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THE ROLE OF THE TEXTBOOK IN PROMOTING ENVIRONMENTAL EDUCATION VALUES AMONG FIFTH-GRADE PRIMARY PUPILS IN ALGERIA

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ABSTRACT

This study aimed to explore the role of the Science and Technology textbook in fostering environmental education values among fifth-grade primary school pupils in Algeria. The research employed a descriptive-analytical approach through a content analysis of the Science and Technology textbook used in the fifth grade. The findings revealed that the textbook contributes to the development of environmental education values to varying degrees, with percentages of 49.54%, 28.19%, and 22.25%, respectively. The cognitive domain ranked first in terms of emphasis, followed by the affective domain in second place, and finally the psychomotor domain, which ranked third.

Study Problem:

Environmental education is considered one of the fundamental and essential pillars in preparing future generations to be aware of various environmental issues, with the aim of active participation and serious contribution to environmental protection and preservation. In this regard, the school textbook serves as a primary and effective tool for conveying important environmental concepts and promoting sustainable values and behaviors among primary school pupils.

However, despite intensive efforts to integrate environmental education into curricula since the 1970s— as noted by Babanassis and Anastasatos (2005, pp. PP227-242) -the effectiveness of textbooks in fostering these environmental values may remain limited due to academic constraints and various challenges facing curriculum design and practical teaching methods.

Given the current environmental issues we are facing today, including radical climate shifts and the degradation of natural resources that threaten our very existence and pose a real danger to the sustainability of the planet and its precious resources (Almencion, Otagan , Tingal, & Davin, 2024), there is an urgent need to promote environmental awareness and instill environmental education values in students so they may become environmentally responsible citizens capable of contributing to solutions for various environmental problems.

In this context, the present study seeks to answer the following central question:

What is the role of the school textbook in promoting and developing environmental education values among fifth-grade primary school pupils?

Research Questions:
• Does the *Science and Technology* textbook contribute to the development of the cognitive aspects of environmental education among fifth-grade primary school pupils?
• Does the *Science and Technology* textbook contribute to the development of the affective aspects of environmental education among fifth-grade primary school pupils?
• Does the *Science and Technology* textbook contribute to the development of the psychomotor (skills-based) aspects of environmental education among fifth-grade primary school pupils?

Objectives of the Study:
• To identify the contribution of the *Science and Technology* textbook in developing the cognitive aspects of environmental education among fifth-grade primary school pupils.
• To identify the contribution of the *Science and Technology* textbook in developing the affective aspects of environmental education among fifth-grade primary school pupils.
• To identify the contribution of the *Science and Technology* textbook in developing the psychomotor (skills-based) aspects of environmental education among fifth-grade primary school pupils.

Significance of the Study:
The environment and its related problems have become a matter of global concern, as it constitutes the living space and the essential habitat for humanity. Environmental issues are among the most complex challenges facing the modern world. Despite the concerted efforts of scientists and specialists to find solutions and protect the environment, these problems continue to escalate, which has further increased researchers' interest and engagement with environmental issues. This is evident in the numerous seminars and conferences held across various parts of the world.

The significance of this study lies in the following points:
• Highlighting environmental issues and exploring methods to enhance environmental awareness through a greater focus on environmental education within educational institutions.
• Opening new horizons for researchers by shedding light on the importance and role of educational institutions in disseminating environmental education values.
• Providing a list of environmental values that should be nurtured among primary school learners—values that curriculum planners can utilize in the planning, construction, and development of curricula aimed at promoting environmental values.

Previous Studies:

Study by Babanassis & Anastasatos (2005)
Title: *Elaboration, Application and Evaluation of an Environmental Education Program*
Environmental education is an important and integral component of environmental protection. In this article, the authors present the findings of a case study conducted in Greece. The study concluded that student participation in environmental education programs is an adequate and necessary condition for enhancing environmental knowledge, transforming attitudes towards environmental issues, encouraging environmental engagement, and fostering an ecologically conscious way of thinking overall.

