



Analysis of Religious Characters and Logical Thinking Skills After Using Solar System Teaching Material Integrated with Islamic Science

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Abstract: This study aims to analyze the religious character and logical thinking skills of students after using solar systems teaching materials integrated with Islamic Science. The type of research used is descriptive analysis with a Post-Test-Only with Non-equivalent Groups research design. The research data were obtained from observation sheets, questionnaire sheets, and posttest. The religious character and students' logical thinking skills of the experiment class students are better than the control class. Students in the experiment class were superior to the control class. The effect of the correlation of the use of teaching materials on the religious character of the students obtained 79.21%, while the effect of the correlation of the use of teaching materials on students' logical thinking skills was 38.44%. The study concludes that students' religious character after using solar system teaching materials integrated Islamic science is dominant in the "very good" category and students' logical thinking skills after the use of solar system teaching materials integrated Islamic science is dominant in the high category.

Keywords: Character; Integrated Islamic Science; Logical Thinking Skills

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INTRODUCTION

Madrasah Tsanawiyah is at the level of a junior high school and has a difference from a junior high school in general. Educational institutions of Madrasah Tsanawiyah (MTs) have a characteristic that is placing the values of Islam and the noble culture of the nation in management and learning, thus creating a religious atmosphere in the educational institution. MTs schools have a vision of Islamic education: "The realization of a superior, moderate Islamic education, and a world reference in integrating religious knowledge, knowledge, and technology." Education in MTs prioritizes the quality of learning to shape the character of students. It can be realized by the use of character learning media in learning.

The use of instructional media in MTs must be under the vision of the Madrasa. Learning media consists of various kinds, for example, teaching materials. Wahyuni (2015) and Hansson (2020) teaching materials as a systematic arrangement of material, both written and unwritten, that is used to create a learning atmosphere for students. Teaching material is one component that plays a vital role in learning (Rizqiana, 2017; Lidar et al., 2020). Teaching materials used in learning activities must contain material that is easily captured, understood, and understood by students.

MTs Al Uswah Bergas is a school with an Islamic educational background in Semarang. Based on observations at MTs Al Uswah Bergas Semarang, it shows that integrating science with religion at school is not optimal. The application of religious teachings in science learning is limited to inserting a little about Islam in learning. One example is by thanking God for the blessings after studying the material. Teaching materials used at MTs Al Uswah Bergas still use science books from Erlangga publishers. The book contains natural science material but has not yet integrated Science and Islam, even though schools with Islamic education backgrounds relate to religious/character education in each learning activity under the vision of MTs.

Teaching materials that have characters are essential for students because the purpose of education, in addition to developing the ability and educating students, also has a goal to shape the religious character of students. Akhwani and Sigalingging (2014) stated that schools as educational institutions have a role in organizing education and science development. Besides, schools have a role in exerting potential and maximizing character education for students. Rosdiana (2015) states that religious characters are the essential characteristics that must be possessed by students. The results of an interview with one of the science teachers at MTs Al Uswah Bergas Semarang stated that the character of students decreased with the times. Good character is one part that must

exist in students. Character education in science learning is carried out by instilling character values that are integrated into science subjects. The integration of religion and Science can allow students to think logically or think according to reason.

The reasoning is a process of drawing conclusions or compiling ideas based on existing facts or based on inferences that have been proven correct. Bao et al. (2009) state that scientific reasoning is broadly defined, including thinking skills involving the activities of investigation, research, evaluation of evidence, conclusions, and arguments made to understand conceptual change or scientific understanding. This scientific reasoning is needed when learning science. Each science learning activity involves several thought skills processes, such as identifying problems, making hypotheses, investigating, determining variables, and analyzing data (Alifa et al., 2018; Bronkhorst et al. 2019). Most students today only think theoretically or think according to theory/memorization only. It is the same as the situation of students in MTs Al Uswah Bergas Semarang. The results of an interview with one of the science teachers at MTs Bergas Semarang said that most ordinary students think theoretically and tend to be difficult to think logically. Students still seem to have difficulty in answering problem-solving questions. Problem-solving is an ability that needs to be developed in the learning process. The primary strategy in problem-solving is logical reasoning (Bancong & Subaer, 2013; Palmer & Bommel, 2020).

The material of the solar system is a material that requires students to be able to think logically. The solar system is included in one of the materials taught in the seventh class second semester and is a science material that is difficult to understand. The material of the solar system has been discussed in the Qur'an. Several verses of the Qur'an study about natural phenomena, one of which is related to the material of the solar system. The integration of science material with Islam in the solar system is done to increase social confidence in his creator. Purwaningrum (2015) states that religious science will be incompatible with reality or reality without being supported by science, while science that is not based on religious knowledge will cause damage or cause negative impacts.

