

The Study of Environmental Problems Consideration in Guidance School Empirical Sciences Textbooks

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Abstract

The purpose of the present study is to analyze the content of the guidance school experimental sciences textbooks in Iran in terms of environmental problems consideration. For this purpose, three experimental sciences textbooks of guidance school were analyzed by using content analysis method. The statistical population is three experimental sciences textbooks of guidance school in the academic year of 2012-2013. Therefore, sampling method was not used in this study and the statistical population and sample population were the same. This study was done by using checklist content analysis tool including four major components such as environmental problems of air, water, soil and sound and 45 sub-components. The William Scott formula was used to determine the reliability of data collection tool and its reliability amount was .82. The research findings showed that environmental problems are ignored in the guidance school experimental sciences textbooks. The most attention was paid to the environmental problems in the third grade experimental science textbook and the lowest attention was paid in the second grade experimental science textbook of guidance school. In relation to the environmental problems, the most attention was paid to the soil problems and the lowest attention was paid to sound problems in experimental sciences textbooks of guidance school. These findings necessitate paying attention to more important issue of the educational content formulating and editing by scientific and literary experts in educational content formulating regarding environmental problems in these books. Therefore, due to the industrialization path of today's society and educational system evolution and review of the content of the textbooks, textbook authors should consider educational content.

Keywords: Content analysis, guidance school, environmental pollution, experimental science, environmental problems

Introduction

The current educational system of country is a centralized system and its curriculum is unique to textbook which is used all over the country (Moharamnezhad & Haidari, 2005). However, due to the breadth of the country, ethnic variety and species population and problems caused by it (such as bilingual students), the rapid growth of science and technology, rapid variation in norms and social values, it is necessary to write textbooks with sufficient accuracy as much as possible and free from defects and in accordance with the determined objectives and scientific principles. In this regard, review of the textbooks content can clarify the issues and provides the possible strengths and weaknesses of textbooks for planners, managers and authors of textbooks to reform and change the content in accordance with the determinant objectives and scientific principles. Content analysis method is one of the suitable ways to check the content of textbooks. Content analysis investigates the actual content of the verbal or nonverbal message, determinant factors and effects of the messages (Delaware, 2009). On the other hand, Mashayekh (1996) believes that the term of the curriculum content is referred not only to the organized parts and pieces that regularly constitute a

scientific discipline, but also includes the events and phenomena that are related to the various scientific fields. Also, content can be described as the knowledge, skills, tendencies and values that should be learned. In other words, the curriculum content refers to the specific facts, ideas, principles and issues that are included in a particular lesson. One of the applications of the textbook content is to determine the amount of content consistency with curriculum goals. Textbook analysis with this interpretation can also be considered as a type of textbook evaluation and on the other hand, human needs environmental communication to resolve his basic needs that environmental behavior is its outcome (Sedough, 2007). For this reason, he is encountered to two key decisions during his lifetime, "how to communicate with others and environment" in a way that his relationships with others will sooner or later impact on the environment and consequently, changes in the environment and ultimately creates the desirable environmental behavior or environmental problems (Keyal, 2004). The scope of this impact and changes during the human life is drawn from subdued human of the nature of the sixteenth century to the extreme consumer human of the twentieth century. Human performs the economic activity regardless of the environment and through his inaccurate and unbalanced environmental behavior has engaged human society with lots of environmental problems.