Study by Almencion, Otagan, Tingal, & Davin (2024)
Title: *Environmental Education and Pro-Environmental Behavior Among UM Peñaplata College Students*
This study aimed to determine the level of environmental education and pro-environmental behavior, as well as to examine the relationship between the two among students at the University of Mindanao Peñaplata College. A quantitative approach was adopted, using a descriptive-correlational design. The researchers applied statistical tools including the mean, Pearson Product-Moment Correlation, and regression analysis for data interpretation.

The findings revealed that both environmental education and pro-environmental behavior levels were high among students. Furthermore, a moderate correlation was found between environmental education and pro-environmental behavior. The study emphasized that students who adopt environmental values tend to be more aware of the environmental impact of their actions. It also showed that the greater the integration of environmental education in schools, the more it promotes pro-environmental behavior. Therefore, incorporating environmental education into the school curriculum enhances students' sustainable practices toward the environment.

Study by Zhao, Y., Liu, X., & Han, X. (2024)

Title: *Enhancing Pro-Environmental Behavior through Nature-Contact Environmental Education: An Empirical Analysis Based on Randomized Controlled Experiment Design* (2024, pp. 1-15)

Environmental education plays a vital role in promoting pro-environmental behavior. Nature-contact environmental education has gradually emerged as a significant form of such education. Therefore, exploring the effects and mechanisms of nature-contact environmental education is crucial to fostering environmentally responsible behavior.

This manuscript focuses on the Qinling Environmental Course at a Chinese university, which represents a model of nature-contact environmental education. The study employed a randomized controlled experimental design as its research methodology. The sample consisted of 112 students who participated in the course, aiming to assess the effectiveness of nature-contact environmental education in improving students' pro-environmental behavior. Additionally, the study examined the underlying mechanisms that mediate this effect.

Findings indicate that nature-contact environmental education significantly enhances students' pro-environmental behavior. Furthermore, environmental attitudes and environmental responsibility were identified as key mediators in the relationship between nature-contact environmental education and pro-environmental behavior. These conclusions offer valuable insights for both theoretical research and practical applications in the fields of environmental education and pro-environmental behavior.

Discussion of Previous Studies:

From the review of previous studies conducted in the field of environmental education, the following conclusions can be drawn:

• The studies concurred on the importance of environmental education, particularly at the primary education level.

• The researcher benefited from previous studies in selecting the appropriate methodology for the current research, as well as in constructing the data collection instrument (i.e., the questionnaire) and in choosing the study sample.

• The findings of previous studies assisted in the interpretation of the results of the present study.

Research Methodology:

The study adopted the descriptive-analytical method, as it is the most appropriate for the nature of this research.

Population and Sample of the Study:

Table 1. Describes the study population, represented
by the *Science and Technology* textbook for the academic year 2019–2020.

Grade Level	Volume	Instructional Unit Title	Number of Lessons per Unit	Number of Lessons Containing Environmental Education Values	Number of Summaries
Fifth Year of Primary School	1	Unit 1: "Matter and the World of Objects"	5	0	1
		Unit 2: "Humans and Health"	4	0	1
		Unit 3: "Humans and the Environment"	9	8	1
		Unit 4: "Learning in Space and Time"	2	0	1
Total	1	4 Units	20	8	4

Description of the Study Population:

For further clarification, the study population is described based on its characteristics as follows:

1. ***The Science and Technology Textbook for the Fifth Year of Primary School***: The study covered all the lessons and topics included in the Science and Technology textbook for the fifth year of primary school.

2. ***Description of the Science and Technology Textbook for the Fifth Year of Primary School***: This textbook is authored by Algerian writers and is approved by the Ministry of National Education under number 152/2019. Its objectives are to achieve the final competencies outlined in the curriculum. It contains 108 pages and includes 20 lessons. These are divided into 4 academic domains, each domain comprising a set of lessons and distributed across 36 weeks, extending from September to May. The edition is from the 2019-2020 academic year and is a single volume. It is important to note that this edition is the same as the one used for the 2024/2025 academic year, meaning there have been no modifications to the planned lessons.

