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A Comparative Study of Components of Promoting Environmental Literacy in Selected Countries: Lessons for Iran

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ABSTRACT

The purpose of research was to investigate the components of improving environmental literacy in order to provide suggestions to the planners of Iran's higher education system. The research method was comparative-exploratory using a systematic review approach. To analyze the data and present the results, the Bereday method was used. The research sample includes eight leading countries in the field of environmental education i.e. Iceland, Finland, Japan, Switzerland, USA, Sweden, Canada, and China. The findings indicated that Iceland and Canada are similar in choosing the approach of "combined teaching of environmental subjects with other subjects". Also, Finland and Switzerland are similar in the development and expansion of the field of environmental education and new environmental trends, Finland and Sweden in the field of continuous updating of course content with environmental needs & requirements, and Sweden and China in the field of relying on the sustainable development approach. In addition, Japan and USA are similar in applying new technology & innovations and supporting & encouraging students through the allocation of financial support.Other finding is that Switzerland and Canada are similar in supporting the creation and expansion of mid and long-term university-approved programs. Canada, China and Iceland are similar in terms of active participation and participatory monitoring & evaluation of educational and group programs to solve environmental problems. The difference between the countries indicates that Japan has the advantage of designing a comprehensive program of environmental education at the higher education level and creating systems for sharing national & global experiences, while the emphasis of the USA is on expansion of green universities and Sweden on the provision of holistic project-based education. According to the findings, it is suggested to Iran's higher education planners to consider a comprehensive and holistic program with an integrated approach in the field of environmental literacy.

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1. Introduction

Attention to environmental issues has become a concern of human societies nowadays, because on the one hand, the quality of the environment has decreased, and on the other hand, dealing with the destruction of the environment and reduction of natural resources can only be realized with the long-term implementation of environmental policies (Hejazi Sidi, Karami Darabkhani, Hosseini *&* Rezaei, 2017). Today, the environmental crisis is very serious and its scope is very wide, so that mankind has noticed the harmful effects of unplanned and careless development. At the same time, it is assumed that environmental education is one of the important requirements of sustainable development; a progress that typically meets the needs of present generation without affecting the abilities of future generations to meet their needs (Suave, 2015). According to Edsand and Broich (2020), in the third millennium, the environment has acquired a different meaning and it can no longer be explained with old patterns and models. Therefore, in environmental policies, public participation & social awareness of environmental issues and development of environmental literacy are very important to change individuals' behavior; because environmental literacy is the ability to understand environmental issues in a macro & related context, which allows people to analyze, draw conclusions, evaluate and finally make accurate and informed decisions (Ikhsan & Kurnianto, 2020); improving the level of this literacy helps people to play a committed role regarding the environment (Mir Sanjarri, Big Mohammadi, Mohammadyari & Hedaytzadeh, 2021).

Various definitions of environmental literacy have been provided. For example, Mackey and Jacobson (2014) state that environmental literacy includes practical environmental ethics, familiarity with environmental cultural & value concepts, changing values & attitudes towards it, participation in protecting the environment, becoming a responsible & committed citizen , learn how to use resources correctly, acquire a lifestyle compatible with nature, make the right decisions to solve environmental problems and prevent new problems. Based on the definition of Disinger and Roth (2012), environmental literacy combines general knowledge about the environment with the ability to apply this knowledge in everyday life. According to Orr (2012), environmental literacy is understanding the connection and interconnectedness with the environment, as well as having a responsible attitude about our surroundings.

Several models have been presented by various researchers regarding the promotion of environmental literacy. For example, Fien &Tilbury (2002) divide the teaching-learning methods of environmental education into three different types of education about environment, education through environment, and education for environment.

In the Constitution of Iran, attention to the environment has a special place, so that a principle is separately and directly assigned to it (Article 50 of the Constitution). The basic question is to what extent these laws are implemented and how is the management of the environment and natural resources. In this regard, the weakness of educational programs is clearly visible in such a way that according to Hajilo, Bahmanpour, Zaimdar & Taqvi (2018) one of the shortcomings of environmental education programs in Iran is the lack of needs assessment of the audience and the participation of employees in the courses simply for the sake of obtaining administrative privileges. The lack of effectiveness of educational programs, and the uncertainty of their impact on the state of the environment, made managers face a kind of doubt and hesitancy about effectiveness of these programs and as a result, their unwillingness to increase educational investments. Therefore, one of the main factors of the ineffectiveness of environmental education is failure to adopt systematic approaches and inattention - or lack of attention - to the steps of the education process - especially educational needs assessment(Blumstein & Saylan, 2007; Erhabora & Done, 2016; Chung-Ting & Hsu, 2020; Suárez, Acosta-Castellanos; Ortegon & Queiruga-Dios, 2023).