Statement of problem and significance of the study

The implementation of this study is necessary due to the unfavorable environmental behavior of today's modern human that has provided causes of uncontrolled exploitation of natural resources, conflicts of technology and nature, threat of the health and welfare of the current generation and the vulnerability of natural heritage, and generally environmental problems development to organize the new ideas and willingness in applying the principles of consistent method with the nature. Because, it is evident that education is not only the necessary conditions for effective participation in the life of the today's world but according to the sensitive situation of ecologically in which we live, the education of environment protection to all segments of society, especially children and incorporating it into their teaching programs (through textbooks, story, fiction, pictorial, etc.) are the most important educational goals. This education contributes them to have constructive role in improving the life and protecting the environment through responding to changes and by breeding human morality and acquisition of knowledge, values, attitudes, and the required academic skills to be able to predict and solve environmental problems in responsible and effective manner and manage them. According to the principles 50 and 45 of constitution of Islamic Republic, rules and regulations of Environment Protection Organization and rules of economic, social and cultural development programs, environmental problems consideration and environment protection are regarded as a public duty so that the necessity of considering and evaluating of these problems is regarded through various civil and educational projects (Abedzade, 1992). The conducted studies indicates that the created sense of responsibility and environmental education during childhood not only is leading factor for the social and environmental behavior in adolescence and adulthood, but also is an underlying basis for favorable or unfavorable environmental behavior namely environmental problems (Weiner, 1995). Therefore, paying attention to environmental problems and educations through the content, materials and textbooks is considered as the elementary and fundamental requirements that due to the sense of environmental responsibility appear in the form of responsible behavior in the first years of a child's life (Hindeh, 2001).

The importance of this issue increases when we know in most cases textbook is as the only instructional media and according to Zamani (2006) it is provided to teacher in the process of teaching-learning. For this reason, with an emphasis on literature, material and curriculum and story remember it as the main source of strengthening the progress incentive of every society.

According to the foregoing issues, it can be concluded that the curriculum planners should consider the environmental problems in formulating the educational objectives and textbook designing because the content of textbooks (terms, words, sentences, shapes and images) of guidance period is the most important tool of identifying and training environmental behavior for students and in addition to these issues, the low sense of environmental responsibility is the biggest obstacle on the path of reaching to the sustainable development and progress that has led to the development of environmental problems. The present research aims to analyze and study the guidance period's experimental science textbooks content in terms of environmental problems consideration. In order to realize this issue, the environmental problems are examined in four main categories of water, air, soil and 45 sub-categories. In this investigation, in addition to determining the attention rate of the experimental science textbooks' content of each grade, they are also compared with each other based on the academic grade and the type of environmental problems.

The concept of environmental problems

Environmental problems refers to any variation in the feature of environmental components in a way that makes impossible the previous use of them and directly or indirectly endanger the benefits and life of living creatures (Dabiri, 2006). Makhdoom (as cited in Miller ,2001) believes that environmental problems are formed after undesirable changes in physical, biological, chemical properties of air, water and earth. Obviously, these undesirable changes will endanger the health, survival and humans' activities and other living creatures of the biosphere. In Iran according to Article 9 of the law of the environmental protection and improvement (approved in 1974 and retracement in 1992) the environmental problems include: "spreading or blending exterior substances with water, air, soil or earth to the extent that leads to the change in their physical, chemical or biological quality" and these changes are harmful to human living, living creatures, plants, works and buildings. In order to clarify the concept of environmental problems, some of the important theories are discussed in this field.

UNEP Theory

UNEP (1989) after extensive studies in the context of environmental problems recall them as the serious risks and environmental threats and according to the environmental conditions of his time expresses environmental problems in 24 sub-components including the destruction of the ozone layer, greenhouse effect of natural resources, increased pollution, desertification, population increase, depletion of natural resources, sea water level rising, psychological problems and increased crimes, excessive dependence on the car, prevalence of unknown disease like AIDS, the risk of genetic manipulating, the acidification of freshwater and fertile soil, the salinization of fertile soil, water feeding, waste and wastewater rising, the destruction and threat of the plant and animal varieties, the reduction of freshwater resources and its waste, overfishing of aquatic animals, the destruction of pesticides and herbicides, increasing wars, and global starvation.

Miller Theory

Miller (1997) by accepting the environmental problems as an obvious fact in human life of twentieth century believes that environmental problems emerge due to the undesirable changes in the physical, chemical and biological properties of air, water and earth. He is interested in the investigation of environment and its protection. Therefore, he began to identify the environmental problems and classified them in 18 categories such as toxic metals, solid waste,radioactive waste, particles suspended in air, wet industrial waste, existing carbon dioxide in the air, the oil spill in the

ocean, sulfur dioxide and sulfates in the air, heat loss, chemical fertilizers, organic waste, chemical oxidants in the air, sound, and carbon monoxide in the air.

