



Sustainable School in Islamic Republic of Iran: A Multi-method Qualitative Approach

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Abstract

The purpose of this study was to design a model for sustainable school in Islamic Republic of Iran. The method of the research was multi-method qualitative including: the meta-synthesis method & case study. Data gathering resources were all researches in the case of sustainable school for the period from 2005 until 2020. These researches were selected by intensity case sampling of targeted sampling approach. In this section, qualitative content analysis was used for data gathering. The findings of this section revealed some part of sustainable school model. In the case study, the potential participants to be interviewed were the experienced natives, and Iran's upstream documents and the declarations of the revolution leaders were surveyed. Key informants to be interviewed were selected by standard targeted sampling method. Data gathering method in this section were semi structured interviews with key informants and document mining. The findings of this research was the model of sustainable school in Islamic Republic of Iran which consists of inputs (teacher and executive staff, curriculum, space & equipment, & policies), processes (teaching, learning, management & planning), subsystems (individual, structural, political & cultural), outputs (student with sustainable development approach & a sustainable school model) and characteristics of them in the form of a social system. The result of this research showed that for achieving the intended outputs, all the inputs, processes and subsystems should have appropriate characteristics.

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Introduction:

Achieving higher living standards is one of the objectives of all nations and societies. Today, based on the experiences gained in different societies, the need for a development approach leading to a comprehensive, durable and sustainable development has been constantly felt; thus, the concept of “sustainable development” has been generalized. The sustainable development fosters the economic growth if protecting environment and enhancing quality of life within the social and individual dimensions (Defra, 2013), and negative impacts on the abilities of the future generations to do the same are considered. In other words, the world is experiencing rapid growth and environmental issues are becoming ever more prominent in the social, political, economic and personal domains. Davis (2008, p19), recognizes that, “... various popular media has heightened awareness of how humans are over- stretching the earths life-support systems” (Vinokurova et al, 2016).

Education is a key tool in improving the sustainable development and in order to respond to the challenges related to the sustainable development, it is required that the schools change to learning organizations where the education for the sustainable development permeates people’s lives, policies, goals, activities and processes (Birney & Reed, 2009). In 2005 recognition of the highest priority of the education in building of better and more sustainable future resulted in declaration of the Decade of Education for Sustainable Development. In 2014 UNESCO developed a Global Action Program (GAP) on Education for Sustainable Development, which was supported by a detailed Road Map of its implementation (UNESCO, 2014). Scott (2009) believes that “Schools are established to educate children and they are elementary agencies for sustainable development or any other social process” (Scott, 2009:38). The global sustainability agenda challenges traditional pedagogies and calls for a school education that fosters awareness of the complexities and uncertainty of the surrounding world. A school organization that promotes such changes can be

regarded as reflexive in relation to social learning and new social movements (Lotz-Sisitka et al, 2015). In fact, learning is considered as a key activity in schools where people interact with others outside the school and improve their knowledge and skills. Therefore, schools should be reoriented toward sustainability and general approaches instead of using mere curricula (Barratt & Barratt Hacking, 2008).

The modern global problems threaten the civilization fundamentals and require adequate consolidated actions focused on sustainable development. Education for sustainable development is the most efficient tool, which the society has to meet the global challenges. It is the education that will shape the world of tomorrow (Vinokurova et al, 2016). In his book, “Twenty-one Trends for the 21st Century: Out of the trenches and into the future”, Marx (2014) pointed out the trends related to the future and advised suggestions for education and they literally indicate the needs of the twenty-one century. He detailed the trends into several spheres: demography, technology, economy, energy and environment, global and international education and learning, leadership and well-being. Most of the trends directly connects to the concept of sustainability. He noted the ecological, social, economic and individual dimensions. (Kensler & Uline, 2017)

In other words, sustainability of schools is the fundamental solution for social, economic and ecological challenges that we encounter today. Sterling (2011) believes that learning should be assumed as a process beyond a content and a goal for learning so that the learner is involved in his/her questioning assumption, values and even high-quality learning. It shows that we need a different education system which focuses on transformational learning (making a change in the belief and perspective of the learner) instead of transitional learning (transferring the data to the learner) (O’Sullivan, 2014). In school improvement research, a school’s organization is commonly understood as reflexive in relation to material and time, and should provide support for students and staff. Further, the school culture should be conducive to conversation and based

on ideals of student-centered approaches (Kelley & Dikkers, 2016). By this definition, school improvement refers to collectively supporting factors in the organization that enhance students' possibilities for learning in relation to a complex surrounding world. Thus, the focus of learning within the organization is a central feature in a school improvement process (Harris et al, 2013).

It has been theoretically suggested that the school organization is one of the most crucial facilitators of ESD implementation in practice (Nikel & Lowe, 2010; Scott, 2013). However, few studies have investigated ESD implementation in relation to school organization. In contrast, in school improvement research there is a long tradition of investigating schools at the school organization level, and many research instruments have been developed for this purpose. (Mogren, Gericke & Scherp, 2018). This means that the principles and values of sustainable development, such as intergenerational equity, respect, solidarity and freedom, must be included in the curriculum. Also, the principles of the sustainable development should be integrated with the culture of schools, the domestic and public relations, employing resources including energy, water and paper (Kadji-Beltran, Zachariou & Stevenson, 2013). In terms of sustainability, the goal of schools is the development of students' awareness and interest in the sustainable life in the hope that it enhances their social participation, thereby, leading to social justice, health and an increase in the resilience of environmental systems (Scott, 2011). Many scholars (e.g. Hargreaves and Shirley, 2009; Nikel and Lowe, 2010; Mader, Scott, and Abdul Razak, 2013; Scott and Gough, 2003; Scott, 2009, 2013; Sterling, 2003) emphasize the importance of studying general qualities used in school improvement to understand characteristics of the ESD implementation process in education. These scholars argue that ESD implementation must be closely related to the schools' own quality assurance culture in education. (Mogren, Gericke & Scherp, 2018).

In Iran, with respect to its historic and religious background, as well as the rapid

development of the country in various dimensions, a special attention to sustainable schools and its localization is needed more than ever. Schools, as the executive arms of the educational system, must be able to meet the needs of the society in this regard. Currently, there are a lot of dissatisfactions with the education system for not meeting the needs of the society and not paying attention to all aspects of education such as economic and social dimensions and lack of development of necessary skills in students. Thus, regarding the importance of the sustainable development in the economic, social and environmental future of the country and the potential of the education system to create the required infrastructure and the importance of schools as the executive arms to achieve the desired functions in the sustainable development, the present study was performed to design the model of a sustainable school in the Islamic Republic of Iran.

