

Development of an Environmental Curriculum Model Based on Self-Management in High School: A Qualitative Study

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Abstract

Purpose: This study aims at developing an environmental curriculum model based on self-management in the high school in a qualitative study.

Methodology: This is an applied study in terms of purpose and a qualitative study in terms of implementation method. The research community included environmental curriculum experts in Iran based on self-management in 2021. The research sample was estimated to include 15 subjects according to the theoretical saturation principle. They were selected by purposive sampling method based on the inclusion criteria. Indexing and semi-structured interviews were used to collect data, the validity and reliability of which were confirmed. Finally, the data were analyzed by content analysis method.

Findings: The results showed that, in terms of objectives, the self-management-based environmental curriculum in the high school included the themes of organizing critical thinking skills development, constructive thinking promotion, behavioral strategies, improving environmental knowledge and cognition, environmental culture promotion, internalization of environmental value, and natural reward strategies. Also, in terms of contents, it included themes of organizing integrated content, applied content, development of thinking skills, alignment with humanities and ethics, comprehensiveness of content, development of managerial skills and integrated content. In addition, in terms of teaching and learning strategies, the themes included being organizational and practicality, interactivity, and being exploratory. The themes of the evaluation element included rational organization, situation-based evaluation, evidence-based evaluation, and evaluation feedback. Finally, based on the organizational and basic themes in the area of objectives, content, teaching and learning strategies and evaluation, a self-management-based environmental curriculum model was designed for the high school.

Conclusion: According to the results, experts and planners can improve the self-management-based environmental curriculum.

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1. Introduction

Today, the environment is seriously threatened nationally and globally, and the irresponsible anthropogenic changes in the environment have led to various problems and left many adverse effects and consequences (Schneller, Harrison, Adelman & Post, 2021). Environmental education can train environmentally literate individuals who have the required knowledge as well as positive attitudes and sensitivity to the environment, in addition to the cooperation, planning, problem solving and functional skills (Reid, 2020). One of the major challenges in the world today is curriculum design and provision of an appropriate and easy method to successfully teach environmental issues, which are mainly taught through workshops and formulation of suitable and straightforward teaching methods (Shobeiri & Shamsi, 2015). The best method to protect the environment is to design environmental projects aiming to find the most appropriate system of presenting contents and activities and its structural implementation method that can promote environmental knowledge and awareness, respect for the environment, responsibility for environmental problems and environmental protection (Khademi-Vidra, 217).

The environmental curriculum has been considered since the early 1960s, and this focus has led to the contents and learning materials based on the student's environment and relevant teaching (Seo, Ryu & Hwang, 2020). Curriculum refers to the formal and informal content and methods of overt and covert teaching and their evaluation method, through which students acquire the necessary knowledge and appropriate skills and change their attitudes and values (Kisige, Ezati & Kagoda, 21). The curriculum is provided in two parts of design (procurement) and operation, the design and procurement of which leads to the regulation of curriculum-related activities and the preparation of appropriate contents (Artun & Ozsevec, 2018). The procurement is a process that requires attention to the basics of the curriculum (philosophical, psychological and sociological foundations), goal-setting, content selection and teaching and evaluation methods (Tytler & Van Driel, 2021).

The four main elements of the curriculum, especially the environmental curriculum, include objectives, content, teaching and learning strategies, and evaluation (Schmidt & Lawson, 2018). The purpose of the environmental curriculum is to raise awareness of the individual's environmental knowledge, cognitions and awareness; in a way that one understands the values of the environment and is diligent in preserving it and conserves the environment through environmental thinking, reflection and contemplation (Srbinovsky, Erdogan & Ismaili, 2010). The environmental curriculum should include experiences of problem solving, challenges, decision-making, and learner participation in ecological, political, economic, social, aesthetic, and ethical aspects (Bester, et al, 2017).

One of the important topics in terms of environmental curriculum is the self-management, which, in environmental curriculum, may explain the environmental goals for students to consider the general goals of environmental protection and take precise and appropriate measure (Moharmnejad & Heidary, 2006). Self-management includes the control of mood, thoughts and behavior, being open to criticism, following the rules, agreement and cooperation with others and a training process through which an individual or a group encourages and guides themselves to achieve a specific behavior and desired result (Van Hooft, et al, 2018). This structure does not seek to change attitudes and personality, but to control and manage behavior and, if necessary, make changes in behavior (Lee, Law, Chun & Chan, 2017). Self-management is a strategy for the self-regulatory process in which a person can maintain a sequence of behaviors or develop a positive and skillful behavior and reduce inappropriate behavior (Adnanes, et al, 2020).