Nowadays, due to the importance of environmental education and consequently the improvement of the level of biological literacy, many efforts have been made in different countries - especially the leading countries. For example, in the USA environmental education document, the following matters are emphasized: Allocation of annual funds by Congress as a financial aid for environmental education, establishment of the National Foundation for Environmental Education, development of environmental training guidelines at different levels of the educational system, and financial support for innovations in environmental education activities (Panjaitan, Aznam, Erlini, & Illahaqi, 2021). According to Nguyen and Pudlowski (2011), environmental literacy is in a high position in the higher education system of developed countries, and universities show great interest in this field. Nevertheless,

there is a lack of research related to the provision of educational models - especially about the categories of promoting environmental literacy - (Schmitz & Rocha, 2018). Also, we can also refer to the findings of the following research: Fissi et al (2020), Kose et al (2013) and Nasery Plangerd et al. (2021).

Examining the research conducted in Iran such as Mirsengari et al. (2021) about "Evaluation of environmental literacy of Malayer University students"; Khajooi , Soltani & Esmi (2018) entitled "Comparative study of environmental education in the curriculum of primary school in Iran and selected countries"; Kaviani and Nasr (2017) entitled "Investigation of the factors affecting the effectiveness of environmental education in Iran: synthesis of findings" and Sasath, Parishani, Jafari, Sharifian & Farhadian (2016) entitled "Comparative study of environmental education goals and related activities in selected countries and Iran" reveal the lack of serious and comprehensive attention to the issue of environmental literacy in Iran's higher education system.

Iran is one of the developing countries with rich natural resources that have been damaged by excessive exploitation in recent years. Among the damages caused to nature as a result of incorrect activities are: unmeasured & unstudied road constructions with adverse environmental consequences in mountain watersheds, or wetland environments; Containment of water and construction of dams without preliminary studies; Development of agricultural lands & destruction of pastures, forests and marginal lands; Destruction of high-quality agricultural lands and turning them into roads and industrial units; Exploitation of forests without considering the necessary conditions for their renewal; increase of domestic animals and their excessive grazing without attention to the capacity of pastures; Soil erosion and intensification of flooding and its direct and indirect effects on the environment (Sadeghi and Aqli Kohneh Shahri, 2017). Also, activities such as increasing agricultural activities in order to produce more crops, inappropriate cultivation patterns, inappropriate plowing systems of agricultural lands with high population density, changing the use of forests and inappropriate exploitation of aquifers and underground water has caused a large area of the country to be affected by the phenomenon of desertification. Water and wind erosion is a part of the inherent characteristics of Iran's climate, while human actions have caused this erosion to intensify(Javiz, Jalalian, Mosaddeghi, Chavoshi & Honarjoo, 2023). On the one hand,

the widespread use of fertilizers and pesticides in agriculture, and on the other hand, the widespread release of municipal sewage effluents - which are heavily contaminated with various harmful chemicals, including detergents and heavy metal salts - as well as extensive industrial activities - with effluents containing oil & hydrocarbon substances and various pollutants - have widened the field of threats to soil resources (Farshchi & Rahnama, 2013).

Among Iran's environmental challenges, air pollution - the presence of undesirable substances in the air in an amount that can adversely affect humans, plants, animals, and materials - is the most tangible and visible threat. The phenomenon of air pollution is directly related to factors such as technological progress, industrial development & improvement of the economic situation, population growth and expansion of urbanization, as well as special climatic and geographical conditions. Air pollutants not only directly endanger the health of humans and living organisms, but also indirectly - by contaminating raindrops, surface water, soil, and plants - threaten living organisms (Kaviani Rad, 2019).