Beer hoof Theory

Beer hoof (2002) based on the available experimental and theoretical knowledge about the environmental problems and by conducting relevant studies developed studies of Weiner. Since he was interested in the process of the emergence and formation of environmental problems in individuals' behavior, therefore states that the environmental problems is caused by unfavorable environmental behavior of people which is emerged because of the weak sense of environmental responsibility in childhood of individuals. Additionally, he believes that people of a country who have higher environmental responsibility sense will promote these thoughts in their literature and the best means of promoting is textbooks and fictions. Therefore, countries which paid attention to the environmental problems in children's literature have proceeded in environmental education and management and in realizing the sustainable development objectives. Three points can be concluded from studies of Beer hoof (1998-2002) that are considered in the present study: Environmental behavior is a function of environmental responsibility; Environmental education and paying attention to its problems should be trained from the early years of life in children; The content of textbooks and fiction of children is the greatest and richest part of the literature of each country for environmental education.

Methodology

In this study, the content of guidance school experimental science textbooks is investigated and analyzed in terms of paying attention to environmental problems and its components including water, air, soil and sound and by using checklist. Therefore, due to the nature of the subject content analysis method is used and descriptive statistics (percentage frequency tables and mean) and qualitative analysis are used to analyze the data obtained from content analysis forms.

Statistical Society, sample and sampling method

All experimental science textbooks of guidance school in academic year of 2012-2013 are statistical population of study that includes three experimental science textbooks of first, second, third grade of guidance school. Thus, the entire statistical population (the experimental science textbooks of guidance school) are studied and analyzed in terms of paying attention to environmental problems and its components, so, sampling method is not used in this study.

Validity and reliability measurement tool

In this study, the checklist content analysis which is made based on the scientific principles of environmental problems and its theories is used to analyze and evaluate the experimental science textbooks of guidance school in terms of paying attention to environmental problems and its components. This tool has four main components and 55 sub-components that are made based on the definition of environmental problems and its theories. The face and content validity method and experts' ideas are used to determine and ensure the validity of checklist content analysis. Therefore, the primary form of content analysis of the experimental science textbooks of guidance school in terms of paying attention to environmental problems and its components is given to four experts in this field (professors of the curriculum, guidance training, environment and environmental health) to change and modify and after applying their opinions, the final checklist content analysis was prepared in the form of four main components and 45 sub-components. William Scott formula was used to ensure the reliability of measuring tool. After collecting questionnaires from experts, the categories that they agreed on them were divided on the whole categories and the result was multiplied by the percentage and the coefficient of agreement was obtained 0.82.

Background of study

A few studies have been done on environmental education in general and environmental education for students and investigating the effect of education on their knowledge amount in particular. Here, some studies that their subject is close to the subject of present study are presented. Ghazavi and his colleagues (2009) in a study have analyzed the content of books of primary schools in terms of paying attention to the environmental problems by using the checklist content analysis in four main components of soil, air, water and sound. Their findings indicate that the most attention is paid to environmental education in fifth grade of primary school and the lowest attention is paid in fourth grade of primary school. Also, in all books the most attention is paid to the soil among the mentioned four main components.

Deibaei and Lahijaniyan (2009) in an article entitled "The evaluation of guidance school curriculum with an emphasis on environmental education centers" which is published in *Environmental Sciences Journal* have concluded that the content of guidance school textbooks is desirable with regard to knowledge scope but is undesirable in the scope of insight and skill. The content employed in these books is interesting for students of this grade, but it is not useful for students. The employed content was not correspond to the goals of the educational system and had no suitable depth and width. Students do not have enough power to apply the content. The experimental science textbook is the best source to present the content relevant to the environment. Extracurricular classes are not used in schools for environmental education and the Environmental Protection Organization does not participate in the education of the guidance school. Patterns of other countries are not employed in the environmental content selection and the need to add an independent lesson for environmental education is not felt.

