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Socialization and Training on Making Instruments for Arguing Skills Students in Madrasah Aliyah School

Yusnidar[1], Harizon[1], Haryanto[1], Astalini[1], Darmaji[1], Sri Suryati[1], Gita Salsabilla Nurma Yahya[1]
[1]Faculty of Teching and Education, Universitas Jambi, Jambi, Indonesia

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ABSTRACT

Research objectives: The objectives of this study are to introduce and improve teachers' ability in designing student argumentation assessment instruments in measuring students' level of understanding in learning. Ultimately, it will help students develop good and correct argumentation skills during the learning process.

Methodology: The method used in this study is a quantitative method. In using this method, the researcher uses a research design in the form of a questionnaire. By combining this method and design, the research results will be obtained in the form of numbers. The subjects in this study were teachers at Mtss Al-Hidayah. Kebon IX. The results of this study will later become a reference for how this research is conducted and what conclusions can be obtained from the implementation of this research.

Main Findings: In the research related to the implementation and application of argumentation instruments, it was found that more than 50% of teachers agreed to implement this argumentation ability instrument. It is seen that teachers strongly agree with the existence of argumentation ability instruments. Teachers are interested and also want to try the argumentation skills instrument.

Novelty/Originality of this study: This study is rarely conducted and this study is also quite interesting. From the discussion session, there are still many teachers who do not know about the existence of this argumentation ability instrument. Teachers are interested in implementing this argumentation ability instrument not only in science learning, but also in other subjects.

Corresponding Author:
Yusnidar,
Faculty of Teacher Training and Education, Universitas Jambi,
Jl. Jambi - Muara Bulian No.KM.15, Mendalo Darat, Muaro Jambi, Jambi, 36361, Indonesia
Email: yusnidar@unja.ac.id

1. INTRODUCTION

Education is a process of growth and development that occurs in a person and lasts from birth. Education is an effort made consciously by families, communities, and governments through teaching, guidance, and training that takes place both in schools and outside of schools [1]. Learning in the 21st century must be able to prepare the human generation to face the progress of information and communication technology in community life [2]. Science Education as part from education play a role important For prepare participant students who have literacy science. The role of science education for student namely to be able to think critical, creative, logical, and initiative in respond issues in society caused by the impact developments in science and technology [3]. Provision of quality science education become key achievement development a country. Science from aspect ontology and epistemology namely a row draft as well as scheme experimentation and observation, as well as useful For observed and experimented more carry on [4]. Science make an effort For to awaken

interest and curiosity know humans so that intelligence and understanding about natural the contents Keep going develop.

Science education is intended here is Science learning. Providing quality science education will become impact on achievement development a country [5]. In the education indicators that must be prioritized is how students are able to have critical thinking skills. Moreover, learning should direct students to 21st century skills. 21st century skills consist of *learning to know, learning to do, learning to be, and learning to live together* [6]. One of the skills *of learning to know* is the ability to argue.

Argumentation itself has its own meaning. Argumentation comes from Latin which means conveying an opinion accompanied by scientific evidence [7]. Argumentation itself cannot be separated from science learning. From the results of the 2018 PISA (International Student Assessment Program) study, Indonesia was ranked 73rd out of 78 countries in terms of overall argumentation ability. In addition, Indonesia has a score of 396 in science, with an average score according to the OECD (Organization for Economic Cooperation and Development) of 371 [8]. This shows that Indonesia's achievements in argumentation ability are still very low. Argumentation in draft science means student to argue own role important in learning science [9].

Education experts believe that the essence of method think scientist is How student capable serve proof as base argument [10]. Argumentation is method effective influencing method thinking [11]. The ability to argue is one of the main goals of science learning, because students must be able to provide scientific explanations of natural phenomena and use them to solve a problem. In the process of mastering argumentation, students will Study finish a problem in a way gradually [12]. Argumentation in science education plays a role in building students' knowledge with critical and logical thinking skills regarding the relationship between concepts and situations so that from the ability to argue students can explain the relationship between facts, procedures, concepts, and solution methods that are interrelated with each other. By presenting an argument, a listener will agree that the speaker's opinion, beliefs and attitudes are correct. The process of creating argumentation give chance to student For understand what they Look or do with show thinking and reasoning they [13].

