

## The Consistency among the Intended and Implemented Curricula of Experimental Science Course Based on the Environmental Components

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(Received: 30.09.2021 Accepted: 08.04.2022)

### همخوانی برنامه درسی قصد شده و اجرا شده درس علوم تجربی بر اساس مؤلفه‌های

#### محیط‌زیستی

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(دویافت: ۱۴۰۰/۰۷/۰۸ پذیرش: ۱۴۰۰/۰۱/۱۹)

#### Abstract

Environmental education (EE) raises awareness of issues impacting the environment upon which we all depend, as well as actions we can take to improve and sustain it. This study investigated the degree of consistency among the environmental components of the intended and implemented curricula belonged to the fifth grade Experimental Science textbook. The methodology in the first part was content analysis, while in the second part was a survey. The statistical population consisted of the fifth grade Experimental Science textbook and 120 fifth grade teachers of primary schools in Sari. The intended curriculum has been examined through the analysis of the objectives and the content of the Experimental Science textbook, and the implemented curriculum has been examined via a researcher-made questionnaire. Chi-square and one-sample t-test were run in data analysis process. The results indicated that with respect to the objectives, there was not any significant difference among the components of the environmental education. However, regarding the content, there was a significant difference among the components of the environmental education. However, there was a significant difference among the contents of the environmental components of the fifth grade Experimental Science course. Moreover, regarding the environmental components and the teachers' opinions, there was a significant difference between the intended and implemented curricula, and hence not any consistency between the two. Therefore, due to the existing inconsistency, it is necessary for the Editing Council of the Experimental Science Book, as well as the school principals and teachers to put more efforts into reducing such inconsistency.

**Keywords:** Environmental Education, Intended Curriculum, Implemented Curriculum.

#### چکیده

آموزش محیط‌زیستی آگاهی در مورد مسائلی محیطی را افزایش می‌دهد و همچنین بر اقداماتی که می‌توانیم برای بهبود و حفظ آن انجام دهیم، تأثیرگذار است. پژوهش حاضر به بررسی میزان همخوانی برنامه درسی قصد شده و اجرا شده مؤلفه‌های محیط‌زیستی کتاب درسی علوم تجربی پایه پنجم دبستان پرداخته است. روش تحقیق در قسمت اول، تحلیل محتوا و در قسمت دوم پیمایشی است. جامعه آماری شامل کتاب علوم تجربی پایه پنجم و تعداد ۱۲۰ نفر از معلمان پایه پنجم دبستان مدارس ابتدایی شهر ساری است. برنامه درسی قصد شده از طریق تحلیل اهداف و محتوای کتاب درسی علوم تجربی و برنامه درسی اجرا شده از طریق پرسشنامه محقق ساخته مورد ارزیابی قرار گرفت. برای تحلیل داده‌ها از آزمون تی-دو و تی تک نمونه‌ای استفاده شده است. نتایج پژوهش نشان داد در اهداف مؤلفه‌های آموزش محیط‌زیستی تفاوت معناداری وجود ندارد اما در محتوای مؤلفه‌های محیط‌زیستی تفاوت معنادار است. همچنین بین برنامه درسی قصد و اجرا شده بر اساس مؤلفه‌های آموزش محیط‌زیستی تفاوت معناداری وجود دارد، به طوری که از دیدگاه معلمان، میان دو برنامه درسی قصد شده و اجرا شده همخوانی وجود ندارد. بنابراین با توجه به ناهمخوانی موجود، لازم است شورای تدوین کتاب علوم تجربی، مدیران و معلمان با تلاش بیشتر راهکارهایی جهت کاهش ناهمخوانی ارائه دهند.