Water crisis is other fundamental challenge of Iran, which is consequence of improper use of water resources. Iran's main concerns about the water crisis include the following: High climate variability, inappropriate water distribution and prioritizing economic development (Madani, 2013). Iran has passed the crisis stage and this situation indicates a water bankruptcy because the demand for consumption is far more than the available water (Estoni, 2018). Iran is experiencing serious water problems such as frequent droughts with excessive extraction of surface and underground water through a large network of hydraulic infrastructure and deep wells (Madani, 2016). One of the signs of this critical situation is the drying up of lakes, rivers & wetlands; reduction of underground water level; Land subsidence; Destruction of water quality; Soil erosion and desertification and increase in dust storms. Today, the poor condition of Iran's environment has become an important national concern. Therefore, it is necessary for thinkers in different fields of science to find a solution in that case through research (Javaheri, 2019).

2. Research Method

The research method was comparative-exploratory using a systematic review of related documents and articles published in the period of 2000-2022. To analyze the

data, the method of George F. Bereday (1969) was used to identify the dimensions and key components affecting the formation of educational programs of environmental literacy in the selected countries. The sampling method is non-probability of the targeted type including the top 8 countries in environmental protection and according to the statistics published in 2021 by the Swiss institute RobecoSAM.

3. Findings

Step 1: Description

At this stage, the researcher has identified the experiences related to the promotion of environmental literacy in the higher education systems of the selected countries:

1. Iceland

In this country, the organization of the content of university curricula in the field of environmental education includes the integration of environmental literacy education with other subjects (Larsson, 2019). Also, in Iceland's higher education system, encouraging and persuading students for responsible social participation and creating active learning opportunities to combine theoretical and practical knowledge is pursued (Drake & Reid, 2018). In addition, group-oriented research assignments and the guiding role of professors in teaching environmental principles to students are emphasized (Larsson, 2019). The selection and use of various teaching methods and facilitating the atmosphere of inter-university cooperation can be observed at the level of the Icelandic higher education system (Larsson, 2019; Drake & Reid, 2018).

2. Finland

In this country, the government has given serious support to the creation and expansion of new environmental disciplines, and efforts have been made to coordinate the content of the courses with the needs and requirements of the environment (Kauppinen, 2014). According to Anttila (2014), the Finnish higher education system also supports the expansion of inter-university cooperation, creating critical opportunities for students and faculty members, and collaborative teaching-open discussion. Other experiences of this country include the design of university curricula with the aim of valuing sustainable ways of life and understanding environmental

literacy and attention to the creation of environmentally friendly universities (Drake & Reid, 2018).

3. Japan

In this country, the design of a comprehensive environmental education program in postgraduate courses is emphasized. Also, by creating sharing systems, national, regional & global experiences are monitored and counted. In addition, in the way of improving students' learning level, the use and application of new technologies is emphasized (Matsubaguchi, Son, Kodama & Jongbin, 2019). According to Drake & Reid (2018), Japan has paid attention to the proportion of lessons and holding and expanding camps and activities outside university classes, continuously evaluation of sensitivity and awareness level of students towards learning & implementing environmental principles.

4. Switzerland

In this country, support for the creation and expansion of mid-term and long-term university programs in environmental education, development of new and interdisciplinary fields, support for effective programs in increasing awareness and general knowledge in the field of environment for all students, allocation of sufficient credits, strengthening learning opportunities inside and outside the university and supporting the creation of local environmental education bases are emphasized (Perry& Miller 2022). Also, according to Drake & Reid (2018), special attention was paid to supporting programs to create individual competition among students in the field of environmental education. According to Perry & Miller (2022), the use of group and team cooperation methods in teaching environmental concepts and criterion of "familiarity with the principles of the environment" as a qualification criteria for university professors is one of the other programs in this country.

5. USA

In this country, supporting students and encouraging and persuading them to participate in environmental education activities, financial support for inventions and innovations, and allocating prizes for the best professors and students in the field of environmental education have been considered (Perry & Miller, 2020). Also, at the

macro level, the government is pursuing the establishment and expansion of green universities and environmental research institutes and establishment of the "National Foundation for Environmental Education" in order to coordinate resources and interdepartmental efforts and the annual budget allocation by Congress - as a financial aid - (Youkhanaa, Leifkesb, & Enrique, 2018). Regarding the macro-government support, Perry and Miller (2020) point to the following policies: Support for development of the use of new educational technologies, serious support for strengthening the scientific & research relationship between domestic and international universities, supporting festivals & conferences, supporting expansion of the atmosphere of academic diplomacy, inviting environmental activists to give lectures and transfer experiences, and continuously encouraging academic centers to improve educational and research standards in the field of environmental education (Perry & Miller, 2020).

