JPPIPA 9(Special Isssue) (2023)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Implementation of STEM-Based Learning Modules Containing Islamic Values to Improve Student Learning Outcomes and Motivation

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Received: July 11, 2023
Revised: October 17, 2023
Accepted: December 25, 2023
Published: December 31, 2023

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DOI: 10.29303/jppipa.v9iSpecialIssue.4627

Abstract: Student learning motivation is the main aspect in achieving student success. Based on the results of observations and interviews, student learning motivation at MTsN 8 Pidie and MTsN 11 Pidie is still relatively low, which has an impact on low student learning outcomes. The aim of this research is to determine the difference in increasing student learning outcomes and motivation on respiratory system material after implementing a STEM-based learning module containing Islamic values. The population of this study were all students in class VIII MTsN 8 Pidie and MTsN 11 Pidie. The samples were taken by purposive sampling, at MTsN 8 Pidie the research samples were class VIII.1 and class VIII.2. Meanwhile at MTsN 11 Pidie the research samples were class VIII.2 and class VIII.3. Data collection uses questionnaire instruments to measure learning motivation and uses test question instruments to measure student learning outcomes. The results of data analysis using a test (Mann-Whitney test) show that there are differences in motivation and learning outcomes, namely a significant value of 0.000 < 0.05, meaning that there is a significant difference between the motivation and learning outcomes of control class and experimental class students. Therefore, it can be concluded that there is an increase in learning outcomes and student motivation by implementing STEM-based modules with Islamic values.

Keywords: Islamic values; Learning outcomes; Motivation; STEM-based modules

Introduction

The learning process so far has been less effective because learning activities in schools are still teacher-centered, thus making students inactive during the learning process (Ping, 2019). This is supported by the results of observations carried out at MTsN 8 Pidie, information was obtained that the average semester exam score was low, only 40% of the minimum completion criteria, namely 75. The school is equipped with teaching materials, namely textbooks. However, other supporting teaching materials are not yet available to guide students in learning. Teachers also do not provide teaching materials that can motivate and facilitate students in improving learning outcomes. Students think that the material being studied is less interesting and still monotonous. Cavus and Alhih (2014) stated that the use of appropriate teaching materials can guide students to obtain optimal learning outcomes. During the learning process, it was discovered that integration between science and religion had not been realized in the classroom so that students had not received both knowledges in their entirety, this made students less motivated in learning.

How to Cite:
Raisah, P., Rahmatan, H., & Safitri, R. (2023). Implementation of STEM-Based Learning Modules Containing Islamic Values to Improve Student Learning Outcomes and Motivation. *Jurnal Penelitian Pendidikan IPA*, *9*(SpecialIssue), 1400–1401. https://doi.org/10.29303/jppipa.v9iSpecialIssue.4627

Another observation result obtained based on interviews with teachers was that the average daily test score was 46.8. The level of completion of daily tests based on the KKM is around 47% and is still relatively low. One of the factors that makes test scores low is that students have difficulty understanding science material which is abstract and has a lot of memorization. Apart from that, the teaching materials used are not yet integrated with various sciences so that they do not link science concepts with everyday life and are also not linked to Islamic values. A learning process that integrates Islam with science can create a complete understanding for students in studying a lesson both in terms of scientific knowledge and in terms of knowledge of the Islamic religion (Al-Qur'an). As a result, students do not know that the material being studied, such as the respiratory system, is closely related to life. The teaching materials used make the learning process less interesting and undirected, so that this condition makes students feel bored and ultimately has an impact on low learning outcomes and students are less motivated to learn.

The next fact currently obtained is that science learning still shows the achievement of mastery of the subject matter without paying attention to whether students understand the material being taught or not. According to Nasir (2019) to improve competence and balance between attitudes, skills and knowledge, a learning plan is needed that not only makes it easier for others to understand the material but can also hone learning abilities. Teachers' efforts to improve learning outcomes and learning motivation are by making students active in learning activities and providing direct experience. Teachers can apply a method, model, approach, and use interesting teaching materials so that learning activities are student-centered (Duda et al., 2019). One of the supporting teaching materials to help students understand learning concepts, thereby achieving optimal learning outcomes is to use teaching materials such as modules (Sriwijaya, 2020). Modules are teaching materials that are prepared systematically and interestingly which include material content, methods and evaluation that can be used independently (Rizky, 2017). The module was developed as a guide in the learning process to make it easier to understand, understand and be more focused in studying the material (Priyitno et al., 2016). This is in accordance with the statement by Alias et al (2012) that the modules developed must be complete, interesting and focused on learning, so that they will have an effect on improving student learning outcomes. The use of modules also does not have to be used in conjunction with other media to be more effective (Setiayadi, 2017).