In general, the necessity and importance of the present study can be classified as follows:

First, scientific recognition of sustainable school and designing its model based on the desired ideals and values in the Islamic Republic of Iran. Second, most researches in this area have been done in other communities and they must be localized for use in another country. Third, the research conducted in the field of sustainable schools in Iran in terms of quantity, quality and modernity are enormously different from what are done in other countries. Also, the number of people working in this field are very few. In the practical dimension, the results of the present study can be useful for these groups: 1. Education headquarters including managers, executives, curriculum planners and textbook authors: whereas no codified documents have been specifically published on standards of sustainable school in our country yet, considering the model of sustainable school in the Islamic Republic of Iran as the infrastructure for designing policies and standards can be useful 2. School principals: can create a better educational environment for staff and students and better quality education by using the model of sustainable school in schools. 3. Educational staff: can train students who are

educated with the knowledge and skills that a citizen of today's society requires as well as creating efficient educational atmosphere by using the methods derived from the model of sustainable school.4- University teachers: When knowing the model of the local sustainable school, university teachers as the effective factors in training the next generation of teachers can provide the potential conditions for training capable teachers and practically transferring the models to the future teachers.

Background of the Research:

The previous studies and researches related to development of sustainable schools and the method of formation, goals, processes and education in the schools indicate that this subject has been reviewed in different angles and various approaches. In his research, Gough (2005) concluded that the sustainable schools act based on education for sustainable development and make changes at three levels: the education level (teaching and learning process); the social-organizational level (culture, social atmosphere and educational policy); and technical-economic level (infrastructure, equipment and managerial activities). Also, Huckle (2006) identified and introduced indexes for developing schools toward sustainability in his researches such as: educational, social, economic, environmental, school ground and surrounding, management of waste materials, management of water and electricity consumption. On the other hand, Frisk & Larson (2011) believe that the relevance and dependence of instructions, the degree of action-orientation, the participatory nature and the foresight of the curricula determine the sustainability standard of schools. On the other hand, in their research, Rickinson, Hall & Reid (2015) have referred to the models for self-assessment such as the WWFS3 model. This model focuses on culture and ethics in schools, career development, curriculum and leadership, learning, individual and social development of students and supports them to develop sustainability in schools.

On one hand, while examining the attitude and behavior of students in relation to sustainable

development, Kalaitzidis (2013); Tucker & Izadpanahi (2017) and Akbari Armand, Alimohamadi & Moharamnezhad (2016) noticed the positive attitude and behavior of students and their parents towards the environment in developing schools into green schools. Also, by assessing the impacts of environmental benefits on students' academic performance and comparing normal schools to sustainable schools, Fehr & Andrade (2016) found out the positive impact of the factors such as, proper energy consumption, environmental education activities, and reduction in litters production, on the students' performance and academic achievement. Also, Zapata, Loizidou, Chaloulakou & Spyrellis (2016) studied the quality of physical and environmental factors and human health in sustainable development in Greek high schools and they concluded that choosing the eco-friendly materials is important in the development of sustainable schools. All environmental factors and school atmosphere and structure have impact on health and behaviors of students and teachers and their learning process. Izadpanahi & Elkadi (2013) and Bromic & Milošević (2012) investigated the impact of the sustainable School design on students' eco-friendly viewpoints and behaviors and they realized that students of sustainable schools show more eco-friendly viewpoints and behaviors than students of ordinary schools. Also, by studying the effective factors in developing ordinary schools to sustainable schools, Barr (2011) referred to supportive culture, pleasant physical factors and curricula and he concluded that these factors improve the function of schools and their move toward sustainability.

In a study titled "Teaching environmental skills to children in the form of green school", Mazlounian and Amiri (2015) have explored the methods of teaching environmental skills to children in the form of green school. This study examines and proposes solutions in three areas of popularizing the school atmosphere, upgrading the level of teacher preparation, and fostering the methods and content of environmental education for children. On the other hand, Molanaie and Arman (2018)

in the paper titled "Green School: Management of the use of plants in schools and its role in humanizing modern schools", inferred that plants play an important role in increasing the characteristics of human-centered architecture in educational spaces and thus humanizing modern schools. Also, Islamieh, Oladian and Safari (2019) in a combined research with the aim of designing a conceptual model of green schools in Iran, succeeded in designing the intended model. They identified three dimensions, nine components, and thirty indexes for designing the conceptual model of the green school. On the other hand, Soleimani,F ,Soleimani,N, Jamali & Shabannejad (2019) in a qualitative research based on the grounded theory approach, and with the aim of presenting a model for the development of nature schools in Iran, refer to some of the components like causal factors such as: cultural and social context, changing the viewpoints of the society and policy makers toward the children, and contextual conditions such as: religious and cultural fundamentals, obstructive administrative system, and interventional factors including: financial possibilities and resources, infrastructures and physical space, and other related components.

Finally, some researchers believe that factors such as: changes in policies, focus on physical and environmental factors, proposing appropriate strategies, supporting the government in developing guidelines and solutions for designing green schools, and developing rules and regulations in designing school buildings, adhering to educational policies towards the principles of sustainable development, the effective role of leadership, and the positive impact of participation activities of students in supporting sustainability in schools and society; are effective in developing ordinary schools into sustainable schools or green schools (Moncaster & Simmons, 2015; Dinham & Crowther, 2011; Roberts, 2014; Ramli, Masri, Zafrullah, Taib & Hamid, 2012; Scott, 2013; Marconi, Schiavo, Zancanaro , Valetto & Pistore, 2018; Liljenberg, 2015).

Therefore, by surveying the previous studies in other countries, it can be inferred that the scope

and importance of this category is very considerable from the perspective of educational professionals and experts of countries. Most researches have focused on different aspects and dimensions of sustainable schools in different communities. But most researches in Iran are done on environmental aspects of sustainability or "green schools" and they have not paid attention to other dimensions and aspects of sustainability and their integration with each other. In other words, the lack of research that has comprehensively addressed sustainable schools and then been localized for Iran is quite obvious. Due to the lack of research in this field, the significance and scope of the subject and the effective role of sustainable schools as leading organizations in developing education and culture in the society and meeting the needs and expectations of the education system on the one hand and their role in the sustainable development of the country on the other hand, the current research focused on the design of sustainable school model in the Islamic Republic of Iran.

