

## **EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD) IN STUDENTS' TEXTBOOKS**

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### **Abstract**

This research aims to analyse the student's textbooks from an education for sustainable development (ESD) perspective. Twelve students' textbooks consist of six textbooks for Elementary School, three for Junior High School, and three for Senior High School have analysed. The analysis included content, sustainability context, articulation, and action-knowledge oriented. The result shows that eleven main contents are learned in stages according to the school level. At the high school education level, students thoroughly study the context of sustainability. It implies that sustainability does not begin in elementary school. As a result, the articulation score of books for elementary school is zero or one, while books for senior high school have the highest articulation score of three. In terms of action-oriented knowledge, it turns out that there is no action-oriented knowledge that focuses on change strategies (Dimension III). Almost all of them only concentrate on environmental problem knowledge (Dimension I) and understanding the root cause of the environmental problem (Dimension II). This study is expected to be a starting point for developing students' textbooks that meet ESD standards.

Keywords: ESD, Students' textbook, Sustainability.

## **1. Introduction**

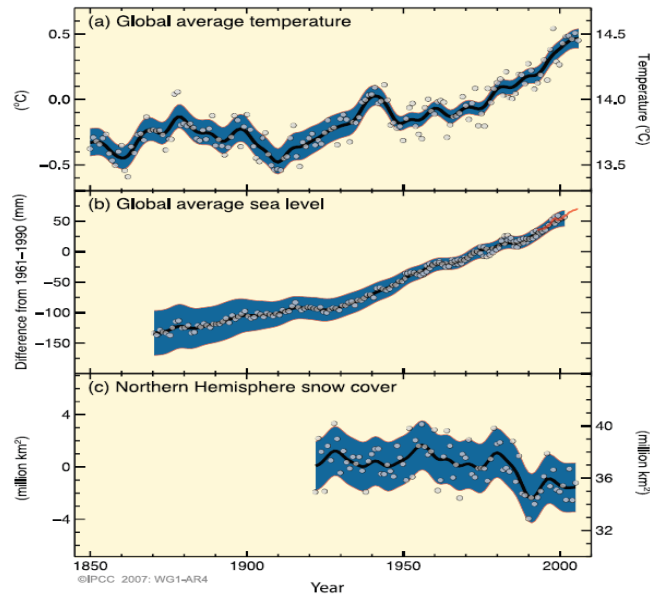
Education for sustainable development (ESD) is a dynamic value that can be realized through education to create a sustainable future [1-3]. Therefore, education can be a strategy for implementing ESD in realizing the Sustainable Development Goals (SDGs) by forming knowledge, attitudes, and values relevant to economic, social, and environmental life. The implementation of ESD is closely tied to the curriculum employed by the school. Therefore, a comprehensive approach to curriculum development issues must include a strategy for integrating ESD into the curriculum [4, 5]. Unfortunately, there is no established curriculum for ESD learning at any level of education. Although ESD is not a required subject in the curriculum, the content of ESD can be analysed by investigating students' textbooks on a variety of topics. Furthermore, because ESD is the dominant perspective discussed within environmental education, a number of the topics covered in environmental education are regarded as subjects closely related to ESD [6]. In other words, environmental education will eventually transform into ESD [7] due to a shift or transformation away from an emphasis on environmental concerns and toward a focus on ESD.

Environmental education textbooks play a crucial role in the pedagogical practice of environmentally-oriented education [8, 9]. The importance of books as a source of student learning is the main focus, so it is crucial to ensure that the book meets the standard. The utilized standard is the standard derived from an ESD perspective. Numerous studies on book analysis have been conducted, including ESD-based analysis of geography textbooks [8], content analysis of science books [10], analysis of middle school science textbooks [11], economic textbooks [12], primary education textbooks [13], and university textbooks [14] based on ESD dimensions. However, no research analyzes environmental education books from primary education through high school education from the perspective of ESD with an emphasis on action-oriented knowledge. Therefore, this research aims to analyse the environmental education student's textbooks from an ESD perspective.

## **2. Literature Review**

ESD is an endeavor to inspire people to be constructive and innovative in the face of global issues. ESD empowers all people to gain the information, skills, attitudes, and values required to design a sustainable future to live a more sustainable lifestyle [15]. ESD is based on three pillars: social, environmental, and economic [16]. ESD in the social dimension promotes social justice, gender equality, human rights, democratic and participatory systems, and health care [17]. The goal of ESD in the environmental dimension is to raise awareness of the physical environment's resources and fragility, the influence of human activities on the environment, climate change, environmental protection, and biodiversity [16]. Finally, ESD in the economic dimension fosters awareness of the possibilities and limits of economic progress, as well as its effects on society and the environment, responsible and sustainable consumerism, and rural development. ESD learning can play a role in familiarizing with sustainable lifestyles that contribute to climate change. Climate change refers to natural or anthropogenic alterations in the climate over time. Climate change is a change in climate caused directly or indirectly by human activity that affects the composition of the global atmosphere in addition to natural climate variability observed over comparable time periods. Figure 1 shows the undeniable warming of the climate system, as seen by the increasing air and

ocean temperatures, melting snow and ice, and rising sea level. Based on Fig. 1, all changes compared to the respective 1961–1990 mean. The smoothed curve indicates the decade's average value, while the circle shows the annual average.