STEM-based modules with Islamic values are really needed in the learning process so that they can solve problems, innovate, design new things, understand themselves, do logical thinking and students understand the relationship between the material studied and Islamic values (Izzati et al, 2020). This is also in accordance with research conducted by Aminingsih and Izzati (2020) that STEM-based modules can make students more active in learning and improve learning outcomes. According to Syahirah et al (2020), STEM-based modules invite students to work together using technology and also use effective ways to solve a problem being discussed, so that it will have an impact on students' motivation in learning if it is linked to Islamic values.

Method

The research design used was a nonequivalent control group design which compared the experimental class and the control class without randomization (Sugiyono, 2016). The experimental class was given treatment for a certain period of time. Measurements were carried out twice, namely pretest at the initial stage and posttest at the end of learning.

The samples were taken by purposive sampling, at MTsN 8 Pidie the research samples were class VIII.1 and class VIII.2. while at MTsN 11 Pidie the research samples were class VIII.2 and class VIII.3.

The data collection technique is by testing and distributing questionnaires before and after treatment in each class. Then proceed with data analysis techniquesusing statistics with the t-test.

Results and Discussion

After the teaching and learning process is complete, each class is given a posttest to compare student learning outcomes before and after the intervention. The results of the test data collection were analyzed using SPSS version 20.0, using the Mann-Whitney test. In full, Figure 1 below presents a summary of learning outcomes.

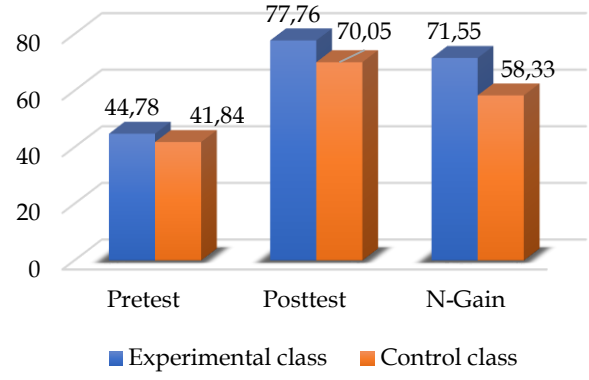

Figure 1. Learning outcomes of experimental class and control class students.

Figure 1 shows the differences in the average results of pretest, posttest and N-Gain scores in the experimental class and control class. The pretest and posttest results show that there are differences in average scores before and after treatment using different learning methods. The posttest results of the experimental class which implemented STEM-based modules integrated with Islamic values were higher compared to the control class which used a scientific approach.Supported by the results of the N-gain test analysis based on the N-gain score category, it shows an increase in learning outcomes in the experimental class using STEM-based modules integrated with Islamic values, which is in the high category, while in the control class, which applies a scientific approach, student motivation is in the medium category. .

Furthermore, to prove that the difference in the increase in learning outcomes for the experimental class and the control class based on Figure 1 is significantly different or not, a hypothesis test was carried out. Hypothesis testing uses the Mann Withney test with the help of SPSS version 20.0 with a significance level of 0.05. Based on the results of the analysis, a summary of the results of the data analysis is in table 1 below.

Table 1. N-gain test of student learning outcomes in the experimental class and control class

Class	N-Gain	Normality test*	Homogeneity test**	*Mann-Whitney***
Experiment	71.55	0.040 (Abnormal)	0.357 (Homogeneous)	0,000
Control	58.33	0.019 (Abnormal)		

Description:
*) :Normality Test, Sig>0.05
**) :Homogeneous Test, Sig>0.05
***) :Mann Whitney test, Asymp.sig. < 0.05

Table 1 shows that the data is not normally distributed. This can be seen based on the results obtained, namely the significant value of the normality test is smaller than 0.05. Furthermorehypothesis testing with the Mann Whitney test in the control class and experimental class obtained a significant value smaller than 0.05, namely 0.000 < 0.05, so it can be concluded that student learning outcomes between the two classes are significantly different.