Research Methodology

This research is an applied research on the basis of purpose multi-method qualitative on the basis of data collection. In this research, the researcher has sought to design a sustainable school model in the Islamic Republic of Iran based on the existing background and documents and the viewpoints of experts in this field. Based on this, the research was carried out in a multi-method qualitative including the theory building meta-synthesis method and the qualitative case study. The sources of data collection in the meta-synthesis section have included all the research articles published in the field of sustainable school since 2005 to 2020. With the targeted sampling approach and the intensity case sampling, among these studies, all research papers related to the objectives of the present study have been selected as participants of the meta-synthesis section. In this section, in order to collect the data to design a sustainable school model, the qualitative content analysis method of the relevant documents has been used. In the

section of qualitative case study, the potential participants to be interviewed were the experienced natives and Iran's upstream documents such as the education fundamental transformation document, the country twenty-year perspective document, the 6th development program, the transformation document of the science and technology, the comprehensive scientific plan of the country and the national curriculum of Islamic Republic of Iran were surveyed. The declarations of the revolution leaders were also considered. Key informants to be interviewed were selected by standard targeted sampling method. The method of collecting data in this section was the semi-structured interview with the informants and document mining. The data collected from the theory building meta-synthesis and qualitative case study of the sustainable school components were analyzed by grounded theory method with axial, selective and open coding to prepare the sustainable school model in Islamic Republic of Iran. To validate the results of the meta-synthesis section and to be certain of the accuracy of the steps, the method was conducted under the supervision of the research committee and database experts. To validate the results of the qualitative case study section, the interviews were assessed and performed by the precise direction and guidance of the thesis committee members.

In the theory building meta-synthesis method, the six guidelines of Sandelowski & Barroso

(2007) were used. Due to the complications and subtleties of the meta-synthesis method, the selection of team members of the meta-synthesis is highly significant. On this basis, the present team of the meta-synthesis is composed of two experts in educational management, two experts in curriculum planning and the meta-synthesis method with the database master of Mirzay-e Shirazi Library of Shiraz University. The first step in this method is the problem statement and preparation of the research questions and whereas the researcher has sought for designing the sustainable school model in the Islamic Republic of Iran, in this part, the same main question of the research "what is the sustainable school model in Islamic Republic of Iran?" is discussed. In the second step that is search for resources, for the purpose of comprehensive search and selection of participants in the meta synthesis section, besides targeted search in information and citation databases detailed in table 1, the search was done in hand-picked method. In the targeted search of the present study, whenever required, "references" was used for the backward search and "cited by" was used for the forward search. Generally, in these search methods, deletion or addition of a new article to review at any step of the meta-synthesis was possible. The search process was continued until reaching theoretical data saturation.

Table 1: Process of Targeted Online Search of References

Citation and Database of the Searched References	Scopus, Springer, Wiley Online, Sage, EBSCO and Google Scholar
Key Words in Search	Sustainable school- green school and echo school
Search in	Title of Article- abstract- key words
Limit of Resources for Study	Social Sciences and Educational Management
Time Limit	Since 2005 (The beginning of Sustainable Education Decade by United Nations) to 2020

In the third step, that is quality control, after search and selection of the intended resource, the research process continued by controlling each report individually and comparatively. In the step

of quality control based on the same criteria publishing in international accredited journal with several reviewers, running in the field of sustainable education, referring to one or several

items of sustainable school and in the end, similarities and differences and the stated basic items were controlled. Eventually, 115 articles were selected for the present meta-synthesis. The fourth step of the meta-synthesis, that is data analysis, began by the initial study of articles and collection of the required primary data from each article. Then the primary codes were analyzed by classification and meta-summary technique. After that, the primary codes extracted from the qualitative case study section were obtained. For this purpose, after rechecking the texts of interviews and upstream documents and the declarations of the revolution leaders, they were converted into short and significant parts in the form of primary codes. At the beginning of the fifth step of the meta-synthesis, the primary codes produced from the qualitative case study section were added to the codes extracted from the fourth step of the meta-synthesis. The fifth step of the meta-synthesis is the accumulation of data that is accomplished by finding the main metaphors and concepts of each report and comparing them with other metaphors or concepts of the same report or other reports. The language used in the meta-synthesis should include new metaphors which are smarter and more general than the metaphors used in the preliminary studies (Paterson, Throne, Canam & Jillings, 2001).

The six step of the meta-synthesis is validation of findings. The current research has benefited from four meta-synthesis validity methods considered by Sandelowski & Barroso (2007), that are descriptive, interpretive, theoretical and pragmatic validity methods.

1- Consulting with reference librarian (descriptive validity)

2- Consulting with expert in the meta synthesis research (theoretical validity), and educational management specialists (pragmatic validity)

3- Independent search of resources at least by two reviewers (descriptive validity)

4- Independent control of each report at least by two reviewers (descriptive and interpretive validity)

5- Meetings with research team to discuss the results of the searches and shaping and reforming strategies of resource search (descriptive validity)

6- Meeting with research team to discuss the results of assessing and decision making about evaluation strategies of studies (descriptive & interpretive validity)

7- Meeting with research team to consolidate the agreed areas and discuss disagreements until reaching consensus (descriptive, interpretive and theoretical validity)

8- Documentation of all processes, procedures, changes in work progress, and results

9- Holding loud thinking meetings for the team (descriptive, interpretive, theoretical and pragmatic validity)

For validity of results in the qualitative case study section, the accurate guiding of interview, supervision of thesis committee on the performance and assessment of the interviews and recheck of the content by the members of the thesis committee were done.

Findings:

The response to the axial question “what is the sustainable school model in Islamic Republic of Iran?” in this qualitative research was resulted in completion of the meta-synthesis fifth step. In fact, the school can be considered as one social system with inputs, outputs, processes and environment. The system includes individual, structural, cultural and political subsystems where the main and core activity is learning and education (Miskel & Hoy, 2013). On the other hand, education and sustainable school attempts to be responsive and develop sustainability in four personal, social, economic and environmental aspects. As a result, in examination and classification of the achieved themes for the sustainable school in Islamic Republic of Iran, school is considered as a social system as shown in figure 1, where its inputs, outputs, subsystems and processes were designed in a form to achieve the goal of sustainable education.