Among the little studies that have been performed on the environmental curriculum, no one has examined it from the self-management point of view and the most important relevant studies are reported below. Asadzadeh, et al (2020) investigated the curriculum model of extracurricular activities with emphasis on environmental education as well as its objectives (including its three aspects of knowledge, attitude and skills), content, teaching methods and learning and evaluation. Explaining each of them, they reported that 90% of the curriculum specialists and elementary school teachers confirmed the characteristics of the objectives, content, teaching methods, and learning and evaluation in the mentioned model. Khodadadi Tirkolaei, Rasoli & Fallah (2020) studied the environmental ethics

curriculum model and illustrated its objectives as follows: recognizing and analyzing environmental problems, cultivating higher mental processes such as self-regulation, learning the proper use of environmental resources, developing environmental problem solving skills, comprehensive environmental education, interpretation of new environmental data, practical environmental ethics, environmental awareness, in-depth learning and reflective thinking, content consistent with previous experiences and intellectual development, attention to three dimensions of knowledge, attitude and skill, emphasis on problem-oriented versus subject-orientation, application and usefulness, reorganizing from complex to simple, emphasis on deliverability, attention to integrality, possibility of change and modification, coherence and flexibility, teaching and learning methods including active participatory teaching, outdoor teaching, 5E teaching method, case study, field visit, simulation, project-oriented and problem-solving and evaluation methods include simultaneous attention and consideration of different environmental dimensions, emphasis on the learning process versus product, evaluation based on high levels of cognition, individual and group projects, problem-solving skills, teamwork skills, and formative evaluation.

In another study, Kopnina & Cocis (2017) reported that the attention of educational systems to environmental ethics, stimulation, maintenance, development and monitoring of successful educational programs and its adaptation to social and economic conditions in the international arena along with the development of educational skills can create a sustainable future and develop human values against the environment as well as the sustainable development of the environment. Karimi, Kian & Aliasgari (2017) investigated the design of environmental education curriculum in study, the objectives of which included conventional environmental behaviors, presence in the environment, friendship with nature, examples of friendly behaviors, valuing the environment, tackling environmental problems, explaining environmental concepts, interaction with the environment, discovering environmental problems, having knowledge of environmental assets, observing environmental health, understanding the community's need for the environment and understanding the differences in the living environment, the contents of which included environment, public media, human trust in the environment, location and dimensions of time and natural factors, inclusion of basic sciences, waste collection program, effects of overuse of natural resources, recognition of community needs, insertion of health messages, inclusion of environmental pollution messages and use of Quran verses about the environment, the teaching methods of which included project methods, performance role, group, demonstration, exploratory, problem solving and lecture, and the evaluation method of which included showing an environmental situation, requesting a solution, requesting a collection of videos or photos of pollutants, questions about messages of movie and photo and painting on the environment. Also, Poorma'soom, Fayyaz & Baazargaan (2017) investigated children's environmental literacy based on curriculum and planning, and introduced four dimensions of environmental knowledge, environmental attitude, environmental skills and environmental literacy. In addition, Soleyman Pouromran, Yarmohammadian & Keshtiaray (2012) concluded in their study that out of 513 environmental components, 305 were dedicated to environmental knowledge, 88 to environmental skills and 119 to environmental attitudes. Other results showed that unbalanced attention has been paid to environmental knowledge, attitude and skills and attention to the cognitive dimension of the environment has been higher than the attitudes and skills. In Iran, although environmental education and curriculum design has been on progress compared to the past, due to insufficient coherence and lack of appropriate approaches, there is still a long way to go to achieve appropriate environmental education and curriculum (Karimi & et al, 2017).

Teaching environmental concepts is so important that protecting water and soil and keeping them from pollution have been emphasized in Iranian culture and religious teachings. The education system is one of the systems that can act as the basis for proper environmental behaviors, for which a detailed curriculum and appropriate facilities and conditions may be applied to improve environmental knowledge and awareness and a positive attitude taken to maintain and promote it. Educational curricula could not meet the environmental requirements of today's society and, in addition to learning knowledge in various fields, students need to acquire environmental knowledge, practical environmental ethics, become familiar with the values and cultural concepts of the environment, change

values and attitudes towards it, participate in environmental protection, become a committed and responsible citizen, use resources properly, have an environmentally friendly lifestyle, making the right decisions to solve environmental problems, etc. On the one hand, this indicates the need for a curriculum and on the other shows the importance of self-management in achieving it. As a result, this study aimed at developing a self-management-based environmental curriculum model in high school.

