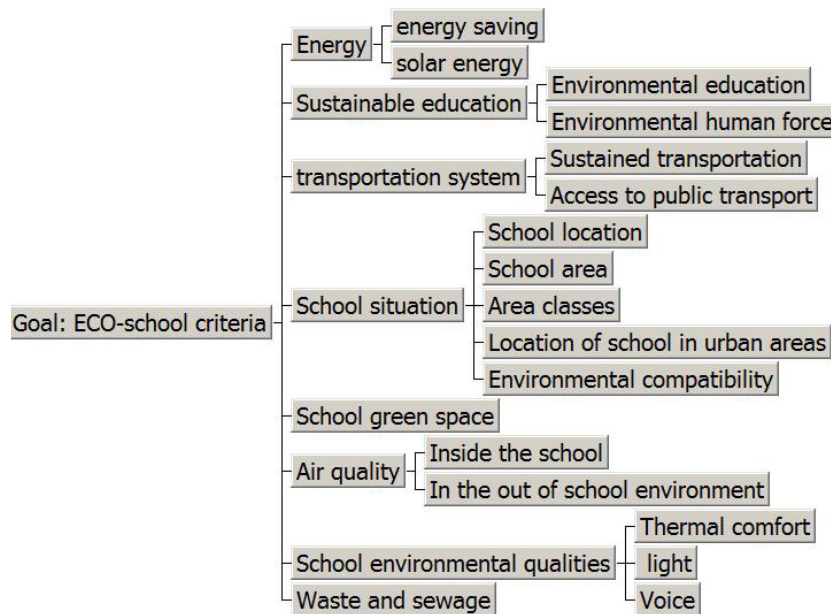


	major criteria	sub-criteria
1	Energy	energy saving Solar energy
2	education Sustainable	Environmental education Environmental human force
3	transportation system	Sustained transportation Access to public transport
4	School situation	School location School area Area classes Location of school in urban areas Environmental compatibility
5	School green space	
6	Air quality	Inside the school In the out of school environment
7	School environmental qualities	Thermal comfort light Voice
8	Waste and sewage	

Tab 1: major criteria and sub-criteria eco-school

## 2) Analytic hierarchy process

In the process of analyzing the hierarchy, at the first level, the goal then criteria and the last level falls sub-criteria



. Fig. 4: Hierarchical structure of goal and criteria and sub criteria

In the process of analyzing the hierarchy, the elements of each level are compared to their respective element at the higher level, and their weights are calculated. We call these weights relative weights. Then, by combining the relative weights, the final weight of each option is determined, which we call a suspended weight. To determine the importance factor (weight) of the criteria and the sub criteria, we compare the two to the two. The basis for

judging the determination of the significance factor of criteria is Table 9 quantity SAATY, which is based on which, according to the purpose of the survey, the severity of the superiority of criterion  $i$  is determined by the criterion  $j$ ,  $a_{ij}$ . All criteria are compared in two WITH two (Yang Huei Lee, 1997). The weighting results of the criteria and sub-criteria in the Expert Choice software are as follows:

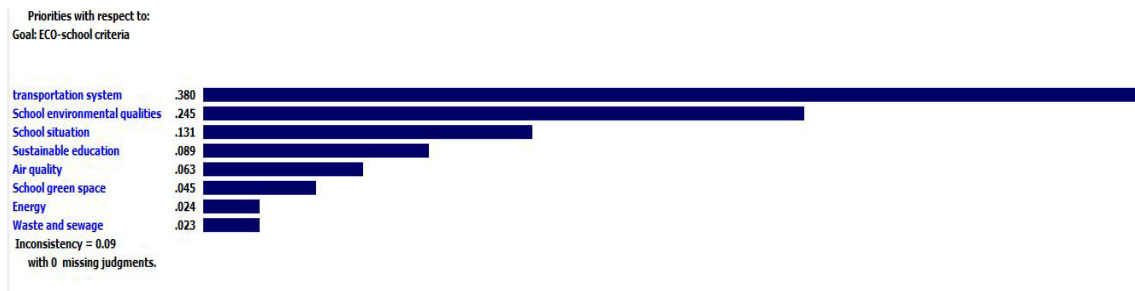


Fig. 5: Weights of criteria

One of the main and important criteria for the renovation or construction of ECO - schools in Iran should be transportation system criterion. due to the large volume of traffic and the lack of sufficient facilities, it is evident that no matter how much school locating has access to the system Public transport is more suitable for private vehicles, and a sustainable system is created. The School environmental qualities are placed in the second criteria. Any amount of school should be placed in a more appropriate place. Qualitative features such as sound, light, air conditioning and more ... will be created Sustainable and friendly school environment. Weights criteria are preferences in Table 2

major criteria	Weight	preferences
transportation system	0.380	1
School environmental qualities	0.245	2
School situation	0.131	3
Sustainable education	0.069	4
Air quality	0.063	5
School green space	0.045	6
Energy	0.024	7
Waste and sewage	0.023	8