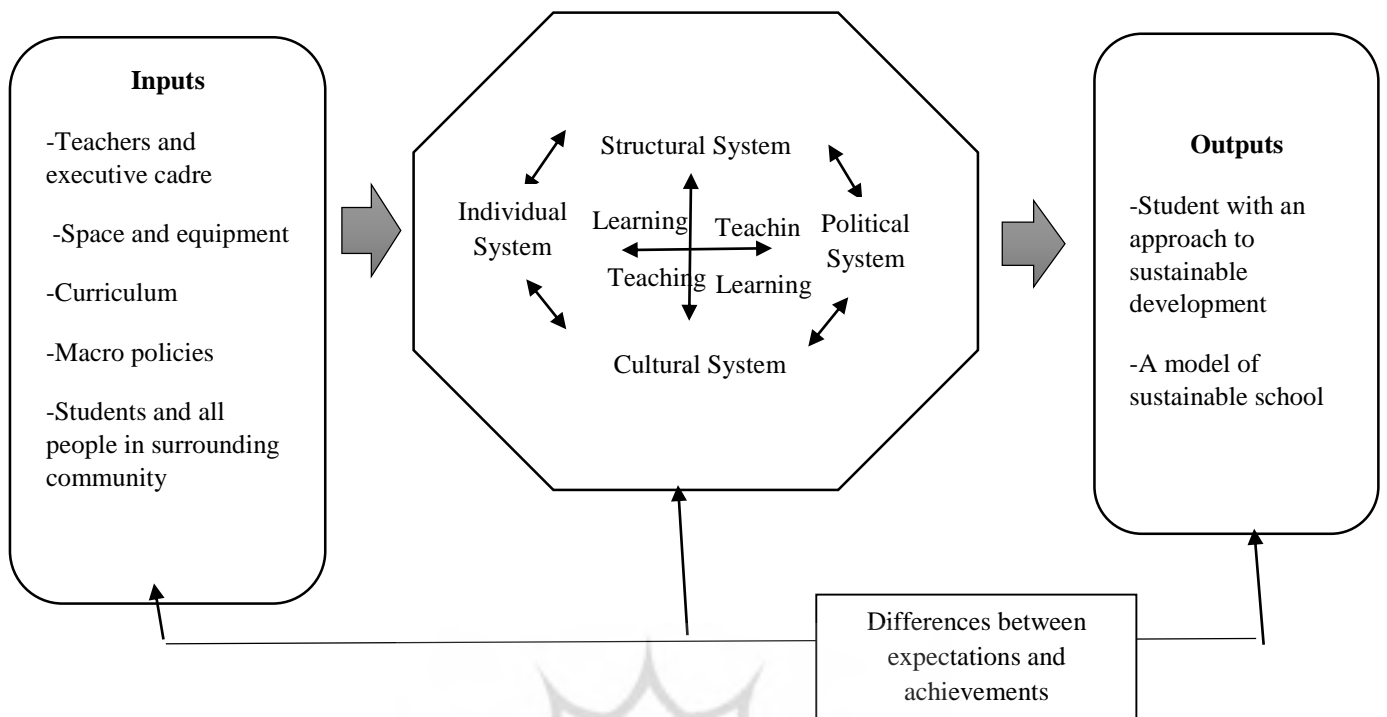


Figure 1: Sustainable school as a social system

Inputs:

Teacher and executive cadre: One of the most important inputs of a school with a sustainable development approach are teachers and executive cadre. They should have the necessary knowledge and skills to build required capabilities of sustainable development in students, and while they are bound by values of sustainable development, they are able to internalize them in students. In table 2, the characteristics of teachers and executive cadre in the sustainable school are described in three scopes of knowledge, skills and values.

Space and equipment: Since one of the aims of sustainable development is to protect the nature while using it appropriately, educational space and equipment in the sustainable school must contribute to this goal. In table 2, space and

equipment and their characteristics as part of the sustainable school system are described.

Curriculum planning: is one of the most important inputs of a sustainable school. The objectives of sustainable education are only achieved if the relevant curriculum is used in schools. The objectives and content of the sustainable curriculum can educate students with an approach to sustainable development when they are implemented by teachers in the schools with appropriate teaching methods.

Macro policies: Because schools do not play a significant role in formulating general policies in the Iranian education system, this element is considered as an input. The characteristics of the upstream policies for achieving a sustainable school are set out in Table 2.

Table 2: Inputs of sustainable school and their characteristics

Teacher	Knowledge	Orientation towards sustainable development	Knowledge about sustainable development and sustainable education- knowledge on the goals and logic of sustainable development and education
		About curriculum	Knowledge about the goals and the content of sustainable curriculum
		About the learner	Knowledge about the types of students and their learning methods- knowledge about teaching students' learning methods to them
		About the educational strategies	Knowledge about the teaching approaches used in the sustainable curriculum - knowledge about the suitable fields for sustainable education
		About the assessment	Knowledge about dimensions of sustainable education which must be assessed- knowledge about the assessment of qualitative merits
	Skill	Creating	The ability to design and production of teaching materials according to the students' characteristics- the ability to provide the opportunities for the students to experience new situations - the ability to enhance students' creativity
		educational	The ability to involve the different senses in educational activities- the ability to develop skills in the form of doing daily chores- the ability to teach how to learn- the ability to use the educational, participatory and student-oriented methods- the skill to make a balance in students' capabilities- the ability to familiarize the students with the indigenous knowledge- the ability to create indirect learning via modeling and using the local literature and customs
		Analyzing and Problem Solving	The ability to challenge their fundamental hypothesis- the ability to make a prudent action time of uncertainty- the ability to diagnose and solve the problem- the ability to use the transformative learning methods- the ability to critically evaluate the changing process in sustainable development- the ability to assess the potential results of various decisions and operations- the skill of critical thinking
		Motivational	The ability to pay attention to individual differences in group interactions- the ability to set activities to expand individual interests- the ability to facilitate and encourage participation in learning process- the ability to create a sense of change- the ability to consider the learners' experiences as a base and foundation for transformation
		Interpersonal and Social	The ability to work with people with different viewpoints and perspectives- the ability to communicate with local and global environment- the ability to develop interpersonal and group skills- the ability to create the pleasure of group learning in the students and develop it- the ability to teach about social problem-oriented issues- the ability to use the social environment as a field and source of learning- the ability to socialize the students according to community norms- the ability to address the social and citizenship responsibilities practically in the form of a classroom- the ability to prepare the students to face the new challenges- the ability to understand and identify the potentials of the surrounding environment

Teacher	Skill	Economic	The skill to create economic experiences (exchange, purchase and sale)- the skill to involve students in economic discussions in the classroom- the ability to plan to improve the use of various available resources
		Environmental	The skill to involve students in ecosystem and the surrounding animal and plant species- the ability to use the natural environment as a field and source of learning- practical observance of the principles of the environmental protection in the classroom, site and camps and creating the ability in the students
		Individual Care	The ability of self-care and teaching it to the students
	Value	To internalize the values of sustainable development	To have a holistic and inclusive viewpoint about different cultures and perspectives- respect and sense of responsibility towards the environment- belief in the importance of sustainable development values- belief in the need to address the sustainable development values- belief in avoiding early education
		Motivation	Motivate to practically address the values of sustainable development - motivate other people to involve in local and global environments- to motivate students to learn the values of sustainable development
Curriculum	Goals		To give knowledge, skills and values in the course components of the sustainable curriculum
	Content	Individual	Self-knowledge (autogenesis)- theology, familiarity with the responsibility to God and him/herself- individual health- public health and environment hygiene- principles of observing physical and psychological health- familiarity with the available health services- natural disasters management - safety principles - types and levels of education- personal protection against the crimes- self-control- the importance of sports and healthy nutrition- life skills- indigenous thought- modern and domestic technologies- individual originality and management - rational decision making- accepting responsibility
		Social	Civil and social responsibility- social skills (codes of social behavior, sympathy, embracing diversity) – identity and privacy- equity and social justice- critical thinking- intercultural understanding- principles of democracy and teamwork- the importance of life space- the concepts of demography (juvenility, senility and ...)- minorities and low-income groups- social security and delinquency- the importance of family and the related skills- social participation and demanding- cultural literacy and cultural invasion- media literacy and trust- national unity- prioritization of national interests over individual interests
	Content	Economic	Poverty and shortages- jobs, professions and methods of earning income - types of technology- thrift and consumerism- basic concepts of economy and business- entrepreneurship and business security- resistive economy and self-sufficiency- local economic advantages- insurance and subsidy- housekeeping and home occupations- food safety
		Environmental	Respect and sense of responsibility towards the environment- air quality- ecosystem and biome- green architecture- conserving the natural resources and energy- new energies- management and