The research results in the experimental class obtained higher learning outcomes compared to the control class, because the experimental class implemented STEM-based modules containing Islamic values which increased students' enthusiasm for learning which influenced student learning outcomes. This is because the experimental class follows the steps in a STEM-based module which consists of an introduction process to Science (in the form of facts, concepts, procedural science contained in the KD that will be studied), Technology (in the form of technology used and/or developed), Engineering (engineering activities: what products are designed, tools and materials needed, testing product optimization, evaluating product results), Mathematics (mathematical activities required in calculations, such as: applied mathematical concepts, required theorems/formulas). The module also contains Islamic values which aim to instill Islamic values, namely providing provisions to students in the form of Islamic teachings as guidelines in their lives, with the hope that apart from studying biology material, students will have a solid religious foundation by means of understand the relationship between material and Islamic values.

Examples of applying STEM-based modules to research emphasize several aspects including (1) asking questions (*science*) and defining the problem (engineering); (2) develop and use models; (3) planning and conducting investigations; (4) analyzing and interpreting data (mathematics); (5) using mathematics; information Technology; and computational thinking; (6) building explanations (science) and designing solutions (engineering); (8) obtain, evaluate, andcommunicate information that contains Islamic values in the form contained in the module.

The results of the research that has been conducted state that in the STEM learning process in schools students can use science, technology, engineering and mathematics skills in the learning process to think and solve problems. Rafli (2022) stated the same thing that the characteristics of STEM in general are the approach of integrating science, technology, engineering and mathematics in one learning experience which can train students to analyze a problem and solve the problem, the implementation is through project-based learning, contextual to real life, prepare students to become Human Resources (HR) who are able to understand scientific disciplines in an integrative manner, develop soft skills and technical skills (Utami, 2019).

Furthermore, other research shows that the concept of STEM-based modules contains Islamic values, namely to increase students' enthusiasm for learning which is equipped with examples that occur directly in the real world and the environment around students so that students can quickly understand the material, as well as

additional assignments and self-reflection. in modules so that students can learn and apply character systematically and continuously. Apart from that, according to Octaviani (2017: 94) learning activities will be meaningful if students gain direct experience and are trained to be able to discover for themselves the various experiences they learn, then connect them with other concepts they already understand.

The increase in experimental class learning outcomes was higher after implementing STEM-based modules because learning with STEM-based modules did not only examine one scientific discipline, but applied four scientific disciplines in learning. Learning by applying these four disciplines causes students to be motivated in completing assignments and tests, so that they can improve student learning outcomes. As Kelley and Knowles (2016) argue, teaching two or more STEM subjects can increase students' interest in learning so that it influences student learning outcomes. Permanasari (2026) also states that the STEM approach canincrease student knowledge and encourage students to create something new. In addition, when learning the engineering process, students can design, create and test products so that students relate science and mathematics concepts to the engineering process. This is in accordance with the opinion of Sukmana (2018) that implementing a STEM approach does not make students only memorize science concepts, but students can understand and understand these concepts.

Another ability from the application of STEM is that students are able to solve problems. This was stated by Marrison (2006) that STEM education aims to make students become problem solvers, inventors, innovative, independent in logical thinking, technologically literate, able to connect their culture and history with education, and able to apply their knowledge in real life. A research was also conducted by Syukri, et al (2013) which was a collaboration between the Faculty of Teacher Training and Education, Syiah Kuala University and the Faculty of Education, Universitas Kebangsaan Malaysia. The modules produced from this research have been proven to improve student learning outcomes and interest.

Apart from that, the application of STEM-based modules containing Islamic values provides opportunities for students to form characters who are able to recognize a concept or knowledge and apply this knowledge with the skills they have mastered to create or design a method using analysis and based on mathematical data calculations in order to obtain solutions to solutions. a problem so that work becomes easier. Coupled with an integrated module of appropriate religious valuesi with the concept of Islamization of science, namely by combining general knowledge with Islamic values. Delivery of material accompanied by presentation of the arguments in the Al-Quran will really help students understand the learning material. This module, which is integrated with religious values, aims to ensure that students not only have knowledge of scientific theories, but also to instill confidence in students that natural science is closely related to religious values.

Examples of material in the systemRespiration, apart from being explained in science, the human respiratory system is also explained inverses of the Koran, including in (QS. Al-An'am: 99), this verse shows how many blessings from Allah we should be grateful for. Allah created plants which have many benefits that we can take from plants. One of them is green plants. We know the green substance in plants as chlorophyll. This chlorophyll will later play a role in photosynthesis which will produce oxygen for the respiration process. This shows the advantages of the module containing Islamic values, namely that students gaingeneral knowledge and learning with Islamic values.