The integration of Science and Islam can be inserted into the learning media used. Educational success is no longer only determined by the teacher as the delivery of the material, but other variables are no less important, namely students and learning media. The role of learning media (teaching materials) as a source of information is crucial. Learning media can also have a significant influence in providing learning experiences for students. Teaching material as one of the learning media has a function to help teachers and students achieve learning goals. Learning objectives are achieved to meet national education goals. The purpose of national education is not only to educate students but also to shape the character of students. The integration of Science and Islam is an alternative model of education that is important for achieving national education goals. The integration of Islamic Science is carried out as one of the efforts of science to support religion and vice versa. In the process of knowledge, the integration of science and religion plays a role that determines the results of theoretical knowledge and practical experience of nature about the oneness of God in the world and our lives (Soni & Klinar, 2010; Hong & Handal, 2020). The integration of Islamic Science can help students to link Islamic Science with the concept of science so that they not only learn the material of science but coupled with applying Islamic values in every learning. Based on this, it is necessary to learn resources that can support learning not only include the concept of science but also provide inculcation of religious values. The use of teaching materials that are integrated with Islamic Science can be used as a source of learning for students as a form of integration of religious values in science learning.

Research findings by previous researchers regarding the use of Islamic integrated science teaching materials have been found. Susilowati's research results (2017) state that using Islamic integrated science teaching materials in learning can improve students' religious attitudes seen from the average gain score obtained by 0.7. Besides, positive attitudes toward science and student learning achievement also increased in the moderate category. Azizah & Kisworo's research results (2018) stated that the use of LKPD Qur'ani had a positive effect of 27.7% on the formation of the science-religious character of students in MAN 1 Plered Cirebon Regency. Research results by Hamzah (2015); Manwaring et al. (2018); Herbst (2020) integrating science with religion with various learning strategies can strengthen understanding of science content.

This study aims to determine the religious character and logical thinking skills of students after the use of solar system teaching materials integrated Islamic Science. Religious character as a result of the use of science teaching materials that integrate religious indicators.

METHODS

The type of research used is a descriptive analysis using the Post-Test-Only Non-equivalent Groups research method. This study adopted the research proposed by Creswell (2015), the design in this method contained two types of research subjects, namely the experiment class and the control class. Each group was equally post-

tested. However, only the experiment class (A) was treated. Posttest is used to determine students' logical thinking skills. This posttest is conducted at the end of learning in the experimental class and the control class.

Participants

The population in this study was the VII grade students of MTs Al Uswah Bergas Semarang. The sampling method used in this study was the purposive sampling technique. The samples were students of class VII A and VII B of MTs Al Uswah Bergas in Semarang regency. Participants in the experimental class were 30 students and in the control class were 30 students. In the experimental class, 12 students were male, and 18 were female. While in the control class, there were 17 male students and 13 female students.

Instrument

Test methods used to determine students' logical thinking skills through posttest questions about the material of the solar system. The form of the test used is a description test that has been validated and tested in advance to find out the validity, reliability of the questions to be used. The validity of the test is done using expert validation. Test questions are validated by the material expert validator to determine the level of validity of the test questions. Observation methods used to obtain data that can show the condition of students during learning takes place. The observation sheet in this study is the assessment of religious character, and the questionnaire method used to determine the religious character of students and students' responses to learning using solar system teaching materials integrated Islamic Science. Evaluation of the religious character of students is carried out by observers who will observe students during the learning process. In comparison, the questionnaire method is carried out by the students themselves, who will fill out the questionnaire sheets that have been provided at the end of the lesson.

Data Collection

The data collection method in the research carried out is through a test and non-test techniques. Data collection techniques through the test were carried out using a test sheet about the ability to do reasoning. While the data collection techniques using non-tests were carried out using observation sheets and questionnaire sheets. Data collection methods in this study are as follows: interview method, documentation method, test method, and observation method. The interview method is used to select the sample to be used. Interviews were conducted with natural science subject teachers at MTs Al Uswah Bergas Semarang as resource persons. The documentation method is used to obtain data on population and sample size, list of students in the sample members, student values, and documentation of activities during the study. This documentation activity was carried out during the research.

Data Analysis

Analysis of the students' religious character was done using observation sheets and questionnaire sheets. Data analysis of students' religious character was done by calculating the percentage of scores obtained by students. The percentage of results is categorized as good, poor, and very poor. In comparison, the results of students' questionnaire data analysis are done by adding up scores obtained by students to be categorized into very good, good, poor, or very poor categories. In addition to analyzing the religious character of students, this study also conducted a correlation analysis of teaching materials with the religious character of students. The analysis was conducted to determine the effect of teaching materials on the religious character of students. The analysis used is the biserial correlation analysis. Analysis of students' reasoning abilities is carried out using a sheet of reasoning ability test sheets. Data analysis of reasoning ability tests is done by adding up scores obtained by students, then categorized in the high, medium, and low categories. In addition to analyzing students' reasoning abilities, this study also conducted a correlation analysis of teaching materials with students' reasoning abilities. The analysis aims to determine the effect of solar system teaching materials integrated Islamic science on students' reasoning abilities. The analysis was performed using the biserial correlation analysis.