Curriculum		quality of surface and ground water- biodiversity and endangered species- management of waste, biodegradable and recyclable materials- sustainable agriculture and organic products- climate change- environmental protection laws (forest, desert and sea)- realizing local environmental benefits
	Teaching Methods	Meaningful pattern- pattern of scientific exploration - pattern of indirect teaching - pattern of enhancing creative thinking- awareness pattern- pattern of experience and conversation- brainstorming method- participatory method- collaboration method- microteaching- conference method- problem solving - project method- question and answer- practical- discussion- experimental- excursion- exploration pattern in a legal way- pattern of how to control oneself- pattern of roleplaying - seminar- symposium conference- workshop teaching- pattern of concept reception - pattern of inductive thinking
	Educator	In the part of inputs- teacher, the characteristics are described.
	Learner	All the students in every class and school at the first level and all individuals of the surrounding community at the second level
	Evaluation	evaluation in qualitative method - care for individual diversity in evaluation
	Time	Time scheduled for class and creating a lifelong learning condition for all learners
	Place	Using the surrounding community and nature as a classroom
	Space and Equipment	Air
Water		Useful and effective use of urban water and rain in the environment- the extent of implementing various water-saving methods such as treating drinking water from non-drinking water- equipping the valves with electronic possibilities- the optimal use of wastewater treatment and the retreating rate of water
Area		The amount of available green space in the school and the method of using and managing them- eco-friendly landscaping- optimal use of the available ecosystem to meet the needs- conserving the available natural space in the area- conserving and increasing the existing biodiversity- using the natural elements in the school- balance between the building site and other school areas
Buildings		Securing and reinforcing the school building- considering the principles of Islamic Iranian architecture- considering the principles of green architecture- using the local materials in the physical construction of the school- considering the durability and types of the building materials- pay attention to lifespan of buildings - using the eco-friendly materials in the buildings construction- considering the plan of the buildings in terms of optimal use of biological resources (using sunlight and ...)
Paper		Care for the amount of paper used in the school- try to save paper- move towards the mechanized systems to decrease the paper consumption- care for recycling paper in the school environment- range of using the alternative methods for paper consumption

Space and Equipment	Food	Using the indigenous products in food production- care for lack of restraint in using foodstuffs- care for the separation of food waste for animal feed- supply healthy foodstuffs in the school buffet- care for food varieties served at the school buffet
	Equipment	Using the eco-friendly equipment- care for the quality and suitability of equipment with the needs- care for the amount of energy consumption of the equipment and energy labels- considering the amount of equipment reparability- considering the rate of equipment damage to the environment and minimizing it- considering the level of equipment safety- considering the local manufacturers for meeting the school's needs- having the possibilities of smart educational assistance (audio-visual)- the possibilities of the internet connections
	Litter	Considering the ways to reduce the litter production and their application- the amount of waste segregation in the school environment- optimizing the managing methods of collecting the waste- the amount of recycling waste in the school environment- considering the recycling as an economic matter
	Energy	The degree of using clean and new energy resources- considering the methods of saving energy-considering using the renewable energy resources

Subsystem and processes

The four subsystems considered by Michelle and Hoy (2013) in analyzing the school as a social system are: individual, structural, cultural, and political subsystems. According to them, these subsystems should act in the direction of the basic processes of a school, that is teaching and learning.

Individual subsystem: Undoubtedly, meeting the needs of people in school is one of the most important functions of a sustainable school. This section discusses all the characteristics of a sustainable school in dealing with people of school, empowering and motivating them, providing health and safety. The characteristics of the individual subsystem of the sustainable school are described in Table 3.

Structural subsystem: Structural subsystem points out the school structure in terms of rules, the scope of authority and participation, financial and educational resource and planning. The key point to this subsystem to achieve the objectives of sustainable development is participation. Participation in sustainable education and

development is one of the most important key concepts. The characteristics of the structural subsystem of a sustainable school are described in Table 3.

Cultural subsystem: The cultural subsystem includes the values, norms and the behaviors resulted by them at the school and its impact on the surrounding environment of school. Creating the culture of sustainable development in school at the first stage and then transmitting this culture to the surrounding community is one of the functions of the cultural subsystem of the sustainable school. Table 3 describes the characteristics of the cultural subsystem in a sustainable school.

Political subsystem: includes the fundamental concepts derived from the system of the Islamic Republic of Iran and the strategic orientation, cultural plans and models to transfer these concepts. The purpose of this infrastructure is the internalization of fundamental concepts derived from the system of the Islamic Republic of Iran. Table 3 describes the characteristics of the political subsystem in a sustainable school.

Table 3: Subsystems of Sustainable School and Their Characteristics

Individual Subsystem	Empowerment	Continuous education and professional development for personnel and teachers- empowering teachers and personnel towards sustainable education- programs for supporting the minorities and low-income groups
	Motivation	Care for job satisfaction- implementing plans to develop welfare for personnel, teachers and students - develop the welfare possibilities for the personnel, teachers and students- create an atmosphere to support and promote personnel, teachers and students- care for the creative ideas- develop the feeling of self-worth in people- create the sense of justice and trust in people- simultaneous attention to individual and collective needs
	Safety	Pay attention to securing the school space- carry out maneuvers to deal with natural disasters- care for the safety of all members of the school community when designing the spaces and environment and using the vehicles- adjusting the school space for using by all members of the school community- care for the rights of the impaired in designing the school spaces- communicate with the organizations involved in the accidents and disasters and providing voluntary services- develop the environmental communications in regard to providing personal and interpersonal safety
Individual Subsystem	Sanitation and Health	Considering the physical and mental health control programs and implementing them in the school- availability of counseling and service centers for the students-care for the noise and light pollution and find solution to control it- cook healthy foods and consume it in school- consider the physical activities in the class and school and create the suitable sports spaces- visit the available health services and train how to benefit health services in the community- use the principles of individual and environmental hygiene in the class and school- make environmental communications with the health organizations and use their services- extend the environmental communications to provide the individual and environmental health
Structural Subsystem	Participation	Integrate the goals of school and individuals- participation of the whole school in creating the goal and perspective, planning and implementation- assess continuously and use the feedbacks- participation of teachers and students in writing curriculum - active participation of students in curriculum and preparation of the course materials- participation of students in planning and arranging the class layout and perform it – active teachers council and students council - apply democratic principles and the right of election in school-cooperation, decentralization and continuous conversation in planning and implementing the programs- create an active learning environment in the school- create sensitivity in people for solving the problems
	Laws	Pay attention to the principles of sustainability in school laws- participation of the whole school in codifying the school laws- care for the local values and customs in school laws
	Educational and Financial Resources	Establish justice in the extent of students' access to educational and financial resources- consider the education costs and their impact on the students- set and implement plans for financial and educational support of students and their families- involve the companies and local industries in the school – involve donors and charities- the educational and economic participation of the parents

