



Analysis of Teaching Material: To What Extent are Students' Argumentation Learning

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Abstract. Argumentation ability is a fundamental skill that underlies 21st-century skills. This article explores the importance of argumentation skills in the field of science education, emphasizing its critical role in students' scientific concept-building and learning. Scientific argumentation involves the construction of new knowledge through criticism, ideas, and supporting evidence. The ability to engage in productive scientific argumentation is described as the capacity to analyze and accept or reject relationships between evidence and theoretical ideas. The importance of argumentation skills in science learning is underscored by their role in scientific development, societal debate, and student understanding. The research aims to identify methods for training students' argumentation skills by analyzing teaching materials. This research involved ten elementary schools in Bandung City. The method used is descriptive qualitative using interview analysis and documentation analysis. Results highlight variations in the integration of teaching materials with argumentation skills across schools, emphasizing the need for digital teaching materials in science education. The research result principles of selecting teaching materials and identifies the challenges faced by teachers, such as shortcomings in selecting materials and the need for a deeper understanding of various teaching materials. show that argumentation learning in elementary schools is still very limited. The findings reveal that the teaching materials prepared do not explicitly contain argumentation learning and the tendency for argumentation learning to be carried out incidentally.

Keywords: critical thinking, primary school teacher, learning strategy.

1 Introduction

Argumentation in the field of science appears as an important scientific skill because it is a fundamental position in building students' science concepts and learning [1]. Argumentation in the field of science focuses on building new knowledge about the world of science through criticism and ideas accompanied by appropriate evidence [2] Scientific argumentation is an ability to use language to show evidence or state a possibility that may occur so that it can change a person's attitude or opinion about something. the ability to participate in productive scientific argumentation, namely the ability to

examine and then accept or reject relationships, or relationships between and among evidence and theoretical ideas used in an explanation [3]

Several reasons why it is important to apply argumentation skills in science learning are: (1) scientists use argumentation to develop and improve their scientific knowledge; (2) society uses arguments in scientific debates; and (3) students in learning need arguments to strengthen their understanding [4]. Argumentation skills can be sharpened with the help of appropriate teaching materials and suitability of the materials to the teaching materials used by the teacher. The development of integrated and unified technology currently requires aesthetic and innovative digital media art. This research aims to identify learning that trains students' argumentation skills based on the analysis of teaching materials. This research contributes to recommending to all educational stakeholders to map the need for using digital teaching materials in science learning in elementary schools. Educators are faced with still using conventional teaching materials related to the learning media used; The need for digital teaching materials is diverse and complex and a need for support from all stakeholders to meet the needs of educators in elementary schools [10]. The Merdeka Program is a program launched by the Ministry of Education, Research, Technology, and Higher Education to replace the previous program. The Independent Scheme is considered more adaptable because educational units can adjust the allocation of study time per year rather than per week. Furthermore, in independent programs, teachers have the freedom to adapt learning to the needs of each student. Changing programs of course requires teachers to adjust learning activities. In independent programs teachers are required to guide all students' natural abilities, besides that in teacher learning teachers must link learning activities. with students' abilities, of course between students and others. Others have different readiness and learning profiles.

According to Carol Ann Tomlinson & Moon [5]. Learning that can accommodate the diversity of students and serve students according to their interests, readiness, and learning preferences is differentiated learning. Customized learning is the philosophy of offering face-to-face instruction [9]. This differentiated curriculum is what defines differentiated learning [12]. Because each child has different and unique basic skills, the learning carried out by teachers cannot be generalized. In this case, the teacher must know the initial state of the students before learning and be able to create different learning scenarios in the classroom [13]. Geoge [6] states that achieving learning that is meaningful, satisfying, long-lasting, and transferable in real life both now and in the future requires different instructions in heterogeneous classes.

2 Method

Research used Qualitative descriptive research; this research investigates identifying students' learning of argumentation skills based on analysis of teaching materials used by teachers in elementary schools. This research involved 10 state elementary schools in Bandung City which were selected purposively. All teachers have a minimum of five years of teaching experience and those who teach in upper grades 4, 5, and 6. The instruments used are interview analysis and analysis of documentation and notes

while in the field. Data collection techniques were carried out according to scientific procedures for qualitative research. This research uses the Milles and Huberman analysis method [7]. This analysis technique has three stages, namely data reduction, data presentation, and data validation. Data reduction aims to simplify abstract data into a clear and detailed picture.

3 Results and Discussion

3.1 Results

The research results in the form of interview analysis and documentation analysis can show how well students understand learning, how they view the effectiveness of teaching materials, and how confident they are when arguing [14].

Table 2 provides an overview of the various types of materials commonly used by teachers in school science classes and how relevant these materials are to the development of students' argumentation skills. This observation will help evaluate the effectiveness of teaching materials in science learning in elementary schools. Data was obtained regarding students' understanding of argumentation: The results of the questionnaire analysis showed that there were differences in students' understanding of the concept of argumentation. Some students have strong comprehension abilities, while others have difficulty understanding the structure and purpose of argumentation. Teachers' perceptions of teaching materials: Interviews with teachers revealed that the majority of teachers believe that the teaching materials currently used provide sufficient support for inferential learning. However, some teachers emphasized the need for additional resources and training to increase the effectiveness of implementing teaching materials. Students' Confidence When Arguing. Student questionnaire data shows their level of confidence when arguing. Some students feel confident in expressing their opinions, some are still unsure.