6. Sweden

In this country, special attention is paid to project-oriented and holistic environmental education, relying on the sustainable development approach and encouraging & supporting the development of new teaching and learning methods. Also, according to Larsson (2019), continuous updating of the content of environmental education courses and extensive use of virtual education are other experiences of environmental education in this country. According to Breiting & Wickenberg (2010), other Swedish programs include supporting the formation of non-governmental organizations in academic environments, using the supervision of academic elites, and connecting the academic body with non-governmental organizations.

7. Canada

In this country, environmental education is followed with a comprehensive integrated approach and relying on the method of active participation (Johnston, 2019). In order to increase the effectiveness of environmental education through practice & experience and attention to sustainable development issues in environmental education , the following programs are also of interest to Canadian politicians : Support the increase of public understanding (Council Of Ministers Of

Education Canada, 2020), support the establishment of several environmental research centers (Perry & Miller, 2020) and outdoor environmental education. Also, according to Johnston (2019), other important programs are: Use of specific & codified educational models to formulate medium & long-term educational programs, use of a specific model for prioritizing environmental education according to different academic courses, diversifying the content of environmental courses and changing current curricula through adaptation to modern curricula.

8. China

According to Tao (2018), the following subjects have been the focus of Chinese policymakers: Prioritizing environmental education by taking advantage of global sustainable development indicators & models, allocating government scholarships to attract students to study in the field of environment, establishment of university centers accountable for their performance in the field of environmental protection, targeted planning for the expansion of environmental education & sustainable development, and the continuous use of global experiences and international scientific & research capacities for open- designing academic courses. Also, Nan, Xiaqiang, & Jin (2013) point to a wide range of Chinese government policies, such as: Using the experiences and capacities of governmental & non-governmental organizations, monitoring & participatory evaluation of environmental education programs, training student teams to use their power and capacity for active participation in environmental matters to local communities, supporting the use of workshop, group discussion and problem solving methods in the education process, supporting the implementation of national strategic programs for environmental education, requiring students of different educational levels to familiarize themselves with environmental laws and the use of new educational techniques in the way of institutionalizing the learning of the key principles of environmental protection and sustainable development (Nan, Xiaqiang, & Jin, 2013).

Step 2: Interpretation

1. Iceland

It is the northernmost country in Europe and an island in the North Atlantic Ocean with an area of 102.775 square kilometers with a population of 372.520

(Worldometer, 2021). Over the years, Iceland has maintained its position as the most environmentally conscious country in the world. This country has made the use of geothermal resources for electricity and heating among its priorities. It strongly dealt with ocean pollution and has promoted sustainable fishing. Iceland is a beautiful and stunning island, known for its water valleys, natural hot springs, volcanoes, northern lights, whale watching and mountaineering from arctic glaciers. Iceland is one of the countries that has given great importance to its environment, has made large investments to maintain its sustainability, and is known as one of the greenest and most compatible countries in the world in the field of environmental protection. In addition, due to the implementation of useful programs for compatibility with the environment, it has obtained high scores of 93.5 in the environmental protection index (Johnston, 2019). One of these programs in Iceland is to keep the waters clean and apply sanitary rules for fishing, which are considered among the priorities of environmental protection (OECD, 2021).

2. Finland

It is a country in Northern Europe with an approximate population of 5,541,000 and an area of 338.145 square kilometers. Although in the 1980s, Finland had a high ranking in nitrogen emissions and other activities that destroy the environment, but for many years, it has tried to restore itself to its original state, and with an environmental protection index of 78/64, it is currently in the list of environmentally friendly countries (Worldometer, 2021). The Finnish government is aggressively tackling greenhouse gas emissions and making significant use of various forms of renewable energy. The most common energy used among the residents of Finland is wind energy, and according to the annual environmental performance index, more than half of its electricity is produced from renewable energies (OECD, 2021). In this country, at the level of the higher education system, the government of Mardan has given serious support to the creation and expansion of new environmental disciplines and they are trying to ensure that the content of the courses presented is accompanied and coordinated with the needs and requirements of the environment (Kauppinen, 2014).