**واژه‌های کلیدی:** آموزش محیط‌زیستی، برنامه درسی قصد شده، برنامه درسی اجرا شده.

## Introduction

One of the pivotal matters in today's flourishing world is the matter of environment and its protection. It seems that people care about the environment and take themselves as environmentalists, or determine some objectives and contents for textbooks in this regard. However, when it comes to practice, there seems to be a plethora of ill-treatment of the environment and nature. Environmental education is a constant process through which students can achieve the required knowledge, attitudes, values, skills, and experiences related to their surrounding environment, and thereby solving the environmental problems related to the future and the present time beside meeting their needs without threatening the future generations. Nowadays human being's destructive activities are the most influential factors menacing the biodiversity and the stability of the environment (Marzban et al., 2019). With respect to the new approaches to the Fundamental Reform Document of Education, it is crucial to specify the extent of consistency between the curriculum intended by curriculum developers and the curriculum implemented by teachers. This study tries to find out the degree of consistency between the intended and implemented curricula of the fifth grade Experimental Science course on the basis of two factors including the objectives and the contents. Indeed, our education system is concerned with the protection of the environment while developing relevant plans and programs. However, the realities on the ground within the context wherein the curriculum is implemented, and also the degree of discrepancy between these events and the programs and objectives of the education system are worthy of scientific research. The distinction between these events and students' real and practical experiences is also a matter of importance. Curriculum is the most fundamental part of each educational system that plays a pivotal role in the reformation and the evolution of educational system. Regarding this role, a frequent evaluation of the curricula at different levels seems to be necessary. As a result, and with respect to the significance of the curriculum as the most fundamental component of the educational system, a permanent evaluation and review of the

intended and implemented curricula, developed in country's educational system, is required (HajiTabar Firoozjaei, 2013). According to the International Association for the Evaluation of the Educational Achievement (IEA), there are three kinds of curricula. The first is the intended curriculum referring to the items mentioned in the official documents. In order to achieve the objectives, this curriculum includes some components such as content, years of study, numbers of credits that should be received, and teaching methodology. Ministries play a crucial role in developing such programs (Yarmohammadian, 2018). In other words, the intended curriculum embraces the activities and measures issued by the educational system in the form of textbooks which are to be used at schools and higher education institutes (MehrMohammadi, 2014). According to Eisner (2002), an intended curriculum is concerned with objectives, ideals, teaching-learning methodologies, content, materials, predictable equipment, and whatever the curriculum developers offer in educational systems (Seifi, 2016). The second is the implemented curriculum referring to what the teacher implements within the classroom. Curriculum implementation verily depends on one's interest, expertise, teaching experiences, and in-service training courses (Yarmohammadian, 2018).

Curriculum implementation entails running the programs, taking the courses, and applying the concepts which are officially approved. The entire purpose of this process is to help students to achieve knowledge and experience. Consequently, the students are one of the essential components of curriculum implementation without whom reaching such an ideal would be impossible. A successful curriculum implementation is the one in which students can acquire relevant knowledge, experiences, and skills, and beside understanding the ideas and attitudes mentioned in the curriculum (Abedi & Sholekar, 2015). The third kind of curriculum is the obtained one, a concept which is not in the scope of this study. The obtained curriculum is the transformation of students' behavior, attitudes, knowledge, skills and learning styles via the implementation of the curriculum. Students at this stage should achieve a

substantial number of desired objectives which are set in the intended curriculum (Ahmadi, 2006). The scores belonged to the educational achievement considerably indicate the extent to which students learn. However, they are not the only measurements showing the obtained curriculum. In order to make the evaluation and supervision useful, there should be some norms and standards on the part of the taught materials. In this way, students' level of proficiency can be described via the scores. In addition, the results of students' performance should be analyzed to recognize which part of the curriculum has been well understood, and which one needs more consideration (Fathi Vajargah, 2016). The following studies have been carried out on the subjects relevant to this study.

A study that evaluated the content of a lesson about water education \_entitled as "Human and Environment"\_ which was provided for students of the 11th grade at secondary school, documented that although the content of water education in this book at low levels of learning was useful and effective in both "cognitive" and "emotional" realms, it hadn't met the needs in both domains at medium and final levels of learning (Boroumand & Kolahi, 2021).

Another study that investigated the status of the environmental education in the second elementary course concluded that of all components of the environmental education, the most consideration was given to the component of biodiversity, consisting of 36 pages, while the least attention was paid to the component of Ozone layer, consisting of no page at all. Moreover, the highest coefficient of importance was related to biodiversity component (0.26), while the lowest coefficient of importance was related to the component of the effects of Ozone layer recovery (0) (Kargozar et al., 2021).