Tab 2: Weights criteria and preferences

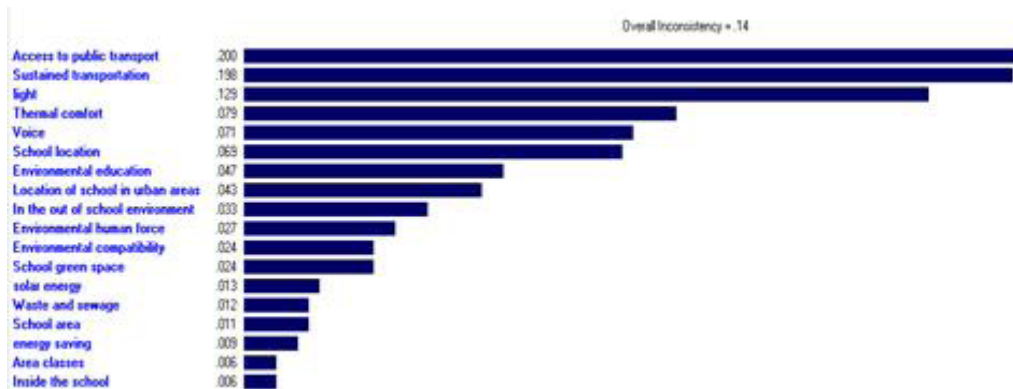


Fig. 6: Weights of sub criteria

## CONCLUSION

The findings of this study suggest that the lack of sustainable design principles based on environmental sustainability can have many environmental and financial losses for the next generation. In general, we can divide the criteria for the conversion of ordinary schools into the environment into the two categories of internal standards of the ECO-school and outside the ECO-school. In other countries, suitable infrastructure such as access to public transport, clean environment, reducing environmental pollution and etc., It is provided and is currently completing and meeting the domestic needs and standards. While few schools are currently operating with global indicators in Iran, these schools are only in their environment-friendly environment. externally, standards such as clean services, use of hybrid vehicles, promote the use of carriage There is no public communication between students and parents. While different countries emphasize environmental education, in Iran, infrastructure Not suitable for converting ordinary schools to environmental schools. The main criteria for ECO-school, access to public transport are the highest in the criteria. Public transport is an essential service which can support local services and facilities. Furthermore, one way to keep the environment on a sustainable trip is to use a bicycle from school to home, that is not acceptable in our schools and this is while, in other countries, the use of public and clean transportation is very important and has become a principle. In fact, basic facilities for the outside environment are not available. It is hoped that this article will be able to reinforce the idea of converting ordinary schools into environmental schools among officials.

## ACKNOWLEDGEMENTS

This work was supported by Faculty of Art and Architecture, Islamic Azad university, North Tehran Branch, Tehran, Iran.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interests regarding the publication of this manuscript.

## REFERENCES

- Abbasi, B., Khan Mohammadi, M.A., Mahmoudi, M., (2014) Evaluating Environmental Sustainability in Iranian Primary Schools through Design Principle Approach, *Asian Social Science*; Vol. 10, No. 19, pp. 206-219.
- Ahmadopr, A., & PourAhmad, A., (2014), Building Space in Iran Before and After Islam, *Sustainable City*, Vol. 1, No, 1, pp. 21 – 36.
- ANSI (American National Standards Institute). (2002). Standard S12.60. Acoustical Performance Criteria, Design Requirements and Guidelines for Schools. Washington, DC: ANSI. Retrieved on 12 April, 2012 from, [http://www.acoustics.com/ansi\\_education.asp](http://www.acoustics.com/ansi_education.asp)
- Charter of Comprehensive Schools of the Environment (Jam), 2015, Office of Education and Peoples Participation, Sixth Edition.
- CHPS (Collaborative for High Performance Schools). (2004). Best practices manual. Volumes 1-4. Retrieved on March 23, 2013, from <http://www.chps.net>
- Dianat, A., Adami, P., (2015), Investigating the Sustainability of New Built Art Schools Based on Executive Methods and Used Materials in Buildings, *European Online Journal of Natural and Social Sciences*, Special Issue on New Trends in Architecture, Civil Engineering, and Urban Studies, Vol. 3, No. 3, pp. 315-321.
- Draft Environmental Charter (2015). Education and Research Deputy of the Office of Education and Public Participation
- EPA (U.S. Environmental Protection Agency). (2008). Care for your air: A Guide to indoor air quality, EPA/402/F-08/008, USA. Available at <http://nepis.epa.gov>
- FEE (Foundation for Environmental Education). (2014). International Eco-Schools Programme. Available at: <http://www.eco-schools.org>.
- Ghazaizade, B. (1994), Principles and criteria for the design of educational and educational spaces, Tehran: renovation, Development, and Equipment of Schools in Iran
- Gibb, N., (2015) Sustainable and climate-friendly schools, Coordination: Julia Heiss and Sabine Detzel, UNESCO Section of Education for Sustainable Development
- Gough Annette, (2005), Sustainable Schools: Renovating Educational Processes, *Applied Environmental Education and Communication*, 4:339–351, 2005, Copyright © Taylor & Francis Inc, ISSN: 1533-015X print / 1533-0389
- Green Management Guide under Article 190 of the Five-Year Development Plan (2013), Human Environment