3. Japan

Japan is an island country in East Asia and the northwest Pacific Ocean with an area of 378,000 square kilometers and a population of 125,700,000. In 2003, Japan passed a law to promote environmental education. The purpose of this law was to strengthen voluntary environmental protection activities and increase educational activities to increase citizens' understanding of environmental protection. Providing graduate education courses is one of the principles of environmental education in many Japanese universities. Voluntary inclusion of environmental concerns in the curriculum by the teachers' union and holding workshops for environmental education teachers are other measures of this country (Dada, Eames & Calder, 2017).

4. Switzerland

It is a landlocked country at the junction of Western, Central and Southern Europe (Berner & Berner, 2012) with an area of 41.285 square kilometers and a population of approximately 8700,000 people. With an environmental protection index of 1.89, Switzerland is also among the most environmentally friendly countries (Worldometer, 2021). This country also has a high level of entrepreneurship and has taken various measures to maintain the sustainability of its environment. In addition, Switzerland has achieved high economic growth by focusing on the use of renewable energy to produce resources. The activities of the government in this country have played a significant role in preserving the environment and highlighting its positive features such as clean air, beautiful lakes and natural mountains (Reimers, 2021).

5. USA

According to the latest census, the population of America in 2022 is estimated to be more than 333 million people, which is the third most populous country in the world with an area of 983,520 square kilometers. The United States, the world's largest economy, has made progress in reducing several environmental pressures while maintaining one of the highest Gross Domestic Products per capita in the world. It has decoupled emissions of greenhouse gases, air pollutants, water abstractions and domestic material consumption from economic and population growth. However, high consumption levels, intensive agricultural practices, climate change and urban sprawl continue to put pressure on the natural environment. Despite the recent acceleration

of action to address climate change, further efforts are needed to achieve the goal of net-zero greenhouse gas emissions by 2050. The United States is also among the major contributors to marine litter with serious consequences for communities and the environment (OECD, 2023).

6. Sweden

It is a country in Northern Europe and the Scandinavian Peninsula with an area of 450.295 square kilometers and a population of 10.42 million. With an environmental protection index of 86, Sweden has been able to maintain its position among the greenest and most compatible countries in the world during two consecutive years of 2018 and 2019. According to the governmental documents, the use of fossil fuels in this country should be completely stopped by 2020. This action, as well as the replacement of renewable energies instead of non-renewable fuels, is done in order to prevent the pollution of the natural environment. In fact, the use of renewable energy significantly reduces the amount of carbon and provides a safer and cleaner environment. The most important action taken in the direction of environmental sustainability is the cooperation agreement between Sweden and neighboring countries in order to protect the Baltic Sea and preserve the region's ecosystem (Jetoo, 2019; Tomasz & Meyer, 2022).

7. Canada

A country in the North American continent including ten provinces and three territories with an area of 9,984,000 square kilometers, it is the second largest country in the world in terms of total area. The total population of this country is 38.25 million people. The ultimate goal of environmental education in Canada is sustainable development. The most prominent activities of environmental education include the following: establishing a government institution or an office of environmental education & sustainable development for coordination between different social sectors; Encouraging and passing laws related to environmental education & sustainable development at the state level; Encouraging and issuing valid school certificates for environmental education & sustainable development; increasing the integration of indigenous and traditional knowledge in environmental education; Partnership with local and non-governmental organizations for environmental

education & sustainable development; Creating a clear set of criteria to preserve the environment in schools; Encouraging intra-state cooperation in increasing environmental education & sustainable development activities; Designing a timeline to examine how to achieve the goals of environmental education; and the establishment of the Ministry of Environment and Climate Change(Environment and Climate Change Canada, 2021).