Study Sample:

The study sample is the textbook, specifically the *Science and Technology Textbook for the Fifth Year of Primary School*, which was analyzed with a focus on the sections related to environmental education topics.

Study Tool:

A content analysis questionnaire was used, relying on the methodological steps typically followed in content analysis.

The content analysis process consisted of several steps, which are outlined as follows:

A. *Identification of the Key Aspects of Environmental Education Values:*
• **Sources for Identifying Key Aspects of Environmental Education Values**: In this phase, the core aspects of environmental education values that must be present and included in educational programs were determined based on prior research and studies in the field of environmental education.

Table 2. Key Aspects of Environmental Education Values.

Number of Aspects	Key Aspects that Include Environmental Education Values
1	Cognitive Aspects
2	Affective Aspects
3	Skill-Based Aspects

B. Preparation of the Content Analysis Tool:

The content analysis tool was defined in the questionnaire, which included the environmental education values that should be present in the *Science and Technology Textbook for the Fifth Year of Primary School*.

The preliminary version of the content analysis tool included three main areas of environmental education values, resulting in (32) items (indicators). This tool was presented to a group of (05) experts to assess its suitability for the study topic.

C. Preparation of the Final Version of the Content Analysis Tool:

After making the appropriate adjustments based on the feedback from the review process, the final version of the tool was determined. This version included (03) main aspects and a total of (23) sub-items, which were clarified in Table (09).

The aim of preparing the content analysis questionnaire was to assess the extent to which environmental education values are present in the current educational program of the *Science and Technology* subject for the fifth year of primary school.

Table 3. Distribution of Items Across the Content Analysis Questionnaire Areas.

Environmental Education Values	Sub-Items Count
1. Cognitive Aspects	8
2. Affective Aspects	6
3. Skill-Based Aspects	9

Determining the Analysis Categories:

The analysis categories were defined in two levels: (available, not available), aiming to determine the presence or absence of environmental education values in the current educational program for the *Science and Technology* subject in the fifth year of primary school, as previously mentioned. Since the unit of analysis is chosen according to the nature of the study, the "idea" was chosen as the unit of analysis. The idea unit could be a sentence or a phrase (paragraph) that includes the idea around which the analysis topic revolves.

Psychometric Properties of the Content Analysis Questionnaire:
A. Validity of the Content Analysis Questionnaire:

We relied on the validity of experts, as the questionnaire was presented to a group of (05) specialists. They deleted some items and modified others, as shown in the table.

Table 4. Number of Content Analysis Questionnaire Items Before and After Review,
and the Number of Modified Items.

Number of Items Before Review	Number of Items After Review	Number of Modified Items
32	23	2

The validity was calculated using the Lushi formula, and the result was (0.61). Thus, the questionnaire is considered valid and reliable.

B. Reliability:

The reliability was calculated based on inter-rater reliability, where the first researcher and the second researcher conducted the content analysis of the environmental education values. The level of agreement between the two analyses was assessed statistically using the "Coper" formula for reliability, which is calculated as follows:

$$CR = N_1 / (N_1 + N_2) \times 100$$

Where:
N_1: Represents the number of agreements.
N_2: Represents the number of disagreements (Dalal, 2015, p. 242)
The first researcher randomly selected three lessons, and the second researcher analyzed the same lessons.

Table 5. Results of Inter-Rater Analysis for Lessons 3, 1, and 8.

Selected Lessons	Agreement Rate	Agreement Points	Disagreement Points	Percentage of Agreement
Lesson 3	82.60%	19	4	82.60%
Lesson 1	95.65%	22	1	95.65%
Lesson 8	91.30%	21	2	91.30%

As shown in the analysis conducted by both the first and second researchers on the selected lessons, the agreement rate ranged between 82.60% and 95.65%, indicating a high level of reliability.

Presentation and Discussion of Study Results:
Presentation, Discussion, and Interpretation of the First Research Question Results:
The content analysis of the *Science and Technology* textbook revealed the following results, which will be presented in the following table.
Here's the translation of the table into English.