2. Methodology

This is an applied study in terms of purpose and a qualitative study in terms of implementation method. The research community included Iranian experts in the field of environmental curriculum based on self-management in 2021. The research sample was estimated to be 15 subjects according to the theoretical saturation principle who were selected by purposive sampling after examining the inclusion criteria. In this sampling methodology, researchers selected a number of experts according to the inclusion criteria, which consisted of being a faculty member, at least 15 years of work experience, minimum academic rank of associate professor and having published a book or article in research-related fields. The researcher came to saturation after the interview with the thirteenth subject, but continued the interview until the fifteenth subject to ensure the adequacy of the data.

To conduct this study, the researchers first examined the documents and articles of the self-management-based environmental curriculum and then, they designed questions for interviewing experts. Thereafter, sampling was performed and coordination with the sample subjects was performed for the time, place and manner of the interviews (in person or by telephone). The purpose, importance and necessity of the study as well as the observance of the ethical points were explained to the participants and they were reassured about the principles of confidentiality. The interviews were conducted individually and in a semi-structured manner, and during the interview, the researcher wrote down the key points and recorded all interviews that had been coordinated with the interviewees. The average interview time was about 40 to 50 minutes. At the end of the interviews, the recorded files were listened to again and the key points of the interviews were noted and the contents categorized.

Indexing and semi-structured interviews were used to collect data. The validity of the interviews was re-examined and confirmed by the experts and the organizing and basic themes were sent to the experts along with the transcripts of the interviews and their confirmation and supplementary comments. Also, the reliability of the interviews was confirmed through the agreement factor (0.76) between the researcher and the co-coder, which indicated the validity and reliability. Finally, the data were analyzed by content analysis.

3. Findings

The samples of the present study included 15 subjects with an age mean and standard deviation of 54.27 ± 5.61 . The number and frequency of demographic characteristics including gender, academic rank and work experience are presented in Table 1.

Table1. Number and frequency percentage of demographic characteristics of samples based on gender, academic rank and work experience

Variable	Levels	Number	Frequency percentage
Gender	Male	4	26/67%
	Female	11	73/33%
Academic rank	Associate Professor	10	66/67%
	Professor	5	33/33%
Work experience	16- 20 years	4	26/67%
	21-25 years	3	20%
	26-30 years	8	53/33%

According to the results, most of the samples in this study were females (73.33%) and had an academic rank of associate professor (66.67%) and work experience of 26-30 years (53.33%) (Table

1). Table 2 presents the results of the content analysis to identify the organizing and basic themes in the model of self-management-based environmental curriculum in the high school.

Table2. Themes of content analysis for organizing and basic themes in the self-management-based environmental curriculum model in the high school