- Delegation, Secretary of the Green Management System
- Habibi, M: Maghsodi,M,(2002), , Terminology and Rehabilitation of the Quarterly Journal of Haft-e-Shahr No. 12 and 13 of Tehran
- Harris. A., (2008), Leading sustainable schools, Specialist Schools and Academies Trust, London, UK.
- Hence, L., Wiedemann, T., Raath, S., Stone, R., Renders, P., & Craenhals, E. (2010). Monitoring environmental management at primary schools in South Africa. *Journal of Cleaner Production*, 18(7), 666-677
- Henderson, K., & Tillbury, D. (2004). Whole-school approaches to sustainability: An international review of sustainable school programs. Australian Research Institute in Education for Sustainability (ARIES) for The Department of the Environment and Heritage.
- Henderson.K,Tilbury.D,(2004),Whole-School Approaches to Sustainability: An International Review of Sustainable School Programs. Report Prepared by the Australian Research Institute in Education for Sustainability (ARIES) for The Department of the Environment and Heritage, Australian Government
- IN-DEPTH REPORT: Indicators for Sustainable Cities, (2015), Science for Environment Policy.
- Kudryavtsev, A., (2013), Urban Environmental Education and Sense of Place, Ph. D. thesis, Cornell University.
- LEED. (2009). New construction and major renovations rating system. Available at: <http://www.usgbc.org/Docs/Archive/General/Docs5547>
- Maddox, D., (2016) Environmental Education and Advancing Urbanization.
- Mahdizadeh.A, (2011), Report on Retrofit Procedure of School Buildings in Islamic Republic of Iran, State Organization of Schools Renovation, [www.nosazimadares.ir/behsazi](http://www.nosazimadares.ir/behsazi)
- Melissa Benner, Elanor Waslander, (2015), Ontario EcoSchools: Get Inspired
- Mibodi, H., Lahijani, A., Shobiri, M., Jozi, A., Azizinejad, R., (2017), Developing Green School Criteria, Quarterly Journal of Education, No. 127, pp. 107-129.
- Ministry of Education, Culture, Sports, Science and Technology (2010), Aiming for Environmentally-Friendly Facilities (Eco-Schools) Renovation at Every School Collection of Case Examples to Make Existing School Facilities More Ecological
- National Strategy Document on Revitalising, Upgrading, Renovating and Enabling Deteriorated and Underutilised Urban Fabrics Approved on 2014
- Ramli, N.H., Masri, M.H., Taib, M.Z.H.M., & Abd Hamid, N., (2012), Social and Behavioral Sciences, Vol. 50, pp. 462 – 471.
- Rapti, D., School Glimate as an Important Component in Scholl Effectiveness, Academicus, International Scientific Journal.
- Rudd, P., Reed, F. and Smith, P. (2008). The Effects of the School Environment on Young People's Attitudes to Education and Learning. Slough: NFER
- Russ.A, Krasny.M, (2016), Essays in Urban Environmental Education, Cornell University Civic Ecology Lab, NAAEE, EE Capacity Ithaca, NY and Washington, DC.
- Tavassoli, Mahmoud. 2000: Termology of Urban Renovation and Improvement, Seventh-Seven Magazine, No. 2- Pages 89-8
- Trachte, S., (2014) Sustainable Refurbishment School Buildings, A guide for Designers and Planners, IEA Solar Heating and Cooling Programme.
- Trachte.S, Herde.R, (2014), Sustainable Refurbishment School Buildings, A guide for designers and Planners UNESCO, (2014) UN Decade of Education for Sustainable Development 2005-2014, Devision for the Promotion of Quality Education, France.
- UNESCO, 1977. Final report: TbilisiInter-governmental Conference on Environmental Education Paris: UNESCO
- United Nations Division for Sustainable Development. (1992). Agenda 21. United Nations Conference on Environment and Development, 3-14 June 1992, Rio De Janeiro, Brazil. New York: Oceana Publications.
- United Nations. (1992). Earth summit: Agenda 21; Rio Declaration; Statement of Forest Principles. The final text of agreements negotiated by Governments at the United Nations Conference on Environment and Development (UNCED). 3-14 June 1992, Rio de Janeiro, Brazil.
- Yang Huei Lee, J. (1997). An AHP decision model for facility location selection. *Facilities*, 15(10), 241-254
- ZENYOJI, S., TAKIGUCHI, N., (2005) PROJECT ON THE ECO-FRIENDLY RENOVATION OF SCHOOL BUILDINGS AND ENVIRONMENTAL EDUCATION, The 2005 World Sustainable Building Conference, Tokyo, 27-29 September 2005 (SB05Tokyo)
- Zhang, J., Zhirong, Z., & Zheng, Y., (2009), An Introduction of Building Green Schools, *Journal of Sustainable Development*, Vol. 2, No. 1, pp. 200-203.
- Zhiyong Yi, Guiwen Liu, Wei Lang, Asheem Shrestha and Igor Martek, (2017) Strategic Approaches to Sustainable Urban Renewal in Developing Countries: A Case Study of Shenzhen, China, *Sustainability*, Vol. 9, No. 8, pp. 1460-1479; <https://doi.org/10.3390/su9081460>