Sahebzadeh, Keykha and Razavi (2012), have conducted a study entitled "educational analysis of the content of the third grade's experimental science textbook of the guidance school based on the amount of being active content" by William Roman method which indicates that the content of mentioned textbook is written in inactive form and has no ability to provide the intended educational purposes and textbook designers and authors should edit and change the content presenting method.

Kaeidi and Ahmadi (2012) in a study entitled "content analysis of the six grade experimental science textbook based on the William Romani technique have concluded that although, the obtained involvement coefficient (0.65) of mentioned textbook is in the defined scope of Romani and its active content, due to the inclusion of this coefficient in the beginning of the coefficient determination axis of students involvement with the content, this book is in undesirable level in terms of being active.

Research questions

The present study aims to determine the amount of paying attention to the content of guidance school experimental science textbooks in various grades in relation to environmental problems and its components. Therefore, this study tries to answer to the following questions:

1. How much does the first grade experimental science textbook's content emphasize on the environmental problems in guidance school?
2. How much does the second grade experimental science textbook's content emphasize on the environmental problems in guidance school?
3. How much does the third grade experimental science textbook's content emphasize on the environmental problems in guidance school?

In addition to the research questions, the amount of emphasis on each component of the environmental problems has been also compared.

Research findings

Content analysis table and descriptive statistic indicators (frequency and percentage) are used to analyze the obtained data. The results obtained from the investigation of first grade experimental science textbook's content of guidance school with regard to the first research question are as following:

Table 1: Types of formulated content about environmental problems in the first grade experimental science textbook of guidance school

Shape Content	Water		Air		soil		Sound		Total	
	Frequency	percent	Frequency	percent	Frequency	percent	Frequency	percent	Frequency	Percent
Text	17	30%	5	9%	12	21%	2	3%	36	63%
Image	5	9%	1	2%	1	2%	0	0%	7	13%
Question	7	13%	3	5%	2	4%	1	2%	13	24%
Sum	29	52%	9	16%	15	27%	3	5%	56	100%

According to the Table 1, among total of 56 units of text of first grade experimental science textbook of guidance school which discuss about environmental problems, 29 units related to water problems, 9 units related to air problems and its pollution, 15 units related to the soil and only 3 units related to sound problems. Also, this Table indicates that 63% of written content about environmental problems is in the form of text and 13% is in the form of image and 24% in the form of question.

In response to the second question of study and according to the Table 2 that how much does the second grade experimental science textbook's content emphasize on the environmental problems in guidance school?

Table 2: Types of formulated content about environmental problems in the second grade experimental science textbook of guidance school

Shape Content	Water		Air		soil		Sound		Total	
	Frequency	percent	Frequency	percent	Frequency	percent	Frequency	percent	Frequency	Percent
Text	3	7%	6	14%	12	27%	4	9%	25	57%
Image	1	2%	2	4%	4	9%	0	0%	7	15%
Question	1	2%	5	11%	6	13%	1	2%	13	28%
Sum	5	11%	13	29%	22	49%	5	11%	46	100%

From total of 45 units of text of second grade experimental science textbook of guidance school which consider environmental problems, 5 units discuss about water problems, 13 units about air problems and its pollution, 22 units about soil and 5 units about sound problems. Also, according to this Table 75% of written content on environmental problems is in the form of text and 15% in the form of image and 28% considers this issue in the form of question.

In response to the third question that how much does the third grade experimental science textbook's content emphasize on the environmental problems in guidance school?

Regarding to Table 3, from total of 81 units of text of third grade experimental science textbook of guidance school which study environmental problems, 25 units associated to water problems, 25 units related to air problems and its pollution, 30 units related to the soil and only 1 unit related to sound problems. Also, this Table demonstrates that 63% of written content regarding environmental problems is in the form of text and 17% is in the form of image and 20% is in the form of question.