One way to describe students' argumentation skills is with the Toulmin's Argument Pattern (TAP) model. Students' argumentation skills at the elementary level occur after applying the Toulmin argumentation skill pattern as stated by Stephen Toulmin in his book "The Uses of Argument" that Toulmin's argumentation has made a significant impact on how science educators define and use arguments [14]. Toulmin's definition of argument can be explained with the following diagram [15] in figure 1.

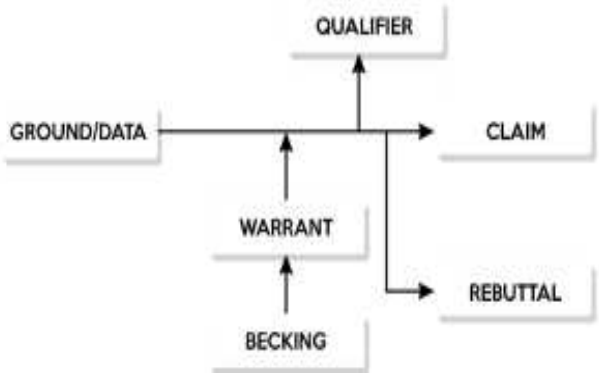

Figure 1. Argumentative Sentence Pattern Structure

From the image, it shows that the argument structure consists of 6 important components, namely ground, claim, warrant, backing, qualifier, and rebuttal. The word Claim itself has the meaning [16] a statements expressed by students, how students write arguments or answer questions based on the information they have. Ground/data is a phenomenon used as evidence to support a claim [17]. Students write all information relevant to the problem. Warrant is students are able to connect information with claims, including mathematical relationships with examples. Qualifier is students are able to answer all questions given. Rebuttal is Rebuttal is students' ability to make rebuttals to problems [18]. Students are able to demonstrate the ability to reject or refute arguments that they think are wrong. The quality of argumentation depends on the understanding of the concept that a person has. With the support of several Toulmin components, these components can be constructed so that they can be convincing and understood by other students.

Skills argumentation and reasoning can improved in a way continuous If method learning based on argumentation applied in learning [19]. To find out how much students' ability is in arguing, an assessment is needed. Assessment provides a picture of a certain quality, usually in the form of measuring a variable. The number of impact positive from skills argumentation demand teachers to enter argumentation scientific to in learning class [20]. Teachers must Can make student capable apply skills argumentation for students .

In the science learning process, argumentation activities are needed so that students can provide arguments by connecting concepts and principles of science to explain phenomena or problems in life [21]. In measuring variables, a measuring tool is needed which is usually called an instrument. In general, what is meant by an instrument is a tool that because it meets academic requirements, it can be used as a tool to measure a measurement object or collect data on a variable [22]. This instrument in the scope of evaluation can be interpreted as a tool used by teachers to assess the level of achievement of learning objectives obtained from student learning outcomes which include 3 domains, namely cognitive, affective and psychomotor domains as the scope of each student's competency [23]. Instrument is tools that meet condition academic so that can used For measure and collect data regarding a variable [24].

From government regulation No. 23 of 2016, the assessment instrument is a tool used by teachers in the form of tests and non-tests. In this case, there is also something called an argumentative ability instrument in learning. The argumentative ability instrument is the main topic in the existing problems. Instrument ability to argue made into reject measuring understanding student in learning science. With use Toulmin's concept, teachers can measure how far is the understanding student related existing learning. Learning strategies using arguments can be one alternative that can help students improve their thinking skills [25], [26]. Therefore that, instrument ability to argue very much Good For implemented in schools. Innovation in context education science is use of the Toulmin model for push student build argument more scientific complex, where they No only state claims, but also must show relevant evidence, explaining connection logical between claims and evidence, as well as consider potential disclaimer. This is make the learning process more dynamic and interactive, encouraging learning based on investigation as well as collaboration in discussion class.

Lots of research previous only focused on development skills think critical and argumentative logical in various context education, including science. In general, approach the arguments used Still nature conventional with focus on structure simple, like statements, reasons, and conclusions. Research This often times only underline importance argumentation but not enough integrate in a way direct in practice classroom learning, especially in education science.Some research is also more tend using argumentation model formally or theoretically, with focus main on the results than the argumentation process students. In addition, research previously Possible not enough give clear instrument For evaluate argument or How argument the built in a way systematic.