**Fig. 1. Observed changes (a) global average surface temperature, (b) global average sea level from tide gauge (blue) and satellite (red) data, and (c) northern hemisphere snow cover. This figure was adapted from <https://www.ipcc.ch/report/ar4/wg1/> on 21 August 2022.**

### 3. Methods

Twelve students' textbooks have been analysed, consisting of 6 elementary schools (ES), 3 junior high schools (JHS), and 3 senior high schools (SHS). The students' textbooks are used for learning environmental education subjects for Indonesian students. The students' textbooks were collected from several publishers and authors. The analysis included content analysis, the context of sustainability, level of articulation, and action-knowledge-oriented analysis. The content analysis has been done by determining the main topics each students' textbooks and categorized based on the criteria (4 = full attention, 3 = ample attention, 2 = some attention, 1 = little attention, and 0 = no attention at all). The 2nd analysis was the determination of sustainability context. There are three contexts of sustainability: environment, economic, and social. The 3rd analysis is articulation level. The following describes the articulation level employed: (i) the context that is initially presented does not refer to any of the contexts for sustainability (level 0), (ii) the sustainability context appears in an initial or motivational activity, but it is not used in any other task (level 1), (iii) the sustainability context appears discontinuously throughout the lesson and does not support all the tasks that are proposed (level 2), and (iv) the sustainability context is the backbone of the entire proposed lesson, from the beginning until the end (level 3). The last analysis focused on action-knowledge-oriented analysis that consists of 4 dimensions [18]. Dimension I relates to

knowledge about the existence and spread of environmental problems and their consequences. Dimension II pertains to knowledge about the root causes of environmental problems. Dimension III relates to knowledge about strategies for change. Dimension IV is concerned with knowledge about alternatives and visions.

#### 4. Results and Discussion

ESD is crucial, but no teacher lacks the background to teach it. Student textbooks are one way to learn ESD. Based on Table 1, eleven primary subjects are broken down into phases of instruction depending on the student's educational level. They are cleanliness, beauty, and health (CBH), the component of the environment (CE), environmental threat (CT), environmental maintenance and management (CMM), environmental pollution (CP), eco-friendly technology (EFT), natural resources (NR), energy (EN), sustainable development (SD), environmental wisdom (EW), and climate change (CC).

**Table 1. Content analysis.**

No.	Content	Books for ES					Books for JHS				Books for SHS		
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	CBH	2	2	2	2	0	0	0	0	0	0	0	0
2	CE	1	1	1	1	1	1	3	3	3	4	4	0
3	CT	1	1	1	2	2	2	3	3	3	3	4	0
4	EMM	1	1	2	2	2	2	3	3	3	3	3	4
5	EP	0	0	1	2	2	2	3	3	3	4	4	0
6	EFT	1	1	1	1	2	2	0	0	0	0	4	0
7	NR	0	0	0	0	0	0	3	4	4	0	0	0
8	EN	0	0	0	0	0	0	3	2	4	0	0	0
9	SD	0	0	0	0	0	0	0	0	0	1	0	4
10	EW	0	0	0	0	0	0	0	0	0	0	4	0
11	CC	0	0	0	0	0	0	1	1	0	0	1	4

There is only one subject taught at all educational levels, which is EMM. The content is given little attention at the elementary school level, ample attention at the junior high school level, and full attention at the senior high school level (Table 1). EMM is a crucial subject for students to master because the content learns how to care for and protect the environment [19].

It is generally true that the content of basic education has received little attention. The greater the education level, the greater the focus on the material. Additionally, it can be said that the content is discussed in greater depth at the higher educational level. Some topics appear at nearly all levels of education, whereas others are exclusive to particular levels. NR and EN materials, for instance, do not exist until the junior high level. Additionally, only high school-level materials are available for SD and EW. Unlike the depth of the content. It turns out that the number of topics that students learn decreases as their level of education increases. This is likely related to in-depth discussions at a higher level of education, only a few topics must be covered.

The next analysis conducted relates to the sustainability context which can be seen in Table 2. Although the sustainability context should have been presented in elementary school students' textbooks, it was brought into the content of high school students' textbooks instead. More sustainability contexts are studied by

increasing the levels of education. There are a variety of courses that cover all aspects of context sustainability, even at the high school level. It suggests that textbooks for elementary school students have not been able to connect all sustainability contexts because basic education is the foundation for fostering a sustainable consciousness.