An investigation into the curriculum development of extra-curriculum activities, based on environmental education, has been carried out in the second elementary course. The results demonstrated that the teachers and experts confirmed more than 90 percent of the characteristics of the four components belonged to the abovementioned curriculum. Those four curriculum components included the objectives, the content, teaching-learning

strategies, and evaluation (Asadzadeh et al., 2020).

In Theories and Applications of Environmental Educations, Shobeiri and Abdollahi (2019) have described the components of environmental education as important issues that should be taught to students in order to protect the environment. These components were water, air, soil, sound, energy, and ecosystem. In a comparative study conducted by Khajouie et al. (2020), the environmental education of Iran's primary school curriculum has been compared with that of some selected countries' curriculum based on four components, i.e. the objectives, the content, teaching methodologies, and evaluation methodologies. It concluded that the objectives and the contents of Iran's environmental education curriculum have been well developed, and that there are not much different from that of those selected countries' environmental education curriculum. However, the implementation of simulation teaching strategies, brainstorming, multimedia resources, and information and communications technology (ICT) has been neglected. Moreover, the Iranian curriculum has failed to use diagnostic evaluation methods and standardized tests in primary schools. Another study has been carried out upon the components of environmental education included in the textbooks of the sixth grade primary school. According to its findings, the Persian Reading textbook is more concerned with two environmental components including the soil and the human's role in the protection of the environment; the Social Studies textbook pays more attention to the renewable and nonrenewable resources; the Science textbook mainly takes the components of jungles and trees into consideration; however, the textbooks of Quran, Divine Gifts, Mathematics, Persian Writing, and Work and Technology give no consideration to the components of environmental education at all (Salehi Omran et al., 2017). Furthermore, Seo et al. (2020) have made an effort in their study to establish key environmental components in the secondary school curriculum in South Korea. Based on their findings, eight key environmental components have been built in the curriculum. They were categorized into three domains: 1) intellect-oriented domain, including critical

thinking ability, creativity, and problem-solving ability; 2) personality-oriented domain, including autonomy, reflective ability, and environmental sensitivity; 3) relationship-oriented domain, including communicative ability and the ability to manage conflicts.

Another survey has been carried out to identify teachers' opinions and awareness of the integration of the environmental education into elementary school students' learning process. It revealed that the majority of teachers agreed with the integration of the environmental education and considered this as an important factor in students' learning process. However, this integration still has its own limitations such as the shortage of time. Also, this survey discovered that the most likely learning process which can be integrated into the environmental

education is the Science learning process (Sukma et al., 2020).

Based on the findings of different books and articles, this study has found six main components of the environmental education consisting of water, air, soil, flora and fauna, sound, and energy. The research has been conducted to address the following question:

Is there any consistency between the intended and the implemented curricula of the fifth grade Experimental Science course on the basis of the abovementioned environmental components?

In Table 1, the main components and subcomponents of the environmental education, which are derived from the theoretical and practical aspects of the research, are elaborated.