This study focuses more on the process of constructing arguments by students rather than just evaluating the results of their arguments. With the Toulmin model, students are expected to learn scientific thinking that involves justifying and evaluating claims based on available evidence. Compared to with approach previously possible more simple, Toulmin's approach provides more framework details that allow student For develop argument scientific with more comprehensive and structured . In this study, the researcher will measure the teacher's interest in implementing the creation of the Student Argumentation Ability instrument in Science Learning. How is the teacher's interest in this instrument? Is this instrument very useful and interesting?

2. RESEARCH METHOD

This study uses a quantitative research type with a questionnaire method. Quantitative research is a scientific method that uses quantitative data in the form of numbers, graphs, tables, and the data analysis is quantitative/statistical [27]. By using quantitative research, researchers will obtain relevant findings data using the help of questionnaires. Questionnaires are a method of data collection that has been carried out by providing several types of questions related to the research problem [28]. By using this research design, researchers can obtain more results from the phenomena being studied.

The subject of research is an object that will be studied by researchers in a study. A research subject is defined as an object or individual studied by researchers through observation, reading, or conducting questions and answers related to a particular research problem [29]. The subject of research cannot be separated from the population and also the sample. The population is all research objects that have the same characteristics and are relevant to the needs of the research. The population of the study was 21 teachers at Mtss Al-hidayah Kebon IX. Sampling was carried out using purposive sampling. The purposive sampling method is a method used to select research samples with certain criteria according to the objectives of the study. The use of sampling techniques aims to represent the population accurately through a small part of the population. This helps save time and money because researchers only study samples rather than the entire population. In addition, sampling makes it easier to manage data because it allows focus on a smaller amount of data. This technique also increases accuracy and precision because researchers can conduct more in-depth analysis on selected samples. Sampling helps overcome practical obstacles, especially when the population is too large or difficult to access as a whole.

In data collection, the first thing to do is to determine the research subjects to be studied based on predetermined criteria, then distribute research instruments in the form of questionnaire sheets to teachers after socialization and community service. The questionnaire sheets were given to 21 teachers of Mtss Al-hidayah Kebon IX. The data that has been obtained will be analyzed using the SPSS application with descriptive

statistical tests. From this test, a conclusion will be obtained regarding teacher interest in the implementation and application of argumentation instruments to students.

The research instrument used in this study is a questionnaire instrument. A questionnaire is a technique or method of collecting data indirectly (research does not directly ask and answer questions with respondents) [30]. In short, a questionnaire is a list of questions given to other people who are willing to provide responses according to the user's request. The questionnaire is an instrument that is filled in freely by respondents. This instrument contains questions that are relevant to the research objectives and is carefully designed to collect the desired information from research participants. The data collection technique used in this study is a survey. Grid of response and perception questionnaires teachers can be seen in the table 1.

Table 1. Instrument Grids Teachers' responses and perceptions

Variables	Indicator	Number Question	Number of Items
Teacher Response	Understanding the Material	1.9	2
	Utilization of Discussion	2	1
	Utilization of Mentoring	3.8	2
	Awareness of Understanding	5	1
	Comprehension Ability	4,6,7,10	4
Teacher Perception	Understanding the Material	1.9	2
	Utilization of Discussion	2	1
	Utilization of Mentoring	3.8	2
	Awareness of Understanding	5	1
	Comprehension Ability	4,6,7,10	4
Amount			20

On the questionnaire sheet to measure Teacher Response and Perception using a Likert scale with 5 categories, namely Strongly Agree, Agree, Neutral , Disagree, and Strongly Disagree. Because it uses a Likert scale, there will be intervals in each category. The description of the Teacher Response and Perception categories can be seen in the following table 2.

Table 2. Category Teachers' Responses and Perceptions

Category	Interval
Strongly Disagree	44-52
Don't agree	35-43
Neutral	26-34
Agree	17-25
Strongly agree	8-16
Strongly Disagree	44-52

The data obtained from the student attitude instrument will be processed using the SPSS application. The test that will be used is a descriptive statistical test. Descriptive statistical tests are a series of statistical methods that aim to describe and summarize data in statistical form. From the descriptive statistical test, the results of the mean, median, minimum and maximum and percentage will be obtained. The mean is the middle value of a number of data. To calculate the mean, add up all the data and divide the sum by the number of data. The median is the middle value of a number of data that has been sorted from the smallest to the largest. The minimum and maximum are measures that provide the lower and upper limits of the data, thus helping to determine the range of data values. The percentage provides information about the proportion or percentage of a value in the entire data.