Table 3: Types of formulated content about environmental problems in the third grade experimental science textbook of guidance school

Shape Content	Water		Air		soil		Sound		Total	
	Frequency	percent	Frequency	percent	Frequency	percent	Frequency	percent	Frequency	Percent
Text	17	21%	15	17%	19	24%	1	1%	52	63%
Image	4	5%	6	7%	5	6%	0	0%	15	17%
Question	4	5%	4	5%	6	7%	0	0%	16	20%
Sum	25	31%	25	31%	30	37%	1	1%	81	100%

Table 4: Comparing the amount of consideration of environmental problems' components in the context of guidance school experimental sciences textbook

Total	Level 3	Level 2	Level 1	Sub component of environmental problems	Kind	No
F	F	F	F			
4	0	0	4	Human weakness in controlling water resources	Water	1
2	1	0	1	Salty and acidification of freshwater		2
8	2	1	6	Indiscriminate use of ground water		3
2	0	0	2	The entrance of municipal and industrial sewage to rivers		4
4	2	0	2	Increased seawater levels and melting of polar ice		5
0	0	0	0	Transferring water from one basin to another basin without ecological study		6
0	0	0	0	Increased wars and military maneuvers		7
3	2	0	1	The entrance of variety of detergent to the water		8
1	0	0	1	aquatic overfishing		9
6	0	2	4	Providing grounds for creating flood		10
4	0	0	4	Low water use culture		11
10	10	0	0	Increased use of fertilizers, insecticides and pesticides		12
9	5	2	2	Poor management and sustainable planning		13
5	3	0	2	The oil spill in the ocean	14	
59	25	5	29	Total		
5	4	0	1	Increased use of fertilizers, insecticides and pesticides	Soil	15
1	0	0	1	The entrance of variety of detergent to the water		16
7	5	1	1	Distributing waste in the residence and office		17
4	1	1	2	Desertification		18
8	1	4	3	Soil erosion		19
7	5	2	0	Salty and acidification of freshwater		20

10	2	4	4	Destruction of natural areas		21
4	1	2	1	Improper disposal of sewage and industrial waste		22
2	0	1	1	Increased natural disasters: floods, earthquakes and hurricanes		23
18	5	3	10	Excessive loading of ecological potential of earth		24
0	0	0	0	Destruction of rare and unique species		25
7	5	2	0	Poor management and sustainable planning		26
1	1	0	0	Radioactive waste		27
0	0	0	0	Human's inability in proper utilization of earth		28
65	30	20	15	Total		
6	3	1	2	Reduction of the ozone layer	Air	29
0	0	0	0	Using private items instead of public items		30
6	3	0	3	Damaging effects of greenhouse		31
5	3	1	1	Deforestation		32
6	4	2	0	Population increase		33
8	5	3	0	Increased acid rain		34
3	2	0	1	Increased use of chemical substances, toxins and pesticides		35
2	1	1	0	Activity of volcanoes		36
0	0	0	0	Increased waste and burning it		37
11	4	5	2	Increase in suspended particles in the air		38
0	0	0	0	Increase in wars and military maneuvers		39
47	25	13	9	Total		
1	0	0	1	Noise caused by the movement of aircraft	Sound	40
2	0	1	1	Hoot of vehicles		41
0	0	0	0	Noise caused by furniture		42
0	0	0	0	Sound of audio devices in residential environments		43
4	1	2	1	Noise caused by construction and industrial jobs		44
2	0	2	0	Industrialization and intensive use of equipment and machinery		45
8	1	5	3	Total		

Also, tables 1 to 3 show that the environmental content written in guidance school experimental sciences textbook about soil subject in the third grade textbook with 30 units allocates the greatest rate to itself and in the first grade book with 15 units the lowest rate, regarding air issue

in the third grade guidance school book with 25 units the greatest and in the first grade guidance school book with 9 unit the lowest rate, about the water issue in the first grade guidance school book with 5 unit devotes the greatest rate to itself and the third grade experimental sciences textbook with 1 unit allocates the lowest rate to itself.