	Planning	Availability of environmental management project and plan- availability of crisis and disasters management program
Cultural Subsystem	Values	Care for the individuals and groups of the minorities- consider the common values and challenges- care for sharing intercultural ideas - maintain justice for access of different individuals and groups to the available services- care for cultural diversity and create a multicultural space
Cultural Subsystem	Norms	Availability of recruitment and employment policies for the impaired and groups of the minorities- make the services accessible for different groups- connect with the organizations related to environment and environmental associations- involve in voluntary activities of solving local environmental issues- use school facilities to solve local environmental issues- interact with social, religious and cultural centers- develop the school social capital by involving the local people in the issues- increase people's sense of belonging to the local community by using the school possibilities to solve the local problems- use the local community potential to solve the school problems- consider the school environmental conditions in planning and implementation- voluntary activities by school individuals- use environmental principles and mingle them in the school culture- cooperate in economic organizations and local plans for job-creation
Political Subsystem	Conceptual	Anti-arrogance and resistance- idealism- liberality (freedom versus duty- freedom of speech and ideas- freedom of thought)- justice seeking - independence (intellectual-political-cultural- economic- scientific)- political ethics- religious democracy- endogenous authority (identical-spiritual- national- scientific)- Iranian Islamic lifestyle- self-sufficiency- revolutionary acts (revolutionary thought- revolutionary motive and spirit- revolutionary insight- revolutionary action)- wait for the end Redeemer- national dignity- identity (Iranian- Islamic- revolutionary)- sacrificing and martyrdom- Jihad (economic- military- social- scientific-cultural- political)- national and religious zealotness
	Structural	Strategic orientation (holding discourse on conceptual components in school- be free from party ideology)- cultural role model (providing the background for development and promulgation of the Iranian Islamic lifestyle- provide the background for development and promulgation of the concepts of liberality, political ethics and national dignity- provide the background for development and promulgation of Jihad, anti-arrogance and idealism- provide the background for development and promulgation of the values of revolutionary Islamic Iranian identity in school)- plan (developing the comprehensive student identity building program- improving the teachers in the field of conceptual components)
	Functional	Education (including conceptual components in formal education curriculum- use and implement the conceptual components in tacit education- teach the skills of thinking, reasoning and liberality)- train (holding programs for familiarizing with religious and national dignitaries- hold programs to familiarize with martyrs and Holy Defense- hold programs to familiarize with Basij groups- hold programs to familiarize with Islamic Iranian lifestyle- hold participatory and democratic events in school)- management (with general and specialty competencies- health- with jihadi approach - justice-oriented and Islamic)

Processes:

The basic processes in school as a social system are learning and teaching, whose implementation

is guaranteed by the management and planning process. The characteristics of the processes in a sustainable school are described in Table 4.

Table 4: Basic processes of a sustainable school and their characteristics

Teaching	Relation of curricula to needs of labor market - educational program with practical aspects- system of continuous assessment of curriculum - allocate sufficient hours to practical education- up-to-date curriculum- combine theory and practice- improve the education quality- availability of needs assessment programs- conduct feasible researches- emphasize on research activities and projects- combine education and research- create a suitable environment for research
Learning	Indirect learning- use the transformational learning methods- encourage participation in learning process- consider the learners' experiences as the basis for learning- create the pleasure of group learning in students and develop it- use the social and natural environment as the field and source of learning- teach learning
Management and Planning	Participatory management-appoint managers in a consultative not procrustean manner- appoint managers based on merit- make the goals and policies of the school based on social needs- coordination between different departments- use and apply an assessment and feedback system

Outputs:

Student with sustainable development approach: Since the basic objective of a sustainable school is educating students with an approach to sustainable development and building the required characteristics and capabilities in them, the most significant output of a sustainable school is a student with an approach to sustainable development whose

characteristics and capabilities are described in table 5.

A model of a school with an approach to sustainable development: By establishing a sustainable school with respect to unique characteristics and circumstances of each school as a social system, a model of a school with an approach to sustainable development is composed.

Table 5: Characteristics and capabilities of a student with an approach to sustainable development

	Characteristics	Abilities
Responsible and Successful Learners	Passion and motivation to learn- set high standards for success- sense of responsibility before God, oneself, others and nature- accept new ideas and thoughts	Use the skills of basic literacy, relation and mathematics- application of technology in learning- creative and independent thinking- group thinking and learning- doing independent assessments- link and use learning and practice in new situations
Self-confident Individuals	Self-respect- sense of well-being and mental and emotional health in oneself- values of beliefs of safety and personal protection- tendency toward progress	Communicate with others and self-management- follow active and healthy lifestyle- self-knowledge- develop one's ideas in relation to others and have worldview- think and live independently- risks management- succeed in various activities

Being Healthy and Safe	Physical, mental and emotional health- the ability to avoid taking any addictive drugs- have a healthy lifestyle- be safe from misbehavior, inadvertency, violence and sexual issues- be safe from accident injuries- have security and stability- be safe in crimes, antisocial behaviors inside and outside school- be safe from bullying and harassment	The ability to enjoy the education process and progress- the ability to achieve social and individual successes- the ability to enjoy healthy recreations- actively participate in the school and enjoy it- acquire the necessary educational and research standards- have motivation and passion to attend school
Citizen with Islamic Iranian Revolutionary Identity	Respect others- commitment to participation and accountability in all cultural, social and economic aspects- with valuable attributes in Islamic Iranian revolutionary identity	Develop the knowledge and understanding of the world and understanding one's place- the ability to understand and accept various beliefs and cultures and adhere to one's principles- have wise choices and decisions- evaluate the technological, scientific and environmental issues- develop ethical perspectives and viewpoints in regard to issues

Discussion & Results:

In the present research, by investigating the previous international researches in the field of sustainable school and considering the circumstances and customary requirements of educational system and teaching philosophy in Islamic Republic of Iran, with a look over upstream documents and declarations of revolution leaders as well as a search through viewpoints of individuals with native experience in education area, a model of sustainable school was designed based on social systems. The objective of sustainable schools is the transfer of sustainable perspective into all aspects of school life and existence by means of sustainable school indexes (Kalaitzidis, 2013). The sustainable indexes contain social, economic and environmental aspects (Campbell & Ronbottom, 2008). Besides, Atkisson (2008, p: 143) has considered human health as the fourth sustainable index. He describes the four compass points of sustainability as: "nature supports economy, economy supports society, and society supports health". Furthermore, sustainability is not a series of facts known by people: sustainability is

actually relevant to values and attitudes (Huckle, 2006).