Table 6. Results of Content Analysis of the *Science and Technology* Textbook for Fifth-Grade Students

Axis	Item Number	Lesson 1	%	Lesson 2	%	Lesson 3	%	Lesson 4	%	Lesson 5	%	Lesson 6	%	Lesson 7	%	Lesson 8	%	Lesson 9	%	Total for All Lessons	%
Axis 1: Cognitive Aspects		T	%	T	%	T	%	T	%	T	%	T	%	T	%	T	%	T	%	Skills Ranking	
1	11	0.90	33	2.72	9	0.74	30	2.47	32	2.63	20	1.64	22	1.81	2	0.16	20	1.64	179	14.75
2	0	0	0	0	0	0	0	0	1	0.08	17	1.40	16	1.31	13	1.07	37	3.05	84	6.92
3	0	0	0	0	0	0	0	0	1	0.08	18	1.48	17	1.40	7	0.57	13	1.07	56	4.61
4	8	0.65	22	1.81	7	0.57	9	0.74	3	0.24	2	0.16	4	0.32	0	0	4	0.32	59	4.86
5	0	0	0	0	0	0	0	0	0	0	11	0.90	9	0.74	7	0.57	27	2.22	54	4.45
6	0	0	0	0	0	0	0	0	0	0	16	1.31	8	0.65	6	0.49	12	0.98	42	3.46
7	0	0	11	0.90	0	0	0	0	11	0.90	6	0.49	5	0.41	7	0.57	33	2.72	73	6.01
8	0	0	0	0	0	0	0	0	1	0.08	14	1.15	12	0.98	8	0.65	19	1.56	54	4.45
Total	19	1.56	66	5.44	16	1.31	39	3.21	49	4.03	104	8.57	93	7.66	50	4.12	165	13.60	601	49.54
Axis 2: Emotional Aspects		9	0	0	0	8	0.65	0	0	15	1.23	8	0.65	7	0.57	5	0.41	0	0	7	0.57
2	10	0	0	0	3	0.24	0	0	9	0.74	20	1.64	17	1.40	8	0.65	15	1.23	72	
3	0	0	7	0.57	0	0	0	0	12	0.98	9	0.74	4	0.32	6	0.49	40	3.29	78	6.43
4	2	0.16	20	1.64	0	0	6	0.49	2	0.16	9	0.74	11	0.90	0	0	5	0.41	55	4.53
5	0	0	9	0.74	0	0	0	0	10	0.82	10	0.82	5	0.41	6	0.49	30	2.47	70	5.77
6	0	0	0	0	0	0	0	0	11	0.90	0	0	4	0.32	0	0	2	0.16	17	1.40
Total	2	0.16	47	3.87	0	0	21	1.73	52	4.28	55	4.53	46	3.79	20	1.64	99	8.16	342	28.18

	L1	%	L2	%	L3	%	L4	%	L5	%	L6	%	L7	%	L8	%	L9	%	Total	%
Axis 3: Skill Aspects	15	0	0	0	0	1	0.08	0	0	0	0	2	0.16	1	0.08	1	0.08	10	0.82	
2	16	0	0	8	0.65	1	0.08	0	0	0	0	2	0.16	0	0	1	0.08	0	0	12
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	18	0	0	0	0	0	0	0	0	0	9	0.74	9	0.74	12	0.98	27	2.22	57	4.69
5	0	0	14	1.15	3	0.24	0	0	0	0	0	0	1	0.08	0	0	3	0.24	21	1.73
6	0	0	0	0	0	0	0	0	0	0	8	0.65	5	0.41	6	0.49	33	2.72	52	4.28
Total	0	0	32	2.63	5	0.41	0	0	14	1.15	31	2.55	24	1.97	30	2.47	134	11.04	270	22.25
Grand Total	21	1.73	145	11.95	21	1.73	60	4.94	115	9.48	190	15.66	163	13.43	100	8.24	398	32.81	1213	100
Ranking of Lessons	9		4		8		7		5		2		3		6		1			

The table above shows the following:

A- The three environmental education values were ranked:

According to their frequency of appearance in the fifth-grade Science and Technology textbook (based on the analysis of a unit focused on environmental education):

- **Cognitive aspects** ranked first in the textbook, appearing **601 times out of a total of 1213**, which represents **49.54%**.
- **Affective (Emotional) aspects** came in second place, with a frequency of **342 times out of 1213**, accounting for **28.19%**.
- **Psychomotor (skill Aspects)** ranked third according to the analysis results in the textbook, with **270 occurrences out of 1213**, , appearing 270 times out of 1213, which represents 22.25%.