**Table 2. Sustainability context analysis.**

No.	Content	Books for ES	Books for JHS	Books for SHS
1	CBH	Env	-	-
2	CE	Env	Env	Env
3	CT	Env, Soc	Env, Soc	Environment
4	EMM	Env	Env	Env, Eco, Soc
5	EP	Env	Env, Soc	Env
6	EFT	Env, Eco	-	Env, Eco
7	NR	-	Env, Eco	-
8	EN	-	Env, Eco	-
9	SD	-	-	Env, Eco, Soc
10	EW	-	-	Env, Eco, Soc
11	CC	-	-	Env, Eco, Soc

The articulation level analysis is the third type of analysis conducted on students' textbooks. It can be seen in Table 3. Levels of articulation represent the extent to which each of the contexts considered in the preceding category developed for the entire lesson. A book analysis involves four levels of articulation [13].

**Table 3. Articulation level analysis.**

No.	Content	Articulation (grade)											
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	CBH	0	0	0	0	-	-	-	-	-	-	-	-
2	CE	0	0	0	0	0	0	2	2	2	2	1	-
3	CT	0	0	0	0	0	0	0	1	1	1	1	-
4	EMM	1	1	1	1	1	1	1	1	1	2	2	3
5	EP	-	-	1	1	1	1	2	2	2	2	2	-
6	EFT	0	0	1	1	1	1	-	-	-	-	3	-
7	NR	-	-	-	-	-	-	1	3	3	-	-	-
8	EN	-	-	-	-	-	-	2	2	2	-	-	-
9	SD	-	-	-	-	-	-	-	-	-	2	-	3
10	EW	-	-	-	-	-	-	-	-	-	-	3	-
11	CC	-	-	-	-	-	-	0	0	-	-	0	3

Based on Table 3, level 0 is the standard articulation level for primary education. This suggests that at the level of primary education, the context in which students are learning has not yet evolved into a context of sustainability. This level of education is the key to increasing students' awareness and commitment to action. The more education a person has, the greater their articulation. The highest level of articulation, level 3, is exclusive to several high school topics, including EMM, EFT, SD, EW, and CC. In general, the predominant level of articulation for all levels of education is level 1, in which the sustainability context is only briefly mentioned in the introduction. This substantially affects students' capacity to

comprehend the ongoing context. It will be challenging to foster comprehension and long-term action due to the superficiality and early stage of the discussion.

The final analysis pertains to action-oriented knowledge analysis which can be seen in Table 4. Four distinct aspects of action-oriented knowledge can be used to describe distinct perspectives on the type of knowledge through which a specific environmental problem can be viewed and analysed [18].

**Table 4. Action-oriented knowledge analysis.**

No.	Content	Action-oriented knowledge (grade)											
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	CBH	I	I	I	I	-	-	-	-	-	-	-	-
2	CE	I	I	I	I	I	I	II	II	II	II	I	-
3	CT	I	I	II	II	II	II	II	II	II	II	II	-
4	EMM	I	I	I	I	I	I	II	II	II	I	I	II
5	EP	-	-	I	I	I	I	II	II	II	IV	II	-
6	EFT	I	I	I	I	I	I					IV	-
7	NR	-	-	-	-	-	-	I	II	II	-	-	-
8	EN	-	-	-	-	-	-	II	II	I			
9	SD	-	-	-	-	-	-	-	-	-	I	-	I
10	EW	-	-	-	-	-	-	-	-	-	-	II	-
11	CC	-	-	-	-	-	-	I	I	-	-	I	II

Based on Table 4, we can identify that there is no action-oriented knowledge focused on change management within the textbooks that all students utilize across all grade levels. Instead, the vast majority of them focus solely on environmental problem knowledge (Dimension I) and understanding the environmental issue's underlying cause (Dimension II). It explains that the students' textbook is still focused on environmental content, rather than being action-oriented to care for the environment. It is essential to create textbooks that lead action-oriented because it will help students to change their behavior and act a sustainable lifestyle. The approach that can use to create an action-oriented book is the transformative learning approach [20].

According to the investigation findings, it is possible to conclude that the existing textbooks for students have not been able to integrate and discuss ESD in its entirety successfully. As a result, it has not been adequately discussed in real terms, in the form of actions taken by both students and teachers, as well as how to react to the current climate by continuing to preserve the environment for the survival of humankind. Thus, to support ESD understanding in textbook, additional some additional techniques in teaching must be added [21-23].

## 5. Conclusion

Eleven main contents are learned in stages according to the school level. At the high school education level, students thoroughly study the context of sustainability. It implies that sustainability does not begin in elementary school. As a result, the articulation score of books for elementary school is either zero or one, while the highest score for books for senior high school is three. Regarding action-oriented knowledge, it turns out that no knowledge focuses on change strategies (Dimension III), almost all of them only focus on environmental problem knowledge (Dimension I) and identifying the underlying causes of environmental problems (Dimension II).

This suggests that the student's textbook is still focused on environmental content, rather than being action-oriented to caring for the environment.

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