In the input section, teachers as the most important inputs of a school with an approach to sustainable development are required to hold special characteristics in three parts of knowledge, skills and values, to be able to play their role in creating a sustainable school. In the knowledge part, the teacher is required to have sufficient knowledge relevant to sustainable development, sustainable education, the objectives and logic of sustainable development and education, sustainable curriculum, and educational and evaluating strategies. In the skill part, the teacher should have educational, interpersonal and social, analytical, problem solving, individual care, creative, motivational, economic and environmental skills. In the value part, the teacher is also required to believe in values of sustainable development while be capable of internalizing them in students. In fact, teachers have a moral responsibility to adapt students' educational opportunities to current and future needs (Kensler & Uline, 2017). Teachers play an important role to inspire students with an

interest in environment and find out a way to move toward sustainable education and this can be achieved by individual changes, motivating students to collaborate and participate in eco-friendly activities and exchange knowledge and experiences (Aceska & Nikoloski, 2017).

The curriculum in a sustainable school, in terms of content, should provide the values of sustainable development, for which, in this case, the necessary characteristics are considered in four areas such as environmental, social, economic and personal. Actually, the education activities for sustainable development are needed to focus not only on the teachers' guided activities, but also to transfer sustainable development concept to the students' minds by means of educational material and suitable curriculum. In other words, the content of curriculum should be integrated with students' everyday activities so that it strengthens students' unconscious ideas about sustainable development. Also in this regard, Thomas (2009) believed that the student-oriented education and teaching method through developing learner's critical thinking, paves the way for education toward sustainable development. Actually, educational and curricular plans are required to help students to comprehend economic, social and environmental concepts (Aceska & Nikoloski, 2017). Also, education for sustainable development includes 21st century skills such as critical thinking, collaboration, communications and creative thinking and environmental awareness (Arman, Perkasa, Satriawan, Jasin & Irwansyah, 2019). Environmental awareness is one of the components of environmental literacy composed of motivation, knowledge and skills and includes aspects of knowledge, awareness, behavior and attitude (Jannah, Halim, Meerah & Fairuz, 2013).

On the other hand, educational space and equipment are some other inputs of sustainable school as social system. In regard to space and equipment, a sustainable school is required to have necessary characteristics about water, air, paper, buildings, surrounding environment, food, energy, waste, and equipment. Such characteristics are all defined in

regard to environmental, social, economic and individual care duties of schools. The main goal of the concept of sustainable school in the environmental scope is a decrease in environmental trace of school by students and their families (Wackernagel, & Rees, 1996). Schools are organizations that produce waste and consume resources and are involved in global warming. The impact of the school is not limited to its area but encompasses a wider social environment and it is considered fully effective as a fundamental part of society (Kalaitzidis, 2013). Chen, Wang,H, Wang,C & Shen (2018) referred to the components of building and equipment and energy storage in the development of sustainable areas in Taiwan. On the other hand, Gough (2005, 2006) believes that the changes implemented in sustainable schools should technically include equipment and infrastructure operations. Besides Brkovic, Pons & Parnell (2015) have emphasized the importance of designing buildings and green spaces and their impact on people's attitudes toward nature.

In the field of policies in the general policy section, it is needed to move toward institutional planning with numerous centers, grassroots organizations and grassroots monitoring frameworks in order to institutionalize sustainable development in society. In terms of policies and guidelines, participatory features should be emphasized more than any other element. Therefore, the education perspective for sustainable development is to make changes in policies, structures and current curricula, and to reconsider the buildup of economic and social structures. Thus, education for sustainable development can be described as the basic education that shapes the societies (spring, 2004). Also, Chen et al (2018) referred to policy management as one of the components of the surrounding area or green campus in the formation of sustainable schools.

In the part of subsystems, also, the individual, structural, political and cultural subsystems need to have such characteristics that can provide values of sustainable development and integrate in the culture of the society. In individual subsystem, paying attention to

empowerment, motivation, safety, health and well-being is particularly important. Some of the characteristics of the individual subsystem include: empowering teachers, fulfilling their job satisfaction, developing welfare facilities for them, paying attention to the school environment safety, considering physical and mental health control programs, and implementing them in school. Zepatou et al (2016) believe that individuals' health in sustainable school is remarkably important. In other words, all environmental factors and space in schools have impact on the health of students and teachers. On the other hand, Buijs (2009) has referred to the significant role of schools in improving health and well-being of students and teachers and he believes that education and health are considered as the important fundamentals in schools to increase the pleasure of teaching and learning. Furthermore, some researchers believe that teachers' sense of well-being is related to conditions of sustainable schools (Jiménez, Winkler & Bregenzer, 2017; Tetrick & Peiró, 2012). In fact, organizational well-being and quality of teachers' work are considered as indicators of teachers' sense of well-being and also, the high level of teachers' sense of well-being and quality of their work facilitate the sustainable education environment (Tetrick & Peiró, 2012). The sustainable school is the outcome of the processes through which those involved benefit from high sense of well-being and have a remarkable collaboration with the principal in school affairs (Algan & Ummanel, 2019). On the other hand, to know how to implement education for sustainable development in schools, teachers also need to be supported and trained (Wang, Zhou & Cui, 2019). Teachers should feel capable of doing activities based on education for sustainable development: in fact, sustainable development should become a familiar concept for teachers (O'Sullivan, 2014). Thus, teachers are required to have sufficient knowledge and skills in the area of education for sustainable development so that they are capable of participating in curriculum writing and choosing proper method for teaching. For this purpose, pre-service and in-service

training should be provided. In other words, teachers need supporting and training to comprehend how to implement education for sustainable development in schools (Wang, Zhou & Cui, 2019).