In line with the research results of Safitri et al (2018), practicum activities using STEM-based modules can improve student learning outcomes in cognitive aspects as seen from learning mastery in the caramel candy practicum by 76% and in the salted egg practicum by 85%. The N-gain value is 0.76 for the practicum for making caramel candy and 0.68 for the practicum for making salted eggs. Practical activities that use STEM-based modules can improve learning outcomes in the psychomotor aspect of students as seen from the skill scores when carrying out practicums by experimenting in the practicum of making caramel candy using various concentrations of sugar and in the practicum of making salted eggs using various methods or techniques for making eggs. quality salt

Then research conducted by Faizah and Mubin (2018) showed the influence of using thematic modules based on the integration of Islam and science on improving student learning outcomes on the theme of energy and its changes in class III students at MI Sunan Drajat Lamongan. This can be seen based on the N-gain score of 0.32, which is in the medium category. This is also proven by the mean posttest result of 81.3 which is greater than the pretest of 72.2. Apart from that, the use of this module can also be used as an alternative for teachers in conveying the integration of Islamic knowledge with learning material

Different conditions occurred in the control class which followed a conventional learning model using a scientific approach. In the student application processexperiencing confusion in solving problems or in the process of getting final resultsAndWhen students have no interest or do not believe that the problem being studied is difficult to solve, they will feel reluctant to try. As a result, the learning outcomes of students who

follow the scientific approach tend to be lower than those of the experimental group.

In contrast to experimental classes, the learning process provides students with the opportunity to form characters who are able to recognize a concept or knowledge and apply that knowledge with appropriate skills.mastered to create or design a method with analysis and based on mathematical data calculations in order to obtain a solution to a problem and add to learning activities containing Islamic values as additional knowledge and have an impact on student learning outcomes.

Regarding student learning motivation, based on answers to questionnaires given to the control class and experimental class. The results of the analysis of learning motivation for both classes are presented in Figure 2.

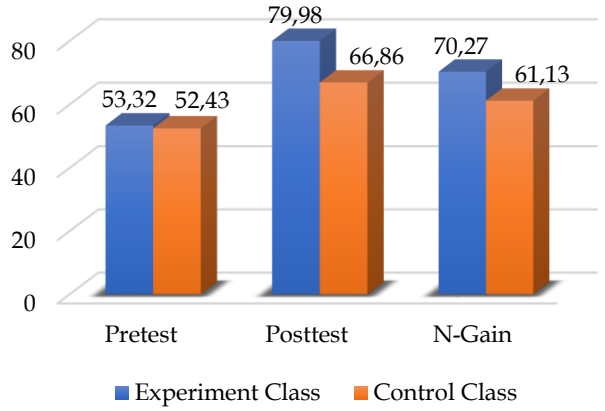

Figure 2. Learning motivation of control class and experimental class students.

Based on the results of the questionnaire analysis, the learning motivation of the experimental class after participating in learning using STEM-based modules integrating Islamic values is different from the motivation of the control class and the experimental class. Supported by the results of the N-gain test analysis based on the N-gain score category, it shows an increase in student learning motivation in the experimental class using STEM-based modules integrated with Islamic values, which is in the medium category, while in the control class, which applies a scientific approach, student learning motivation is included in the medium category. low category.

Next, to prove the results of the pretest and posttest data on student learning motivation based on Figure 2 are significantly different or not, a hypothesis test was carried out. Hypothesis testing uses a two-sample t-test, namely the Mann-Whitney test with the help of SPSS version 20.0 at a significance level of 0.05. Based on the results of the analysis, complete data can be seen in Appendix 3.4, a summary of the results of the data analysis is in Table 2.

Table 2. N-gain test of students' learning motivation in the experimental class and control class.

Class	N-Gain	Normality test*	Homogeneity test**	*Mann-Whitney***
Experiment	70.27	0.036 (Abnormal)	0.081 (Homogeneous)	0,000
Control	61.13	0.014 (Abnormal)		

Description:
*) :Normality Test, Sig>0.05
**) :Homogeneous Test, Sig>0.05
***) :Mann Whitney test, Asymp.sig. < 0.05

Tabel 2shows the average value of learning motivation for control class and experimental class students after different treatments. However, to see whether the motivation of the two samples is significantly different is based on decision making in the Mann-Whitney test, namely, if the value*Asymp*.sig. (2-Tailed) < 0.05, then there is a significant difference between the learning motivation of the control class and the experimental class. Based on Table 4.3, the values obtained are:*Asymp.sig.(2-tailed)*0.000 <0.05, it can be concluded that there is a significant difference in learning motivation between the control class and the experimental class which are taught with different learning strategies, the experimental class applies STEM-based modules containing Islamic values and the control class applies a scientific approach.