RESULT AND DISCUSSION

The results obtained include (1) research documentation, (2) posttest data on students' logical thinking skills, (3) data on observing students' religious characters, (4) students' religious character questionnaire, and (5) questionnaire responses students towards the use of solar system teaching material integrated Islamic Science in the learning process.

Analysis of Students' Religious Character

The results of students' religious character research were measured using observations and character questionnaires in the experiment and control classes. Indicators used to measure the religious character of students based on what was stated by Marzuki (2015) include: a) Obedience to God; b) Responsible; c) Be honest; d) Discipline; e) Courtesy. Observation of the religious character of students carried out during four meetings. The observation results showed that the religious character of the experiment class and control class was dominant in both categories. The most visible difference in results from the experiment class and the control class is on indicator 1. The integration of Al-Quran verses in teaching materials can accustom students to read Al-Quran verses and their translations in each meeting. The habit of reading the verses of the Quran every day can make the religious character of students better and stronger. In line with the results of research by Akhwani & Sigalingging (2014), it is stated that the development of religious character can be carried out with accustomed activities. Recitation of the Qur'an which is done every day, can bring religious attitudes to students, such as being devout in carrying out worship, having religious insight in communication, and having good morals. It is also following the results of Pratikno's (2016) research stating that the application of reading the Qur'an, one of which is by reading the Surah Yasin in an exemplary manner, can form noble characters from the values contained in the Qur'an. The repeated stimulus will form strong characters and behaviors in students that are difficult to remove.

The religious character of students is also seen based on the results of the character questionnaire. The character questionnaire was given at the end of the meeting, which was after the use of solar system teaching materials integrated Islamic Science. The results of the students' religious character questionnaire can be seen in Table 1.

Table 1. Results of Students' Character Religious Questionnaire

Category	Number of Students	
	Experiment Class	Control Class
Very Good	20	6
Good	10	24
Poor	0	0
Very Poor	0	0

The results of the character questionnaire shown in Table 1 state that 20 out of 30 experiment class students had religious characters in the very good category, and 10 out of 30 students are in a good category. 6 out of 30 students in the control class had religious characters in the very good category, while 24 out of 30 students are in a good category. The influence of the use of science teaching materials is calculated using biserial correlation. The magnitude of the correlation coefficient (r) is 0.89. It shows that there is a robust linear relationship between the influence of the use of solar system teaching materials integrated Islamic Science with the religious character of students. Correlation value (r) of the use of solar system teaching materials integrated Islamic Science on the religious character of students is used to test the research hypothesis. The analysis shows the value obtained for $t\text{-count} = 10.33$ and $t\text{-table} = 1.9$, then $t\text{-count} > t\text{-table}$ so that result is accepted. It shows that the use of solar system teaching materials integrated Islamic Science affects the religious character of students. The magnitude of the influence of the use of solar system teaching materials integrated Islamic Science on the Islamic religious character of students is determined by the coefficient of determination (CD) that is equal to 79.21%. These results indicate that the religious character of students by 79.21% is influenced by the use of solar system teaching materials integrated Islamic Science.

The magnitude of the coefficient of determination obtained is 79.21%, showing the superior religious character of students in the experiment class. The superior religious character of students in the experiment class compared to the control class is caused by the use of science teaching materials integrated Islamic Science. It influences the religious character of students. These results are supported by research into the integration of Islamic Science in LKPD media conducted by Azizah and Kisworo (2018); Brandt (2019) stating that the development of the teaching media of LKPD Qur'ani that integrates Islam and Science can influence the formation of religious science characters of students.

In the solar system teaching materials integrated Islamic Science, there are solar system materials that are integrated with the verses of the Qur'an to make students able to develop their religious character. Hamzah (2015); Belzen (2019) states that the religious-based Integrated Science is developed so that students can understand natural phenomena in their entirety and comprehensively. The natural phenomena in the module are related to Islamic teachings. Students who have studied the module are expected to be able to integrate science concepts with Islam. The statement was supported by Mulyani et al. 's (2016); Rogińska (2019) study that states that the more studying natural science, including other sciences, the religious value will increase in a person. The

integration of science learning with Islamic values is an important thing to shape the character of students. The results of observations and character questionnaires that have been analyzed show that the religious character of the experiment class students is superior compared to the control class. Characteristics of students after using science teaching materials about solar systems are in the very good and good category.