In structural subsystem, determine the method of participation and financial and educational support, proper planning and paying attention to the principles of sustainability in school laws can help the subsystem succeed in achieving the goals of sustainable development. In this part, the items such as participation of teachers and students in the school affairs, attention to sustainable principles in school laws and attention to financial and educational resources as well as establishment of justice in the scope of students' access to financial and educational resources, can be considered. Katsenou, Flogaitis & Liarakou (2015) have referred to improving students' active participation in running and developing sustainable schools. Lysgaard & Simovska (2016) have also taken the effective role of teachers and students' participation in education for sustainable development and education of health in green schools into account. On one hand, participation of students in making decisions about running schools sustainably and continuous occupational development of teachers and staff and assessing the progress toward education for sustainable development are of other elements referred to as effective movement toward establishment and development of sustainable schools (Gough, 2005). Actually, in order to survive in today's world, organizations are required to invest in activities leading to sustainable development. Some of the activities include hiring staff with environmental knowledge and commitment to protecting the environment and natural resources. On the other hand, rewarding and encouraging the staff committed to environmental resources and training them to conserve the environment can lead to achieving sustainable goals of the organization and improving the performance of the staff and the organization (Roscoe, Subramanian, Jabbour & Chong, 2019; Yong, Yusliza, Ramayah & Fawehinmi, 2019). In other

words, organizations need employees who focus on the issues related to sustainability (Singh, 2018). Briefly, today's organizations need management of sustainable human resources (Zaid, Jaaron & Bon, 2018). Eco-friendly human resources engage in activities such as reducing natural waste and enhancing green and sustainable behaviors, thereby they provide green effectiveness, reduce costs, and enhance sustainability in the organization (Yong et al, 2019). On the other hand, principals' support of teachers and their participation in decisions of school play a remarkable role in achieving school goals (Lunenburg & Ornstein, 2013).

In cultural subsystem, also, the values and norms in line with sustainable development, such as justice, attention to minorities and attention to environmental values can institutionalize the culture of sustainable development in school. International organizations such as United Nations Educational, Scientific and Cultural Organization (UNESCO) also supports the education approach to sustainable development. This approach encompasses the needs of sustainable societies, such as justice, the right of education for all, and the eradication of poverty (Hargreaves, 2010). Wijkman & Rockstorm (2012, p: 179) also believe that "The only way to avoid tensions and struggles over access to scarce natural resources is through policies based on the principles of equity and justice." As a result, today's teachers must involve students in the principles of equity and justice and direct them to these values and principles to become adults who obey these values and principles. Furthermore, the existence of an incentive culture in school, holding seminars and the existence of proper communications between school people is effective in strengthening the sustainability of education (Lunenburg & Ornstein, 2013).

In political subsystem, in order to internalize the fundamental concepts of Islamic Republic of Iran such as anti-arrogance, idealism, independence, Islamic and revolutionary Iranian identity and its other conceptual components, must be adopted to correct strategic orientations such as holding discourse on these components

and being independent of the party view. Then, it is required to prepare the intended cultural model and design to build-up the ground for the development and promulgation of these concepts. In terms of performance, the plans can be implemented in the three sections of education, training and management. In the official education part, this importance can be achieved by considering the concepts in curriculum and creating an atmosphere in implicit education where the concepts are tangible for students. In the training part, also, it is possible to benefit from the available capacities like national and religious dignitaries, martyrs and Basij groups. If the above items are fulfilled by competent, and proper management with constructive and Islamic approach, it is possible for the educational system to achieve this part of its objectives. In general, it can be stated that the method of leadership and management is a function of values controlling the constructive context of a society and it is obvious that the nature of the component elements of a society itself requires a special type of value system and a special method of management. Islamic management is a method of management which considers all the people of a community responsible and influenced by values orienting the value system of Islam (Turkzadeh, Gholami & MazgiNejad, (2019).

It is necessary to refer to the fundamental processes in a sustainable school, which include the processes such as: education, learning, management and planning. One of the most important characteristics of education in a sustainable school is the integration of theory and practice that enables students to apply what they have learned. In addition, in the learning process, the most important feature is the emphasis on transformational learning that can internalize the intended values in individuals. O'Sullivan (2014) believes that in the current era, we need a different educational system that focuses on transformational learning instead of emphasizing on the transitional one. In other words, sustainable education is a transformational paradigm that improves learning and coheres behavioral and cognitive perspectives and

develops a socio-environmental system toward flexibility in the face of threats in the ambiguous future (Semin, 2019). In management and planning process, also, the most important feature is participating in all programs and implementing them. In a sustainable school, principal support for teachers and participatory management plays a remarkable role in achieving the school objectives (Lunenburg & Ornstein, 2013).

Eventually, in the outputs section, a sustainable school seeks to train students who are confident, able to succeed in learning, and able to achieve economic prosperity. Besides, they are citizens with Iranian, Islamic and revolutionary identities, able to ensure their health and safety and effective participants in the social, environmental, economic and political fields. Some of the consequences of a sustainable school in the society can also be considered as economic, social and cultural, environmental and personal consequences. Van Den Branden (2015) believes that sustainable education improves learners' self-esteem, health and well-being and makes them successful, responsible and accountable learners. On the other hand, Vare & Scott (2007, 2008) also believe that in the field of education, two approaches for sustainable development should be taken into account: 1. providing guidelines for behavior and changing the way of thought about life 2. Creating the ability and capacity for critical thinking in students and developing the ability to make rational choices for an uncertain and complicated future. In a sustainable school, the participatory and student-oriented approaches are applied to enhance students' skills and abilities, and improve the quality of critical thinking, intercultural understanding, and willingness to participate in them. These are the key characteristics of an active citizen. Team training on the problem-oriented topics is an appropriate teaching and learning method in sustainable schools. Students' active participation in curriculum planning, the role of the teacher as a coordinator, the discovery of new knowledge by the students themselves, the introduction of innovations and technology within the learning process are all aspects of sustainable schools that are related to improving

the learning process and at the same time, improving the overall performance of the school (Kaliatzidis, 2012).

At the end, with attention to all the components and elements of the school as a social system and by benefiting from capable teachers in sustainable education, appropriate space and equipment, sustainable curricula and suitable teaching methods with an impact on all three levels of knowledge, skills and value, it is possible to provide a sustainable school. In addition, by involving companies and economic, social and charitable institutions, benefiting from transformational learning methods and participatory management and ultimately improving the quality of education, it is possible to provide a proper environment to train successful and motivated learners, with high self-confidence and mental and physical health, responsive and responsible as the outputs of the system. Such an approach has consequences such as: training capable people to meet the economic, social, cultural and political needs of the country, development of the self-sufficiency culture, increasing awareness, social literacy and skills and in short training of capable citizens in different fields with Iranian and Islamic identities; that is the mission of a sustainable school in Islamic Republic of Iran..

Finally, it is suggested that in future researches, the model provided by this research be validated and assessed in quantitative methods, and the model is formulated and implemented in operational programs to determine its adequacy and feasibility. It is also suggested holding specialized meetings with a focus on the subject to review theoretical perspectives and related practical experiences.

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During the implementation of this research and the preparation of the article, all national laws and principles of professional ethics related to the subject of research, including the rights of statistical community, organizations and institutions, as well as authors and writers have been observed. Adherence to the principles of research ethics in the present study was observed and consent forms were consciously completed by all statistical community.

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