**Table 1.** Main and sub-components of environmental education

| References   | Sub-components   | Main components             | Theme                                 |
|--|--|-----------------------------|---------------------------------------|
| Qasemi (2011), Shobeiri & Abdollahi (2019), Salehi Omran et al., (2017), Palmer (2002), Boroumand & Kolahi (2021). | <ul style="list-style-type: none"> <li>- Intake of municipal and industrial wastewater into the rivers and the seas</li> <li>- Excessive water consumption</li> <li>- Entry of various toxins and detergents into the water</li> <li>- Poor culture of groundwater usage</li> </ul>                                  | Water                       | Components of Environmental Education |
| Qasemi (2011), Shobeiri & Abdollahi (2019), Salehi Omran et al., (2017), Palmer (2002).                            | <ul style="list-style-type: none"> <li>- wastes Incineration and smoke of factories</li> <li>- Ozone depletion</li> <li>- Volcanic activity</li> <li>- Using the public transport instead of the private one</li> </ul>  | Air                         |                                       |
| Qasemi (2011), Shobeiri & Abdollahi (2019), Salehi Omran et al., (2017), Palmer (2002), Agha Soleimani (2011).     | <ul style="list-style-type: none"> <li>- Soil erosion</li> <li>- Desert greening</li> <li>- Entry of various toxins and detergents into the soil</li> <li>- Destruction of natural areas, mountains, cliffs</li> <li>- Salinization and acidification of fertile soil</li> </ul>                                     | Soil                        |                                       |
| Qasemi (2011), Shobeiri & Abdollahi (2019), Salehi Omran et al., (2017), Palmer (2002), Pepper, (1987).            | <ul style="list-style-type: none"> <li>- Threats to natural resources, forests, pastures and animals</li> <li>- Gradual extinction of rare plant and animal species</li> <li>- Protection of pastures., forests and animal environment</li> <li>- Improper use of forests and pastures</li> </ul>                    | Flora and Fauna (Ecosystem) |                                       |
| Qasemi (2011), Shobeiri & Abdollahi (2019), Salehi Omran et al., (2017), Palmer (2002).                            | <ul style="list-style-type: none"> <li>- The sound of flying aircraft</li> <li>- The sound of the horns of motorcycle, car and other kinds of vehicle</li> <li>- The sound of household appliances such as vacuum cleaners, televisions, etc.</li> <li>- The sound of factories and construction projects</li> </ul> | Sound                       |                                       |
| Qasemi (2011), Shobeiri & Abdollahi (2019), Palmer (2002).   | <ul style="list-style-type: none"> <li>- Solar Energy</li> <li>- Wind and hydropower</li> <li>- Nuclear energy</li> <li>- Renewable and non-renewable energy</li> <li>- Energy from fossil fuels</li> </ul>  | Energy                      |                                       |

## Research Methodology

The main purpose of this study is to investigate the amount of consistency between the intended and implemented curricula of the Experimental Science course with regard to the environmental components. The investigation has been carried out through content analysis and survey method. Therefore, this study will be an applied one, and with respect to the data gathering process, it is in the form of a survey and content analysis.

In this study, the environmental components have been chosen based on the literature review of the two past decades. Then the two methods of content analysis and survey have been employed to address the research question. With respect to the content analysis method, the main components and subcomponents mentioned in teacher's guidebook text and the fifth grade Experimental Science textbook have been examined. For the survey part, a researcher-made questionnaire has been developed and a Likert scale measurement has been implemented to measure the responses. Therefore, for the statistical population of the intended curriculum, the fifth grade Experimental Science textbook (5th ed., 2019, 506), and the fifth grade Experimental Science teacher's guidebook (1st ed., 2018, 70) which was written by the authors of the fifth grade Experimental Science textbook and published by the Ministry of Education, the Organization of Education Research and Planning (OERP), are used. With regard to the statistical population of the implemented curriculum, all the male and female fifth grade Experimental Science teachers who practiced teaching at state schools in Sari (2018-19) were chosen including 120 teachers altogether. The stratified sampling method was employed to determine the sample size. Based on Krejcie and Morgan's (1970) table, the sample size included 92 teachers. The researcher has developed a checklist in order to examine the content and the environmental components (water, air, soil, flora and fauna, sound, and energy) and to determine the status of the Experimental Science intended curriculum. The objectives of each lesson, mentioned at the beginning of it, have been examined on the basis of its content analysis. In order to gather the information, a researcher-made Likert scale questionnaire

(with the options from too little to too much) has been distributed among the fifth grade teachers of the primary school. A panel of experts has checked the content validity the face validity of the checklist and the researcher-made questionnaire, distributed among teachers and students. The content validity (CVi) was about 0.90. William Scot's (1995) formula has been used to determine the reliability of the checklist related to the content analysis of the environmental education components (Zamani, 2006). This checklist has been submitted to 4 experts. The agreement coefficient has been calculated as 87.5.

$$C.R = \frac{\text{The agreed concepts}}{\text{total concepts}} \times 100$$

$$C.R = \frac{5+6+4+6}{4 \times 6} \times 100 = 87.5$$

The Cronbach's alpha test has been run in SPSS to determine the reliability of teachers' and students' questionnaires. The reliability coefficient for teachers' questionnaire was 0.81 and the reliability coefficient for students' questionnaire was 0.83.