B- As for the Ranking of Lessons Based on the Occurrence of Environmental Education Values:

- **Lesson 9** ranked first, with environmental education values appearing 398 times out of 1213, which represents 32.81%.
- **Lesson 6** ranked second, with environmental education values appearing 190 times out of 1213, which represents 15.66%.
- **Lesson 7** ranked third, with environmental education values appearing 163 times out of 1213, which represents 13.43%.
- **Lesson 2** ranked fourth, with environmental education values appearing 145 times out of 1213, which represents 11.95%.
- **Lesson 5** ranked fifth, with environmental education values appearing 115 times out of 1213, which represents 9.48%.
- **Lesson 8** ranked sixth, with environmental education values appearing 100 times out of 1213, which represents 8.24%.
- **Lesson 4** ranked seventh, with environmental education values appearing 60 times out of 1213, which represents 4.94%.
- **Lesson 3** ranked eighth, with environmental education values appearing 21 times out of 1213, which represents 1.73%.
- **Lesson 1** ranked ninth and last, with environmental education values appearing 21 times out of 1213, which represents 1.73%.

C- Analysis of the Results:

From the results, we find that **cognitive aspects** achieved the highest percentage in the content of the educational program, reaching 49.54%, ranking first. This is because cognitive aspects, which develop environmental values, are the core of environmental education. They are considered the foundation for raising environmental awareness and pave the way for students to develop the other aspects (emotional and skill aspects). Furthermore, cognitive aspects are easier to convey to the learner compared to the other aspects, as they form the theoretical foundation for the remaining aspects. Given the sensitivity of this stage, where information is provided to children, the knowledge component plays a prominent role in instilling environmental values and skills. Therefore, the cognitive aspect is an essential point that will be considered in the proposed educational program.

Regarding **emotional aspects**, these ranked second, with a presence of 28.19%. Although this percentage is relatively low, developing this aspect is crucial at the elementary school level due to the importance of fostering positive attitudes toward the environment. At this stage, the child's personality is developing, and it is important to cultivate positive feelings about their environment to leave a lasting impact. According to the researchers, the neglect of this aspect is due to a lack of attention to including lessons and activities that contribute, either directly or indirectly, to the development of emotional aspects in the educational program. Educational program designers have not ensured sufficient focus on this in the textbook, and the proposed educational program aims to address this issue.

As for the **skill aspects**, these ranked third with a presence of 22.25%, the lowest percentage. This is considered very low compared to the importance of the skill aspect, which plays a key role in enhancing and developing environmental values among learners. In early childhood education, children learn primarily through their senses and acquire a significant amount of knowledge in a theoretical manner. Therefore, focusing on sensory experiences is crucial for developing environmental values, given its importance in learning.

Consequently, developing the skill aspect is very important, as children, as mentioned earlier, learn more effectively through hands-on experiences than through theoretical learning. To teach this aspect, various tools and resources must be provided to help develop the learners' skills in their daily lives, which are essential for them to become responsible citizens who care for and improve their environment.

Conclusions:

In conclusion, after analyzing the content of the *Science and Technology* textbook for fifth-grade students, it can be concluded that the textbook contributes to the development of environmental education values at varying rates, ranging from 49.54% to 28.19% and 22.25%. The analysis shows that cognitive aspects ranked first, followed by emotional aspects in second place. Finally, skill aspects ranked third and last.

The following recommendations were made:

• It is essential to focus on instilling environmental education values in individuals, both young and old, across various socialization institutions and active civil society organizations in this field.

• There should be a focus on conducting further studies on environmental education.

• Environmental education topics should be included in all school textbooks or made into a standalone subject.

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