Basic themes	Organizing Level	Themes	Second Level	Organizing Themes First Level (Elements)
1. Ability to analyze environmental issues and 2. Logical reasoning	Enhancing skills	critical	thinking	Objectives
1. Improving the system of environmental beliefs 2. Mental imagery of positive environmental performance and 3. Expressing environmental issues for oneself	Enhancing thinking		constructive	
1. Evaluation of one's behavior, 2. Self-targeting, 3. Self-direction	Behavioral attitudes			
1. Awareness of environmental problems, 2. Basic knowledge and understanding of the environment and its relationship with humans, 3. Positive attitude to the environment 4. Skills to solve environmental problems	Enhancing knowledge		environmental cognition	
1. Increasing root beliefs, 2. Creating the necessary grounds for environmental education 3. Creating the cultural foundations of the youth	Enhancing culture		environmental	
1. Understanding environmental values and 2. Binding ethics to environmental values	Internalizing values		environmental	
1. Wise use of the environment, 2. Use of educational tools for a sustainable future, and 3. Sustainable development	Ecological sustainability			
1. Enhancing environmentally friendly behaviors and 2. Mitigating anti-environmental behaviors	Natural reward strategies			
1. Combining practical and theoretical contents of the environment, 2. Combining the content in different courses, 3. Combining ethics, spirituality and aesthetics of the environment, and 4. Combining the three aspects of knowledge, attitude and skill in the content of the courses	Composite content			
1. Creating real-life environmental contents, 2. Skill-centeredness, and 3. Process-orientedness	Applied content			
1. Effective contents in self-direction, 2. Following-up the learning process by the learner, and 3. Setting the learning goals by the learner	Enhancing thinking skills			
1. Ethical basis, 2. Social basis and 3. Humanistic basis	Alignment with the humanities and ethics			Content
1. Education in the family, 2. Education in the community, 3. Education in schools and 4. Simultaneous consideration of knowledge, value and moral responsibility	Comprehensive contents			
1. Creating opportunities to develop decision-making skills, 2. Creating opportunities to develop problem-solving skills, 3. Creating opportunities to develop creative thinking skills, and 4. Creating opportunities to develop critical thinking skills	Developing managerial skills			
1. Skills of combining environmental solutions and 2. Understanding the relationships between environmental phenomena	Combined and integrated content			
1. Situational approach, 2. Simulated approach, and 3. role play	Practicality			Teaching and learning strategies
1. Critical approach, 2. Research and investigation, and 3. Outdoor teaching	Interactivity			
	Exploratory			
1. Gamification approach, 2. Scientific workflow, 3. Project approach, 4. Case study, 5. Facing challenging situations, 6. Creative thinking approach and 7. Problem solving approach	Rationality			Evaluation
1. Performance in simulated situations, 2. Simultaneous attention and consideration of different environmental dimensions, and 3. Assessment based on the analysis of pervasive nonverbal reactions	Position-focused evaluation			

1. Self-assessment, 2. Peer evaluation, 3. Individual and group projects and 4. Participation in discussion	Evidence-based evaluation
1. Evaluation for learning and 2. Improving performance with evaluation	Feedback from evaluation

According to the results, four first level organizing themes or curriculum elements, 22 second level organizing themes and 71 primary themes were identified for the self-management-based environmental curriculum model in the high school; in a way that in the objective element, there were eight organizational themes including improving critical thinking skills, promoting constructive thinking, behavioral strategies, promotion of environmental knowledge and understanding, promoting environmental culture, internalizing ecological values, ecological sustainability and environmental protection strategies; in the contents element, there were seven organizational themes of compositional contents, applied contents, development of thinking skills, alignment with humanities and ethics, comprehensiveness of content, development of managerial skills and hybrid and integrated content, in the teaching and learning organizational element, there were three organizing themes including practicality, interactivity and exploratory and exploratory and in The evaluation element of the four organizing themes included rationality, situation-focused evaluation, evidence-based evaluation, and evaluation feedback (Table 2). The results of the content analysis to identify the organizing the first and second level as well as the base themes in the model of self-management-based environmental curriculum in the high school are presented in Fig. 1