## Findings

After the data gathering and data analysis processes, the results have been explained below with respect to the research question. Firstly, this study put an attempt to discover the status of the environmental components and the desired objectives mentioned in the fifth grade Experimental Science textbook. As it has been said before, in the methodology section, the content analysis method was employed to find the status of the environmental components. The results demonstrated that among the objectives of the fifth grade Experimental Science teacher's guidebook, soil, flora and fauna were the most frequent environmental components with the frequency of 3 and 3 respectively, while water, air, soil, and energy were the least frequent environmental components with the frequency of 2, 2, 2, and 2 respectively. Hence, the total number of the environmental components in the educational objectives of the fifth grade Experimental Science textbook of primary school were not more than 14 (Table 2).

**Table 2.** Statistical Distribution of Environmental Components in the Objectives of the Fifth Grade Experimental Science Textbook

| Total | Energy | Sound | Flora and Fauna (Ecosystem) | Soil  | Air   | Water | Components Indicator |
|-------|--------|-------|-----------------------------|-------|-------|-------|----------------------|
| 14    | 2      | 2     | 3                           | 3     | 2     | 2     | Frequency            |
| 100   | 14.29  | 14.29 | 21.49                       | 21.49 | 14.29 | 14.29 | Frequency Percentage |

Taken the inferential statistics, the study made an effort to find whether there was any significant difference between the objectives of the environmental components of the fifth grade Experimental Science textbook. According to the results, the chi-square statistic

at  $p > 0.05$  level of significance was 0.57, and hence there was not any significant difference among the objectives of the environmental components (water, air, soil, flora and fauna, sound, and energy) of the fifth grade Experimental Science textbook (Table 3).

**Table 3.** Chi-square Test to Compare the Objectives of the Environmental Components of the Fifth Grade Experimental Science Textbook

| X <sup>2</sup> | sig  | Degrees of Freedom | Residual | Expected Frequency | Observed Frequency | Components Indicator        |
|----------------|------|--------------------|----------|--------------------|--------------------|-----------------------------|
| 0.57           | 0.98 | 5                  | -0.3     | 2.3                | 2                  | Water                       |
|                |      |                    | -0.3     | 2.3                | 2                  | Air                         |
|                |      |                    | -0.7     | 2.3                | 3                  | Soil                        |
|                |      |                    | -0.7     | 2.3                | 3                  | Flora and Fauna (Ecosystem) |
|                |      |                    | -0.3     | 2.3                | 2                  | Sound                       |
|                |      |                    | -0.3     | 2.3                | 2                  | Energy                      |

At the second stage, the study investigated the content of the environmental components of the fifth grade Experimental Science textbook. The results showed that the second chapter of the textbook, consisting of 18 environmental components, was more concerned with environmental education than the other chapters. The tenth, eleventh, fourth, and third chapters included 10, 7, 2, and 2 environmental components respectively. In first, fifth, sixth, seventh, eighth, ninth, and twelfth chapters there was not any environmental components at all. The soil component, and after that the flora and fauna component were more taken into consideration

than the other environmental components. The components of water, air, energy, and sound were discovered with the frequency of 5, 4, 3, and 2 respectively. According to Table 4, the total number of environmental components included in the content of 12 chapters and the textbook cover was not more than 39. As an example of such components in the content of the textbook, in chapter 10, page 84 with the title of "The Valuable Soil", there were some explanations about the soil erosion, the factors causing soil erosion, and the ways to reduce soil erosion. The chapter then asks students to gather some information about the subject (Table 4).