Analysis of Students' Logical Thinking Skills

Students' logical thinking skills can be seen from the results of the posttest scores obtained by students. Indicators used to measure students' logical thinking skills include a) Identifying problems based on the phenomena that occur in the problem; b) Estimating the answers and the solution process; c) Making, denying, and supporting arguments, and explaining phenomena scientifically; d) Making a pattern of relationships with relevant concepts or facts; e) Drawing conclusions and explanations or solutions that have been obtained. The results of tests of logical thinking skills of students in the experiment class and the control class can be seen in Table 2.

Table 2. Results of Students' Logical Thinking Skills Test

Score Range	Criteria	Experiment Class	Control Class
$23 < x \leq 30$	High	17	2
$16 < x \leq 23$	Medium	13	27
$10 \leq x \leq 16$	Low	0	1

Table 2 shows that 17 out of 30 students in the experiment class have logical thinking skills in the high category, and 13 out of 30 students are in a medium category. Control class students who have logical thinking skills in the high category are 2 out of 30 students, while 27 out of 30 students are in the medium category, and 1 out of 30 are in a low category. The relationship of the use of solar system teaching materials integrated Islamic Science to students' logical thinking skills seen by correlating the test scores of the experiment class and the control class. The effect of using solar system teaching materials integrated Islamic Science on logical thinking skills is shown by the correlation value (r). The results of the calculations produce an r-score of 0.69, classified in the category of strong influence. It shows that the use of solar system teaching materials integrated Islamic Science strongly influences the logical thinking skills of students.

Correlation value (r) of using solar system teaching materials integrated with Islamic Science on students' logical thinking skills is used to test the research hypothesis. The analysis shows the value obtained for t-count = 4.18 and t-table = 1.67, then t-count > t-table so that the result is accepted. It shows that the use of solar system teaching materials integrated Islamic Science influences the logical thinking skills of students. The magnitude of the influence of the use of solar system teaching materials integrated Islamic Science on the students' logical thinking skills is determined by the coefficient of determination that is equal to 38.44%. These results indicate that the logical thinking skills of students by 38.44% are influenced by using science teaching materials on the integrated solar system Islamic Science.

The magnitude of the coefficient of determination obtained is 38.44%, indicating the superior logical thinking skills of students in the experiment class. The superior logical thinking skills of students in the experiment class compared to the control class are caused by the use of solar system teaching materials integrated Islamic Science.

In the solar system teaching materials integrated Islamic Science, there are solar system materials that are integrated with the verses of the Qur'an to make students able to develop students' logical thinking skills. The integration of Al-Quran verses that are adjusted in teaching materials trains students to develop students' logical thinking skills. Besides that, in solar system teaching materials integrated with Islamic Science, there are also activities, including practical activities and discussion activities that help students develop their logical thinking skills. It is supported by research conducted by Ahmad (2015); Bunt & Gouws (2020), which states that experiment activities can help students to develop students' logical thinking skills.

Analysis of Student Responses to the Use of Teaching Materials

The results of the questionnaire data analysis of the students' responses stated that the students gave a positive response to the use of solar system teaching materials integrated with Islamic Science. It can be seen from the percentage of each statement that states very good and good. This positive response arises from new knowledge and experience that has never been obtained before. The existence of integration between Science and Islam can increase students' knowledge and interest in the learning process. Based on the results of questionnaire data, responses of students as a whole stated a positive response to the use of solar system

teaching materials integrated with Islamic Science in learning and teaching materials are suitable for use as a source of learning in MTs. It is in line with the results of research conducted by Asyfa et al. (2017) stated that 84.43% of students gave a positive response to science teaching materials based on the complementation of the Qur'an science verses. 66.9% of research respondents accept the statement that the Qur'an is in harmony with modern science. The consequence of the belief that the Qur'an is compatible with science will increase Muslim students to learn science, even among students from traditional religious schools who reject previous science studies because they believe that the Qur'an is not compatible with science.

CONCLUSION

Based on the results of the analysis and discussion, the following conclusions are made in this study: the religious character of students based on five religious character values indicates that the experiment class has a better religious character compared to the control class. The religious character of students after the use of solar system teaching materials integrated with Islamic Science is dominant in the very good category. Students' logical thinking skills are based on five indicators of logical thinking skills that the logical thinking skills of the experiment class are superior compared to the control class. Students' logical thinking skills to think after the use of solar system teaching materials integrated with Islamic Science is dominant in the high category. The use of solar system teaching materials integrated with Islamic Science influences the religious character and students' logical thinking skills. The use of solar system teaching materials integrated with Islamic Science allows students to develop religious character and logical thinking skills.

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