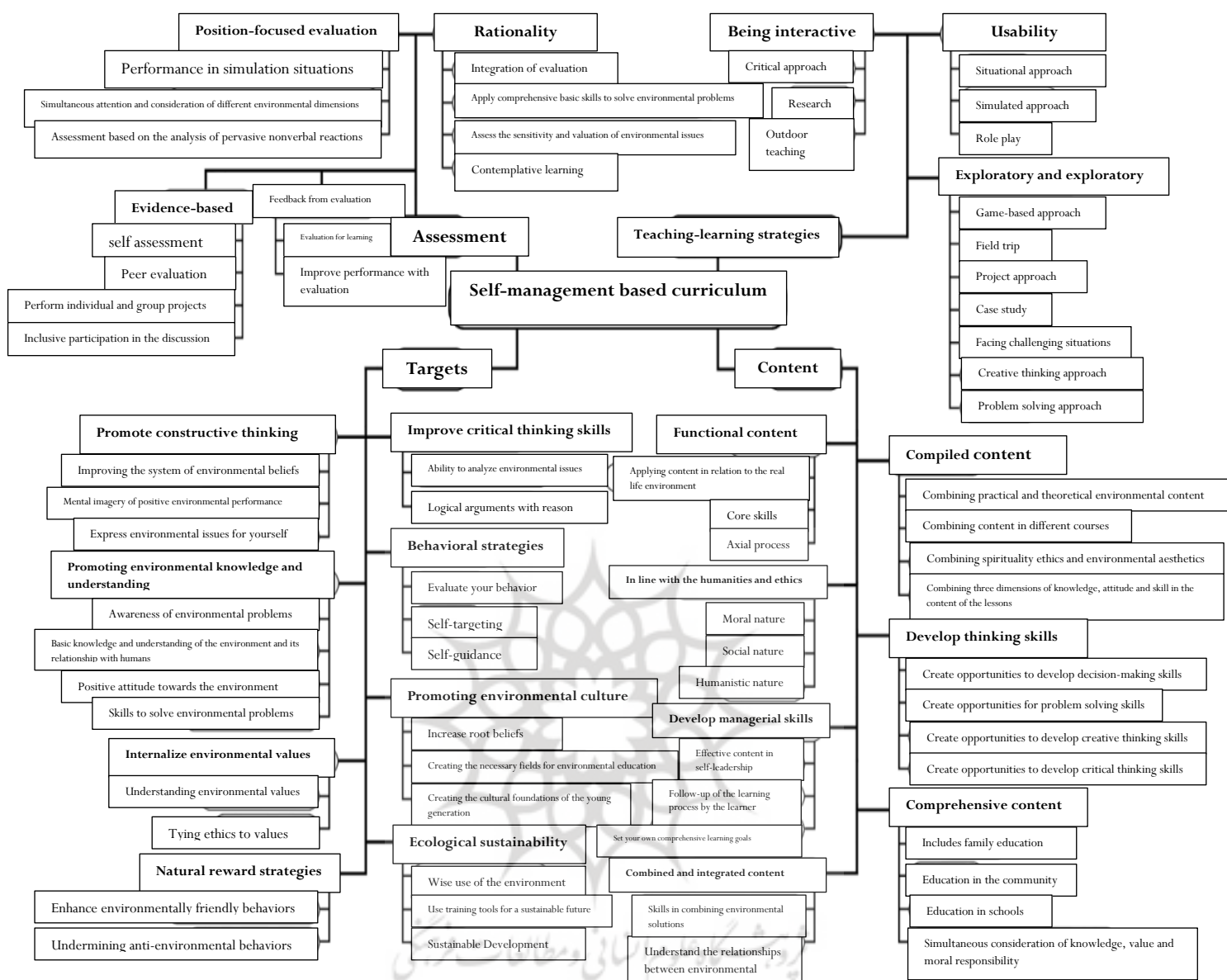


Figure 1. Results of content analysis for the first and second levels as well as basic organizing themes in the self-management-based curriculum model in the high school

4. Discussion

Today, the world is facing many environmental challenges. This increases the importance of designing and developing an environmental curriculum model based on various features, including self-management. The environmental curriculum is a very diverse concept and its development requires attention to the elements and themes of its organizer. As a result, this study was to develop an environmental curriculum model based on self-management in high school.

Findings of the present study indicated that the objectives element included the eight organizing themes of improving critical thinking skills, promoting constructive thinking, behavioral strategies, promoting environmental knowledge and understanding, promoting environmental culture, internalizing environmental values, ecological sustainability and natural resource strategies; the content element includes seven organizing themes of integrated content, applied content, development of thinking skills, alignment with humanities and ethics, comprehensiveness of content, development of management skills and integrated content; the element of teaching and learning strategies included three organizing themes of practicality, interactivity and exploration, and the evaluation element included four organizing themes

of rationality, situation-focused evaluation, evidence-based evaluation, and evaluation feedback. These findings are in line with the findings of Asadzadeh, et al (2020), Khodadadi Tirkolaei, et al (2020), Kopnina & Cocis (2017), Karimi, et al (2017), Poorma'soom, et al (2017) and Soleyman Pouromran, et al (2012) were aligned.