8. China

Located in East Asia, China with an area of 9.569.961 square kilometers is the fourth largest country after Russia, Canada and the United States, and with a population of over one billion four hundred million, it is the most populous country in the world. Dry seasons and wet seasons with monsoons are the prevailing weather conditions in most parts of China, which results in a significant temperature difference between summer and winter. In winter, the northern winds blow cold and dry, and the southern winds from the sea coast are hot and humid. Monsoon storms (about 5 times a year) along the southern and eastern coasts, destructive floods, tsunamis, earthquakes, landslides and droughts are some of the natural disasters in China (Asian Development Bank, 2013). The expansion of deserts—especially the Gobi Desert—is a major environmental problem in China. Although planting trees in desert areas has reduced the number of sandstorms since the 1970s, continuous drought and inappropriate agricultural practices have caused sandstorms to hit northern China every spring. The Chinese government approved the "National Action Plan for Promotion and Education" for the years 1996-2000 and suggested that environmental education should not be applied only in biology, geography and chemistry school subjects, but also should be included in other subjects - such as physics, mathematics and moral education (Nan et al., 2013).

Step 3: Juxtaposition

At this stage, the experiences presented in the promotion of environmental literacy in the higher education system of the selected countries are examined together and common experiences are counted and aggregated. The findings of this stage can be expressed as follows:

- Creation and development of interdisciplinary academic disciplines and trends in the field of environmental education (common experience between Iceland, Finland, Switzerland and China),
- Revision and adaptation of the content of university curricula in the field of environmental education based on the sustainable development approach (common experience all selected countries),
- Requiring students of different educational levels to familiarize themselves with environmental rules and regulations (common experience between United States and China),
- Using new educational methods different from traditional teaching styles (common experience between all selected countries),
- Facilitating the atmosphere of cooperation and inter-university diplomacy in the field of environmental education (common experience between USA, Iceland, Canada and Japan),
- Financial support of government for university educational programs in the field of environmental education (common experience between all selected countries except Iceland and Finland),
- Transfer of experiences and capacities of governmental and non-governmental institutions active in the field of environment (common experience between Canada, China, Sweden, Switzerland),
- Using new technologies to improve students' learning level in the field of environment (common experience between Switzerland, America, Sweden and Japan),
- Designing and developing a comprehensive environmental education program in the university system with an integrated approach (common experience between China, Switzerland, Japan and Canada),
- Using the capacity and supervisory power of academic elites in environmental education and improving related laws at the community level (common experience between China, Canada, and Sweden),
- Emphasis on the guiding role of professors in teaching environmental principles to students (common experience between Iceland and Switzerland),

- Setting up and developing research institutes and environmental research centers at the university level (common experience between Canada and the United States),
- Encouraging pioneering academic centers to improve educational and research standards (common experience between United States, Finland, China and Sweden),
- Prioritization of environmental education using global models (common experience between Japan, Canada and China).

Step 4: Comparison

Table 1: Comparative study of experiences in promoting environmental literacy in the higher education system of 8 selected countries

No.	Similar Components	Iceland	Finland	Japan	Switzerland	USA	Sweden	Canada	China
1	Facilitating atmosphere of cooperation and inter-university diplomacy in the field of environmental education	*	*	*	*	*	*	*	*
2	Major government support for university educational programs in the field of environmental education	*	*	*	*	*	*	*	*
3	Encouraging pioneering academic centers in improving educational standards in the field of environmental education	*	*	-	*	*	*	-	*
4	Emphasis on the role of guiding and coaching professors in teaching environmental principles to students	*	*	-	*	*	-	*	*
5	Transferring experiences and capacities of governmental & non-governmental institutions active in the field of environment	*	*	*	*	*	-	-	*
6	Creation and development of interdisciplinary academic courses and trends in the field of environmental education	*	*	*	*	*	*	*	*
7	Designing and developing a comprehensive environmental education program in the university system with an integrated approach	*	*	*	-	*	*	*	-
8	Setting up and developing research institutes and environmental research centers at the university level	*	*	*	*	*	*	*	*
9	Prioritization of environmental education using global models	*	*	-	*	*	-	-	*

10	Using the capacity and supervisory power of the elites of the academic body in environmental education	-	*	*	-	*	-	*	*
11	Requiring students of different educational levels to familiarize themselves with environmental laws	*	-	*	*	*	-	-	*
12	Using teaching methods different from traditional teaching methods in environmental education	*	*	*	-	*	-	*	*
13	Adapting the content of university curricula in the field of environmental education	-	*	*	*	*	-	*	-
14	Using new technologies, equipment and educational facilities to improve the level of learning	*	*	*	*	*	*	*	*

In the first, second, sixth, eighth and fourteenth components, there is similarity between all countries .Regarding the third component, there are similarities between 6 countries and differences between two countries. In components 4th, 5th, 7th and 12th, there are similarities between 6 countries and differences between 2 countries. In the 9th, 10th, 11th and 13th components, there are similarities between 5 countries and differences between 3 countries.