3. RESULTS AND DISCUSSION

Below is descriptive statistical results for Teacher Response. This study was conducted at Mtss Al-Hidayah Kebon IX with data collection using a questionnaire sheet. The description of Teacher Response can be seen.

Table 3. Questionnaire Teacher Response To Implementation and creation instrument Ability To argue Student in Science Learning

Interval	Category	F	Mean	Median	Min	Max	%
44-52	Strongly Disagree	6	42.3	40.0	33.0	48.0	28.5%
35-43	Don't agree	15					71.1%
26-34	Neutral	0					0%
17-25	Agree	0					0%
8-16	Strongly agree	0					0%
44-52	Strongly Disagree						

From the table 3, it can be seen that the teachers agree with the implementation and creation of student argumentation ability instruments in science learning. Around 15 teachers are in the category of agreeing with the existence of this instrument with a percentage of 71.1%. Then there are around 6 people in the category of strongly agreeing with the existence of this instrument with a percentage of 28.5%. In the neutral, disagree and also strongly disagree categories, no one can be seen choosing these categories and the percentage is 0%. Then continued with the perception questionnaire for this instrument as table 4.

Table 4. Questionnaire Teachers' Perceptions of Implementation and creation instrument Ability To argue Student in Science Learning

Interval	Category	F	Mean	Median	Min	Max	%
44-52	Strongly Disagree	6	42.3	40.0	33.0	48.0	28.5%
35-43	Don't agree	13					61.9%
26-34	Neutral	2					9.5%
17-25	Agree	0					0%
8-16	Strongly agree	0					0%
44-52	Strongly Disagree	6	42.3	40.0	33.0	48.0	28.5%

From the table 4, it can be seen that the teachers agree with the implementation and creation of student argumentation ability instruments in science learning. Around 13 teachers are in the category of agreeing with the existence of this instrument with a percentage of 61.9%. Then there are around 6 people in the category of strongly agreeing with the existence of this instrument with a percentage of 28.5%. In the neutral category, there are 2 teachers who choose the implementation of this instrument with a percentage of 9.5%. Then, in the categories of disagreeing and also strongly disagreeing, it can be seen that no one chose the category and the percentage is 0%.

The results of the questionnaire distribution and the analysis of teacher responses and perceptions toward the implementation of the argumentation ability instrument show a high level of interest among teachers at MTss Al-Hidayah. Teachers found this instrument useful as it enhances their ability to gauge student comprehension during classroom activities. Specifically, the instrument, designed to measure the ability to construct, convey, and defend arguments, proved valuable in addressing a common concern: silent or disengaged students, whose level of understanding often remains unclear to teachers.

According to the results displayed in Tables 4 and 5, a significant majority of MTss Al-Hidayah teachers support the application of the argumentation skills instrument. The data show that 71.1% of teachers “agree,” while 28.5% “strongly agree” with the instrument's usefulness, leaving 0% in the neutral, disagree, or strongly disagree categories. For teacher perceptions, 61.9% “agree,” 28.5% “strongly agree,” and 9.5% are neutral, with none disagreeing or strongly disagreeing. This overwhelming support suggests that teachers view the instrument as a beneficial tool for improving classroom learning dynamics.

During the learning process, students are the primary focus, while teachers guide and facilitate their learning. However, teachers often struggle to assess whether students truly grasp the material or merely feign understanding. This issue is evident when evaluating daily test results, which often fall below the expected benchmarks, highlighting the need for improved instructional methods [31]. This study suggests that many students do not fully engage with or comprehend the material, further emphasizing the importance of tools like the argumentation ability instrument in helping teachers identify and address learning gaps.

This study provides a fresh perspective by developing an argumentation ability instrument that goes beyond the traditional application of Toulmin's model in classroom settings. Previous research on Toulmin's argumentation model has typically focused on basic components such as claims, data, and warrants, often overlooking key elements like rebuttal and backing [7]. This study addresses this gap by creating an instrument that emphasizes these previously underexplored components, thereby enriching the argumentation process for students. The inclusion of rebuttal and backing in the instrument provides a more comprehensive approach to argument construction, facilitating a deeper understanding of scientific practices. Moreover, unlike many studies that focus solely on the outcomes of argumentation, this study emphasizes the entire learning process, how

students gradually construct arguments using Toulmin's framework. The novelty lies in the instrument's capacity to analyze each stage of argumentation development, guiding students to build strong, evidence-based arguments while also considering objections and supporting claims with robust backing. This broader focus not only deepens student engagement with argumentation but also prepares them for real-world scientific reasoning, where counterarguments and strong supporting evidence are critical.