Researchers interviewed teachers and several students about the development of teaching materials and students' expectations of these teaching materials. Teachers hope to have materials that enable them to utilize their curriculum, especially in science subjects. We need reference materials that make learning fun and meaningful for all students. On the other hand, some students stated that they like material that attracts attention, provides challenges so that learning becomes more fun, and is easy to access.

Based on data on the problem of implementing differentiated argumentation-based learning in science subjects as part of the implementation of an independent curriculum in elementary schools, the researcher concludes that there is a need for alternative solutions to develop teaching materials that attract students and teachers by easily introducing different argumentation ability-based learning in subjects IPAS [15].

Table 1. Table of observation results related to the implementation of learning using teaching materials in 10 elementary schools, with a focus on teachers' efforts to link teaching materials with argumentation skills.

School name	Subjects	Teaching Materials Used	Frequency of Use	Teachers' Ability to Link to Argumentation	Information
Elementary school A	IPAS	Book	3 times a week	Yes	Teachers use books and practical experiments to teach science concepts and improve students' reasoning skills.
Elementary school B	IPAS	Interactive Module	4 times a week	No	Interactive modules are frequently used and have been designed to improve students' reasoning skills.
Elementary school C	IPAS	Collaborative Project	5 times a week	No	Even though textbooks are used, the link to argumentation skills still needs to be strengthened.
Elementary school D	IPAS	LKPD	once every 2 weeks	No	Although books are used, there is a need for increased integration with research projects to improve students' argumentation skills.
Elementary school E	IPAS	Audio visual, LKPD	Every day	Yes	The use of digital teaching materials and interactive simulations helps in combining technology with science learning
Elementary school F	IPAS	Module	2 times a week	No	The use of projectors and concept maps needs to be strengthened to further emphasize the development of argumentation skills.
Elementary school G	IPAS	Module	2 times a week	No	Even though group discussions are used, there needs to be increased linkage with argumentation skills in the science concept.

School name	Subjects	Teaching Materials Used	Frequency of Use	Teachers Link it to Argumentation Ability	Information
Elementary school H	IPAS	LKPD	3 times a week	No	The use of interactive teaching aids and materials creates adequate learning experiences to improve students' abilities.
Elementary School I	IPAS	Audio visual	3 times a week	No	The integration of information technology and presentation projects is lacking in improving students' argumentation skills.
Elementary School J	IPAS	Visual	3 times a week	No	Although a teacher's handbook is used, it needs increased integration with practical experiments to improve students' argumentation skills.

Table 2. Teaching materials that are often used in learning

Teaching materials	Intensity used in elementary school A	Intensity used in elementary school B	Intensity used in elementary school C	Intensity used in elementary school D	Intensity used in elementary school E	Intensity used in elementary school F	Intensity used in elementary school G	Intensity used in elementary school H	Intensity used in elementary school I	Intensity used in elementary school J
Textbook	Often	Often	Often	Often	Often	Often	Often	Often	Often	Often
Hand out	Often	Often	Often	Often	Often	Often	Often	Often	Often	Often
LKPD	Often	Seldom	Often	Seldom	Often	Seldom	Often	Seldom	Often	Often
E-Books	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom
E-Module	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom
Audio	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom
Audio visual	Often	Seldom	Seldom	Seldom	Often	Seldom	Seldom	Seldom	Seldom	Seldom

3.2 Discussion

According to [8] in selecting teaching materials, several principles must be considered, namely: 1) The principle of relevance means connection. Learning materials must refer to or meet basic competency standards. 2) The principle of consistency means being consistent. If four different basic abilities must be mastered, then the topic of teaching materials must also contain four types of competencies. 3) The principle of sufficiency emphasizes that the subjects to be taught must be sufficient to help students master the basic skills being taught. Material is not too little and not too much.

In this research, it was found that there are still many teachers who have shortcomings in choosing teaching materials that will be determined or used during science learning and incompatibility in choosing teaching materials that are in line with science materials [16]. The research results still show that teachers need to understand various kinds of teaching materials and types of teaching materials that are adapted to the IPAS material related to argumentation skills.

4 Conclusion

Based on discussion of research results and teaching materials. Teaching materials are a very important part of the learning process and can be understood to represent parts of teaching materials which can be interpreted as containing specific or general learning messages that can be used for learning purposes. Teaching materials are what teachers use to support the learning process, so they must be designed and made taking into account class regulations. Teaching materials or learning materials are basically the "content" of the curriculum and take the form of subjects or fields of study, including topics/subtopics and details. It is understandable that the teacher's role in designing and editing teaching materials greatly determines the success of the teaching and learning process through teaching materials.

Differences in the use of teaching materials in elementary schools have differences in the types of teaching materials used by teachers. Examples of commonly used materials include standard textbooks, interactive modules, digital materials, and other materials. Integration with argumentation skills, most teachers have attempted to link teaching materials with the development of students' argumentation skills, including interactive modules, art projects, and debate simulation, combining learning and discussion skills. Challenges in Integration: Some schools still face challenges in integrating material that focuses on argumentation skills. Barriers identified include limitations of standard textbooks and a lack of focus on research projects. Role of Information Technology: Through the use of information technology such as laptops, presentation projects, and digital learning materials, students' discussion skills can be improved effectively. Success Factors: Successful integration of material into students' argumentative skills depends on the extent to which teachers can create learning experiences that challenge and support students' argumentation. Suggestions for improvement: A higher level of integration of teaching materials and argumentation skills can be achieved by

training teachers in learning methods that support the development of argumentation skills. It is necessary to develop teaching materials specifically designed to improve students' discussion skills.

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