4. Conclusion

This research was conducted with the aim of learning from the experiences of selected countries to promote environmental literacy in Iran's higher education system. The findings showed that the countries of Iceland and Canada compared environmental subjects with other subjects by using the integrated teaching approach. Finland and Switzerland are similar in the development and expansion of new environmental trends. Also, Finland is similar to Sweden in terms of continuously updating course content with environmental needs and requirements, and there is a similarity between Sweden and China in relying on the sustainable development approach. Japan and USA are similar in applying new technology and innovations in this field, while Switzerland and Canada have similar activities in supporting the creation and expansion of mid-term and long-term university environmental programs. In addition, USA and China have similar activities in terms of supporting and encouraging students and allocating financial support to environmental education. Other finding of the research shows that Canada, China and Iceland benefit from active participation and collaborative monitoring and evaluation of educational and group programs to solve environmental issues. The differences in this area indicate that

Japan has the advantage of designing a comprehensive environmental education program at the higher education level and creating systems for sharing national and global experiences, while the USA has green universities and Sweden has a project-oriented and holistic approach in environmental education.

In Iran, only two components namely the creation and development of interdisciplinary fields and trends in the field of environmental education, and establishment and development of research institutes and centers at the university level, have received the attention of environmental education policymakers. Other identified experiences were not found in the higher education system of Iran. In explaining the above findings, it can be said that in the current situation of Iran - due to the lack of awareness of the officials and the people - a fatal blow has been inflicted on the environment - we need to raise a generation that is friendly to the environment. The young generation must believe that environmental challenges are dangerous and can cause a crisis in the sustainable development of the country. In order to achieve this goal, a fundamental change in educational policies and programs in order to support environmental education and promote environmental literacy at various levels - especially at the university level - is an urgent need. According to the findings, it seems that all the selected countries have policies such as facilitating the atmosphere of cooperation and inter-university diplomacy, government's support for university educational programs in the field of environmental education and encouraging pioneer university centers in improving educational and research standards. These policies can facilitate continuous encouragement of academic centers to improve educational and research standards in the field of environment. Universities and higher education centers should be able to develop effective programs to increase the awareness and general knowledge of the environment and sustainable development of students.

The findings also indicated that most of the selected countries have put the guidance and coaching of professors and faculty members in teaching environmental principles to students. In this regard, it seems that in the mentioned countries, the guidance of students is not solely entrusted to the universities, and the role of governmental and non-governmental institutions - and their interaction with the universities to exchange capacities and experiences - is also considered important. In addition, the findings indicated that most of the selected countries have considered

the use of modern educational methods instead of traditional teaching methods in environmental education for students. They have also paid attention to the use of new educational technologies, equipment and facilities in order to revise and adapt the content of the curriculum in the field of environmental education. In this regard, it seems that in the mentioned countries, there is a foresight regarding the promotion of students' environmental literacy and its institutionalization in the higher education system.

The findings also reveal that most of the selected countries have prioritized environmental education by taking advantage of global models of environmental protection, using the capacity and supervisory power of academic elites, and requiring students of different educational levels to familiarize themselves with environmental laws. In this regard, it seems that the mentioned countries have well understood that any type of educational program developed in order to promote environmental literacy at the level of the higher education system requires continuous monitoring and evaluation. Also, monitoring and evaluation with the participation of academic elites can inform managers and those involved in education about the degree of sensitivity of students to learning and implementing environmental principles, as well as the degree of effectiveness of education - both quantitatively and qualitatively - ; so that they can determine the priorities of environmental education and plan for it.

The findings also highlighted that most of the selected countries focused on the development of environmental literacy courses through the creation and development of interdisciplinary courses, design and development of a comprehensive environmental education program, and launch and development of research institutes and centers. In this regard, it seems that the view of the mentioned countries regarding the promotion of environmental literacy is not partial, but holistic and comprehensive. Basically, in order to achieve the goals of environmental literacy, a comprehensive education program is designed in the university system and based on this program with a developmental view of disciplines and trends, educational and research institutes and centers in the field of environment (both quantitatively and qualitatively) should be expand.

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