**Table 4.** Statistical Distribution of Environmental Components in the Content of the Fifth Grade Experimental Science Textbook

| Total | Energy | Sound | Flora and Fauna (Ecosystem) | Soil | Air | Water | Components Indicator |
|-------|--------|-------|-----------------------------|------|-----|-------|----------------------|
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | Chapter 1            |
| 18    | 3      | 0     | 3                           | 6    | 3   | 3     | Chapter 2            |
| 2     | 0      | 1     | 0                           | 0    | 0   | 1     | Chapter 3            |
| 2     | 0      | 0     | 2                           | 0    | 0   | 0     | Chapter 4            |
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | Chapter 5            |
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | Chapter 6            |
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | Chapter 7            |
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | Chapter 8            |
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | Chapter 9            |
| 10    | 0      | 1     | 2                           | 7    | 0   | 0     | Chapter 10           |
| 7     | 0      | 0     | 4                           | 1    | 1   | 1     | Chapter 11           |

| Total | Energy | Sound | Flora and Fauna (Ecosystem) | Soil | Air | Water | Components Indicator |
|-------|--------|-------|-----------------------------|------|-----|-------|----------------------|
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | <b>Chapter 12</b>    |
| 0     | 0      | 0     | 0                           | 0    | 0   | 0     | <b>Book Cover</b>    |
| 39    | 3      | 2     | 11                          | 14   | 4   | 5     | <b>Total</b>         |

Then the study examined if the results of the second stage were statistically significant. The chi-square statistic at  $p < 0.05$  level of significance was 18.077, and hence there was a significant difference among the environmental components (water, air, soil, flora and fauna, sound, and energy) of the content of the fifth grade Experimental Science textbook and there

was not any consistency between the content of the environmental components and the intended curriculum of the fifth grade Experimental Science course. The components of soil, flora and fauna, water, air, energy, and sound were included in the fifth grade Experimental Science textbook in a decreasing order of consideration.

**Table 5.** Chi-square Test to Compare the Environmental Components in the Content of the Fifth Grade Experimental Science Textbook

| X <sup>2</sup> | Sig   | Degrees of Freedom | Residual | Expected Frequency | Observed Frequency | Components Indicator               |
|----------------|-------|--------------------|----------|--------------------|--------------------|------------------------------------|
| 18.077         | 0.003 | 5                  | -1.5     | 6.5                | 5                  | <b>Water</b>                       |
|                |       |                    | -2.5     | 6.5                | 4                  | <b>Air</b>                         |
|                |       |                    | 7.5      | 6.5                | 14                 | <b>Soil</b>                        |
|                |       |                    | 4.5      | 6.5                | 11                 | <b>Flora and Fauna (Ecosystem)</b> |
|                |       |                    | -4.5     | 6.5                | 2                  | <b>Sound</b>                       |
|                |       |                    | -3.5     | 6.5                | 3                  | <b>Energy</b>                      |

The third stage was to examine the degree of consistency between the environmental components of the fifth grade Experimental Science textbook (the intended curriculum) and the teachers' practice (the implemented curriculum) within the classroom. For the inferential statistics, one-sample t-test was run to examine teachers' opinions about the implemented curriculum. The environmental components of water, air, soil, flora and fauna, sound, and energy were separately compared to the hypothesized mean (3) since the researcher expected the implementation of the objectives included in the intended curriculum of the fifth grade Experimental Science course. The results revealed that there was not any significant

difference between the sample mean and the hypothesized mean (3). Moreover, the t-value of each environmental component, i.e. water, air, soil, flora and fauna, sound, and energy, was between 17 and 34 which means that this relatively large value with  $p = 0.00$  was statistically significant as the p-value is below 0.05 ( $p < 0.05$ ). Taking teachers' opinions, and according to the calculated t-value and p-value with the confidence level of 95%, there was a significant difference between the intended and implemented curricula of the Experimental Science course on the basis of environmental components. Hence, there was not any consistency between these two curricula (Table 6).

**Table 6.** One-sample t-test to Compare the Environmental Components from Teachers' Perspective (Implemented Curriculum)