Motivation in the experimental class is higher than in the control class. This is because in learning that uses STEM-based modules containing Islamic values, students can understand the respiratory system material by linking science, technology, engineering and mathematics independently, so that it attracts more interest and arouses motivation. students' intrinsic ability to learn. In line with the opinion of Andini (2020) who states that the advantages of the STEM model can increase student interest, participation and increase attendance.

Learning motivation is the driving force within students which gives rise to learning activities (Dessy, 2017). This motivation is aimed at students, so that students study more actively, are more enthusiastic and interested in participating in learning. This is also found in this research, where STEM-based modules can increase student motivation because the STEM approach has 4 aspects, namely Science, Technology, Engineering and Mathematics, so that STEM program activities can help students increase intentions and factors in the ARCS model, namely attention.), relevance (relevance), confidence (confidence), and satisfaction (satisfaction).

Attention(attention) students using STEM-based modules are drawn by using unusual things to attract

students' interest, and stimulate students' curiosity with problems that must be solved. An example of application in the learning process, apart from understanding the structure of parts of the respiratory system, students also learn to use engineering concepts to design the shape of the organs involved in the respiratory system and use their creativity to design shapes or images.

Relevance(relevance) in the research carried out aims to build relevance regarding target knowledge to increase student motivation. The application of STEM-based modules in the learning process is related to achieving knowledge targets which show better learning outcomes and motivation, because students in STEM-based modules identify scientific information, then apply it in the real world which also has a role in finding solutions. This process actively involves students so that it can increase student learning motivation. In line with the statement by Rahmayani and Amelia (2020) to make students active participants, students must also be active in conveying their ideas for solving a problem so as to foster motivation in learning.

Confidence(Self-confidence) for students using STEM-based modules gives students the opportunity for success and a level of self-confidence during the learning process. Self-confidence helps students understand their chances of success in learning and helps them avoid feeling that they cannot complete learning objectives. In line with what Naili (2021) said, STEAM is able to increase children's self-confidence, encouraging children to build a concept of knowledge through observation activities, investigations, and asking several questions that children want to know.

Satisfaction(satisfaction) aims to make learning useful or satisfying, as a form of achievement. Students must feel satisfied with what they achieve during learning activities (Keller, 2009). The learning process using STEM-based modules, students compare their performance or perceived results compared to students' expectations through engineering activities, namely students are given the opportunity to show their skills to operate tools/objects or assemble things, especially the human respiratory system.

Apart from that, the problems that arise in the module can also improve students' critical thinking skills. students are able to solve problems related to daily life related to respiratory system material, so that the learning experience students gain in discovering new knowledge and solving problems, will further increase students' motivation in discovering a concept.

This is in accordance with Mulyasa's statement (2006) which states that modules are independent learning packages that include a series of learning experiences that are planned and developed systematically to help students achieve their learning goals and add to the importance of learning modules that are integrated with religious values. has the aim that students not only have knowledge of scientific theories but to instill confidence in students that natural science is closely related to religious values.

This is in line withThe research results ofjauhariyah (2007) concluded that STEM-based learning can train and improve scientific literacy, motivation, understanding of material, creative thinking skills, effectiveness, meaningful learning, and support future careers. The STEM component is realized with various activities that can help students to improve their abilities. The science component is in the form of material or concepts of environmental change, technology is implemented in the role of environmental change for humans and the environment, engineering is realized in the form of student activities to find out steps regarding environmental change, and mathematics in the form of data on environmental changes that occur.

Conclusion

Student learning outcomes differ significantly between control class and experimental class students. The learning outcomes of experimental class students who implemented STEM-based modules with Islamic values had higher learning outcomes compared to the control class. There are significant differences in student learning motivation between the control class and the experimental class. The experimental class that implemented STEM-based modules with Islamic values had higher learning motivation compared to the control class.

Acknowledgments
Thank you to the principals of MTsN 8 Pidie and MTsN 11 Pidie for giving researchers the opportunity to conduct research there. Apart from that, thank you also to the teachers of MTsN 8 Pidie and MTsN 11 Pidie, who always provide encouragement and provide guidance and direction to researchers while conducting research.

Author Contributions
All authors wrote and finished manuscript.

Funding
None.

Conflicts of Interest
No conflict of interest

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