Table 4 indicates the amount of consideration of each 45 environmental components that study is done based on them. By looking at this table, in guidance school books, the most attention is paid to the components like loading earth more than its ecological potential with 18 cases and increased solid particles in the air with 11 cases and the lowest attention is paid to factors such as the transfer of water from one area to another without ecological study and increased wars and military maneuvers and increased radioactive substances in the soil.

Discussion and conclusion

Environmental problems consideration as a manifestation of undesirable environmental behavior is one of the most important factors to realize the sustainable development goals that will lead to the environment protection. Therefore, although, it is necessary to aware the various organizations toward environmental problems and education, its consideration in educational organizations, due to the deeper and more effective influence on its students is considered more necessary.

In the present study, guidance school experimental sciences textbooks' content is analyzed in terms of addressing environmental problems and its components. According to the data obtained from content analysis form it can be concluded that among the guidance school experimental sciences textbooks, the most attention is paid to the environmental problems respectively in third, second and first grade. Namely, the most attention is paid to the environmental problems in the third grade and the lowest attention in the first grade.

Additionally, comparing the amount of attention to each environmental problem in basic sciences textbooks shows that about environmental problems of water the most attention is paid in the third grade experimental sciences textbook and the lowest attention is paid in the second grade experimental sciences textbook, regarding the environmental problems of air, the most attention is paid in the third grade experimental sciences textbook and the lowest attention is paid in the first grade, about environmental problems of soil, the most attention is paid in the third grade and the lowest is paid in the first grade, about environmental problems of sound, the most attention is paid in the second grade and the lowest is paid in the third grade. Therefore, regarding three problems of soil, air and water, the most attention has been paid in the third grade basic book (Table 3).

Also, in comparing the amount of attention to the main components of environmental problems in guidance school experimental sciences textbooks, the most attention respectively is paid to environmental problems of soil, water, air and sound. Namely, in guidance school experimental sciences textbooks the most attention is paid to environmental problems of soil and the lowest is paid to the environmental problems of sound (Tables 1 to 3). This result is consistent with the research results of Ghazavi, Lyaghatdar and Abedi (2009) entitled: Content analysis of elementary school experimental sciences textbooks in terms of environmental problems consideration.

Investigating the sub-components shows that among the units of sub-analysis of soil, although the most attention is paid to soil erosion and the threat of natural resources, the destruction of natural areas and soil salinization and acidification, the lowest attention is paid to the entry of a variety of detergents into the soil, and the increased consumption of pesticides. Therefore, it is necessary to know that considering the radioactive residues and destroy of rare and unique species are ignored in guidance school experimental sciences textbooks.

Regarding the priorities of units of sub-analysis of water, the greatest attention is paid to the indiscriminate use of groundwater, weaknesses of management and sustainable development. While the lowest attention is paid to the increased wars and military maneuvers and transfer of water from one area to another area without ecological study and entrance of municipal and industrial sewages into rivers that according to the ecology state of our country, these three cases need to be considered more in textbooks. Priorities of the units of sub-analysis of air prove that the greatest attention is to the reduction of the ozone layer, detrimental effects of greenhouse, increased acid rain, while the lowest attention is paid to the increased waste and burning it, the use of personal items instead of public, increased wars and military maneuvers and the destruction of rare species.

Therefore, the consideration of the last four cases during the review of textbooks is essential for environmental education. Finally, the evaluation of the priorities of the sub-analysis of sound shows that the considerable attention is not paid to any of its components in any grade of guidance school. The results are consistent with studies of Kaeidei and Ahmadi (2012) and Debaei and Lahijaniyan (2009). Therefore, according to the industrialization path of today's society, it is necessary the textbook authors consider this matter since the educational system evolution discussion and the review of the content of textbooks are started (Table 4).

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