| Components Indicator |        |                             |        |        |        | Number<br>Hypothetical Mean<br>Sample Mean<br>Mean Difference<br>Standard Deviation<br>DF<br>Sig<br>T<br>Lower<br>Upper |
|----------------------|--------|-----------------------------|--------|--------|--------|---|
| Energy               | Sound  | Flora and Fauna (Ecosystem) | Soil   | Air    | Water  |   |
| 92                   | 92     | 92                          | 92     | 92     | 92     |   |
| 3                    | 3      | 3                           | 3      | 3      | 3      |   |
| 4.0906               | 3.9094 | 4.0435                      | 4.0652 | 4.0616 | 4.3297 |   |
| 1.0906               | 0.9094 | 1.0435                      | 1.0652 | 1.0616 | 1.3297 |   |
| 0.4558               | 0.4919 | 0.4342                      | 0.3898 | 0.4814 | 0.3811 |   |
| 91                   | 91     | 91                          | 91     | 91     | 91     |   |
| 0.000                | 0.000  | 0.000                       | 0.000  | 0.000  | 0.000  |   |
| 22.946               | 17.731 | 23.049                      | 26.208 | 21.148 | 33.461 |   |
| 0.9962               | 0.8075 | 0.9535                      | 0.9845 | 0.9619 | 1.2508 |   |
| 1.1850               | 1.0113 | 1.1334                      | 1.1460 | 1.1613 | 1.4086 |   |

## Conclusion

The studies conducted within the environmental domain indicate that the institutionalization of environmental literacy, values, and attitudes noteworthy issues especially for primary schools. Certainly, in the process of developing the objectives and the content of the Experimental Science textbooks the environmental components (water, air, soil, flora and fauna, sound, and energy) are inevitable factors that should be taken into consideration. On the other hand, the advent of the environmental crises in recent years, the changes occurred in the textbooks, and the lack of consideration for the environmental components which are all reported in the previous studies provide an absolute necessity for this study.

The findings of this study, which examined the degree of consistency between the objectives and the content of the intended curriculum based on the environmental components of water, air, soil, flora and fauna, sound, and energy, documented that, there was regrettably little consideration taken into such components in the fifth grade Experimental Science textbook. For instance, in the content of the textbook the “sound” component had been repeated only two times. Regarding the results and the environmental components, it can be concluded that in the environmental objectives of this textbook only the components of soil, flora and fauna received little attention. In addition, with respect to the significant difference among the teachers’ opinions, there was not any consistency among the intended and implemented curricula.

The results of the first stage of this study (examining the status of environmental objectives) were in line with those of the studies conducted by Boroumand and Kolahi (2021) and Kargozar et al. (2021). In other words, the existence of environmental components in the objectives of the fifth grade Experimental Science textbook was very rare. Nowadays the environmental concerns and the related issues are one of the main universal values that should be considered as a must for sustainable development; however, it seems that in the objectives of the curriculum little consideration has taken into the environmental components. It appears that these objectives should be accomplished through appropriate teaching methodologies and correct communicative

activities. If the objectives of each lesson, based on the environmental components, are elaborated in teachers’ guidebook, the intended objectives will be achieved through an appropriate teaching of the content written in the textbook.

With respect to the environmental components of water, air, soil, flora and fauna, sound, and energy included in the content of the fifth grade Experimental Science textbook, it can be claimed that there was not any consistency between the content of the environmental components and the intended curriculum of the fifth grade Experimental Science course since the degrees of consideration taken into soil, flora and fauna, water, air, energy, and sound were not harmonious, and sometime these components were given consideration only two times throughout the textbook.

The findings of this section were akin to the findings of the studies carried out by Boroumand and Kolahi (2021), Kargozar et al. (2021), and Khajouie et al. (2020). In terms of the degree of consistency between the environmental components of the fifth grade Experimental Science textbook (the intended curriculum) and the teachers’ practice (the implemented curriculum) within the classroom, it can be said that there was a significant difference between the two. It can be also concluded that based on the environmental components, there is significant difference between the intended and implemented curricula of the fifth grade Experimental Science course from the teachers’ point of view. The results of this stage are similar to the results of the study conducted by Afzal khani (2020) and in contrast with the findings of the study conducted by Ahmadi (2006).

According to the findings of this study, the following suggestions can be offered to improve and reform the environmental education in the fifth grade Experimental Science textbook:

- As in the educational system of our country the textbook is the most important means, through which students can grasp the content and the knowledge, the objectives of the environmental education should be determine with more care and attention. Therefore, the environmental components should have a better and higher position in the objectives of the curriculum.



- It is recommended to keep a relative and logical balance in the distribution of the environmental components and concepts in the content of the environmental education.
- The study proposes that teachers should practice teaching with more focus on the environmental components and more attention to the objectives and the content.

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