The findings of this study have several important implications for both educators and the broader educational system. First, the successful implementation of the argumentation ability instrument can transform the way teachers assess student understanding, particularly in scientific and critical thinking contexts. The instrument allows teachers to identify students' strengths and weaknesses in real-time, enabling more targeted interventions that can enhance learning outcomes. Teachers who previously struggled with passive or disengaged students can now more effectively evaluate and engage all students in active learning processes. Second, the instrument's focus on argumentation as a structured, process-driven activity has broader implications for developing critical thinking and communication skills across subjects. When integrated into curricula, this tool can encourage students to engage in more thoughtful, logical reasoning, not just in science but also in social studies, literature, and other disciplines that require structured debate and argumentation. Finally, this instrument underscores the importance of comprehensive assessment models that go beyond rote memorization and multiple-choice testing. By focusing on students' ability to construct and defend arguments, educators can foster higher-order thinking skills that are essential for success in the modern world.

Despite its contributions, this study has several limitations. First, the research was conducted in a single educational setting at MTss Al-Hidayah, limiting the generalizability of the results. The instrument's effectiveness may vary in different schools or educational contexts, particularly where cultural or curricular differences exist. Further research is needed to assess whether the instrument can be successfully implemented in a broader range of educational settings. Second, while the instrument helps teachers evaluate students' argumentation skills, it may be less effective in addressing other learning domains, such as creativity or emotional intelligence. Future studies could explore how to integrate argumentation assessment with other cognitive and affective domains to provide a more holistic evaluation of student performance. Lastly, the study relies heavily on teacher feedback and perceptions without directly measuring student performance outcomes beyond classroom observations. Future research should include a more comprehensive analysis of how the use of the argumentation instrument impacts actual student learning outcomes, especially over the long term.

To further enhance the effectiveness and reach of the argumentation ability instrument, several recommendations are proposed. Broader Implementation Across Subjects, While this study focuses on the application of the instrument in science classes, the framework is adaptable to other subjects that require critical thinking, such as history, literature, and social studies. Schools should consider incorporating argumentation assessment tools across the curriculum to foster a culture of reasoning and debate in various subjects. Teacher Training and Development, Successful application of this instrument requires teachers to be familiar with Toulmin's model and effective argumentation techniques. Schools should provide professional development programs that equip teachers with the necessary skills to implement the instrument effectively in their classrooms. Integration with Technology, To make the argumentation process more engaging for students, educators can incorporate digital tools such as online debates, argumentation software, and interactive platforms that allow for real-time feedback. These tools can further enhance students' ability to construct and defend arguments in dynamic, interactive environments. Longitudinal Studies, Future research should include longitudinal studies to measure the long-term impact of using the argumentation ability instrument on student learning outcomes. This would provide more insight into how continuous use of the instrument shapes students' critical thinking and reasoning abilities over time. Adapting the Instrument for Diverse Learning Environments, Given that different schools have varying levels of resources and student demographics, it is important to adapt the instrument to different educational contexts. Future studies should explore how the instrument can be modified for use in under-resourced schools or for students with diverse learning needs.

4. CONCLUSION

Based on the results, it can be concluded that the argumentation ability instrument is effective in measuring students' understanding of learning materials. Using argumentation as a learning strategy can serve as a viable alternative to help students enhance their critical thinking skills. The data from teacher responses and perceptions at MTs Al-Hidayah shows that over 50% of the teachers support the implementation and application of argumentation skills, indicating their belief in the instrument's potential to help analyze student comprehension. This suggests that the socialization and training on developing argumentation skills instruments for students at Al-Hidayah Kebon IX Private Madrasah was successful.

The successful implementation of the argumentation skills instrument underscores its value as a tool for both teachers and students. Teachers can use this instrument to better assess student understanding, while students can benefit from developing their critical thinking and reasoning skills. This method of learning through

structured argumentation has the potential to shift classrooms towards a more interactive and cognitively stimulating environment, promoting deeper engagement with the material. For future research, the development of technology-based instruments, such as digital applications or online platforms, could further enhance the effectiveness of argumentation in education. Interactive digital tools could provide students with real-time feedback, guiding them through the process of constructing well-supported arguments. Such advancements could make argumentation skills more accessible and engaging, offering teachers more detailed insights into student progress while fostering a more dynamic and adaptable learning experience.

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