In explaining and interpreting the eight organizing themes of the objectives element for the self-management-based environmental curriculum, including the development of critical thinking skills, development of constructive thinking, behavioral strategies, promotion of environmental knowledge and cognition, the promotion of ecological culture, internalization of natural ecological and environmental values, ecological sustainability and natural rewards strategy, it may be realized that critical thinking skills may play an effective role in improving the self-management-based environmental curriculum model, and includes subcategories of the ability to analyze environmental issues and provide rational reasoning. Promoting constructive thinking focuses on creating and changing the pattern of thought in a desirable way and has a positive effect on students' behavioral performance. Behavioral strategies emphasize increasing self-awareness and managing original and pleasant and sometimes even unpleasant behaviors and are made up of the subcategories of self-evaluation of behavior, self-targeting and self-direction. Promoting environmental knowledge and understanding is another goal of the environmental curriculum and provides the subcategories of awareness of environmental problems, basic knowledge and understanding of the environment and its relationship with humans, a positive attitude towards the environment and the ability to solve environmental problems. Promoting environmental culture is another feature of the objectives of the environmental curriculum that can strengthen the spirit of adaptation and protection of natural resources in individuals and rationally increase the sense of responsibility. The internalization of environmental values has always been an important part of the goals of educational systems, and the reason is that these systems, as their core, seek to transmit its culture and values to the next generation, but what matters here is how the desired values can be internalized in students, and this theme is made up of the subcategories of understanding environmental values and tying ethics to environmental values. Ecological sustainability is providing a desirable future for society and human beings without harming natural resources and the environment and without disrupting the existing order of nature. In other words, we minimize the destructive environmental effects, for which an ecology-based educational program can be used in education. That is, the entire educational program should be equipped with positive examples to get rid of negative examples, such as waste management. It should be noted that this theme includes the sub-categories of wise use of the environment, use of educational tools for a sustainable future and sustainable development. Natural reward strategies relate to positive experiences of doing a task and the process of achieving it, and this strategy emphasizes the attractiveness of the work, focusing on its positive aspects and confirms that the work is valuable in itself, while rewarding and motivation can create the attitude that only some aspects of work are worthwhile and that people should think of their activities as enjoyable and rewarding, since such an attitude increases the sense of competence and self-control, which results in improved performance, and this theme consists of the sub-categories of strengthening environmentally friendly behaviors and weakening anti-environmental behaviors.

In describing and interpreting the seven organizing themes, the content element of the self-management-based environmental curriculum included integrated content, applied content, development of thinking skills, alignment with the humanities and ethics, comprehensiveness of content, development of management skills, and hybrid content. They should be selected based on criteria that are the same as the identified themes and its subcategories. For example, integrated content provides the necessary context for students to achieve unity and integration in learning experiences and leads to meaningful learning. Content should be designed to encourage learners to apply knowledge in real life and to reinforce a sense of responsibility in them and to teach them to be self-sufficient in applying their skills, assessments and solving environmental problems. Another important point is that the content should develop students' managerial skills and causes them to identify educational goals and analyze the goals and make accurate and appropriate plans for using environmental resources.

Also, in describing and interpreting the three organizing themes, the element of teaching and learning strategies for the self-management-based environmental curriculum includes practicality, interactivity, and exploration, and it can be said that teaching and learning strategies should be used as a method to achieve goals and implement them, and should be designed to engage students in solving environmental problems and challenge their thought domains of environmental issues. Teaching and learning strategies should include characteristics such as practicality (situational approach, simulated and role-playing approach), interactivity (critical approach, research and outdoor teaching) and exploration (gamification approach, field trip, project approach, case study, facing challenging situations, creative thinking and problem solving approach).

In addition, in describing and interpreting the four organizing themes of the evaluation element for the self-management-based environmental curriculum, including rationality, position-based evaluation, evidence-based evaluation, and feedback from evaluation, it can be said that evaluation of the curriculum indicates the achievement of goals, and the actual evaluation of what students have learned should be based on principles such as being rational, situation-focused, evidence-based, and evaluating feedback. Therefore, the correspondence of evaluation strategies with the objectives of the curriculum, process and continuity, the use of diverse strategies and the authenticity and realism of the strategies may help achieve the goals of the curriculum. Evaluation should include features such as rationality (integration of evaluation, application of comprehensive basic skills to solve environmental problems, evaluation of sensitivity and evaluation of environmental problems and reflective learning), being situation-based (performance in simulated situations, simultaneous attention and consideration of various dimensions of the environment and assessment based on the analysis of inclusive nonverbal reactions), being evidence-based (self-assessment, peer assessment, individual and group projects and participation in the discussion) and feedback from the assessment (assessment to learn and improve performance by assessment).

Based on these findings, the professionals, planners, administrators and teachers may improve the self-management-based environmental curricula. To this end, while gaining the necessary knowledge and awareness of the objectives of the environmental curricula, they have to use them to raise awareness and create a sense of responsibility for environmental issues and promote self-management. Also, textbook designers should consider the objectives of the environmental curricula in designing the contents of courses and use integrated approaches to improve students' managerial skills and prepare them for life in the real world. Another important point is that teachers should use attractive and diverse teaching and learning strategies to provide content to achieve the goals, and in addition, use appropriate and diverse evaluation methods.

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