The Development of a Mathematics Learning Module on Proportion Material Based on STEM with Islamic Integration for Junior High School

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Abstract

21st-century learning requires a special approach which improve students' learning outcomes, namely aspects of cognitive, affective, and psychomotor. Mathematics learning tools must still pay attention to the universal values of Islamic teachings and the use of technology, including STEM. The learning module is the teaching material used by teachers in the mathematics learning process. This study aims to develop and determine the level of validity of ISTEM-based mathematics learning modules on proportion material. This research was carried out at junior high school based on research and development with the ADDIE model, namely Analysis, Design, Development, Implementation, and Evaluation. The instruments were observation sheets, questionnaires, and interviews. The module has been validated by design experts and material experts. The results showed that the development of the module based on the assessment of material experts obtained an average percentage of 90.42% with appropriate criteria, learning expert assessments obtained an average percentage of 81.67% with appropriate criteria, and design expert assessments obtained an average percentage of 81.08%. The results of using the module obtained an average score of 85.71% with a total of 24 students who completed it. The module obtained very high assessment criteria and met the requirements for effective use in improving mathematical learning outcomes and was suitable for use in the mathematics learning process on proportion material for junior high school level. Thus, based on the results of this study, it is necessary to integrate ISTEM in the development of mathematics learning modules for junior high school on proportion materials.

Keywords: Islamic; Mathematics Learning; Module; Proportion; STEM

Abstrak

Pembelajaran abad ke-21 membutuhkan pendekatan khusus yang meningkatkan hasil belajar siswa, yaitu aspek kognitif, afektif dan psikomotorik. Perangkat

pembelajaran matematika harus tetap memperhatikan nilai-nilai universal ajaran Islam dan pemanfaatan teknologi, diantaranya adalah STEM. Modul pembelajaran merupakan bahan ajar yang digunakan oleh guru dalam proses pembelajaran matematika. Penelitian ini bertujuan untuk mengembangkan dan mengetahui tingkat validitas modul pembelajaran matematika berbasis ISTEM pada materi perbandingan. Penelitian ini dilaksanakan di SMP berdasarkan penelitian dan pengembangan dengan model *ADDIE* yaitu *Analysis, Design, Development, Implementation, Evaluation*. Instrumennya adalah lembar observasi, angket dan wawancara. Modul tersebut telah divalidasi oleh ahli desain dan ahli materi. Hasil penelitian menunjukkan bahwa pengembangan modul tersebut berdasarkan penilaian ahli materi diperoleh persentase rata-rata 90,42% dengan kriteria sesuai, penilaian ahli pembelajaran memperoleh persentase rata-rata 81,67% dengan kriteria sesuai, penilaian ahli desain diperoleh rata-rata persentase 81,08%. Hasil penggunaan modul tersebut diperoleh nilai rata-rata 85,71% dengan total 24 siswa yang tuntas. Modul tersebut memperoleh kriteria penilaian sangat tinggi dan memenuhi syarat efektif digunakan dalam meningkatkan hasil belajar matematika dan layak digunakan dalam proses pembelajaran matematika materi perbandingan tingkat SMP. Dengan demikian, berdasar pada hasil penelitian tersebut, perlu ada integrasi ISTEM dalam pengembangan modul pembelajaran matematika materi perbandingan jenjang sekolah menengah pertama.

Kata Kunci: Islam; Modul; Pembelajaran Matematika; Perbandingan; STEM

Introduction

Teaching materials are materials used by teachers in carrying out teaching and learning activities (Dachi, 2018; Purwitaningrum & Prahmana, 2021). One of the teaching materials that can be used by teachers is the module. The modules are teaching materials that are arranged systematically and contain learning activities (Sabri, 2010; Choirudin et al, 2021) Modules are printed teaching materials that contain the information students need to acquire knowledge, in this case mathematical knowledge (Ekawati, Anggoro, & Komarudin, 2019). Modules are teaching materials that have been arranged more attractively and systematically which include materials, methods, and evaluations that are used independently (Bachri, 2021). The purpose of making the module is to help students to learn the material independently (Krisnanti, Riski, & Vahlia, 2020). Thus, the module is a printed teaching material that can be used by students and teachers in teaching and learning activities.

The module used in SMP Muhammadiyah 10 Turen is the 2013 curriculum enrichment module and is not integrated with Islamic values. In addition, the material listed is still incomplete, so students have difficult to understand the material and work on proportion problems. This also causes students to get low grades. Therefore, researchers develop learning modules integrated with Islam and

STEM (Science, Technology, Engineering, and Mathematics). Across the world, STEM receives tremendous attention in education reform efforts and in popular media (Holmlund, Lesseig, & Slavit, 2018).

STEM is a new approach from a scientific discipline that integrates Science, Technology, Engineering, and Mathematics (Hasanah, Mukti, & Aida, 2020). The STEM approach is an approach that combines more than one field of STEM sciences (Ismayani, 2016). According to Arikan, Erktin, and Pesen (2022), Dachi (2018) the benefits of STEM are to develop students' critical, logical, systematic thinking, and creativity in solving problems. In learning with the STEM approach, students not only learn about theory, but also direct practice (Septiani & Tp, 2016). Thus, STEM has a positive impact on students, one of which is improving student learning outcomes.

In this study, researchers also have integrated mathematics with Islam. This is based on Law No. 20 of 2003 which states that education is a conscious and planned effort to create a learning atmosphere and an active learning process in order to develop students' potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by students, society, and state. Therefore, the integration of mathematics with Islam needs to be done, since it is useful to shape the character of students. In addition, the use of Islamic values in learning can increase students' faith and devotion (Firdaus, 2018). Thus, the integration of mathematics with Islam needs to be done because it has a positive impact on students.

In previous research, many researchers have conducted research related to the development of STEM-based mathematics modules. The results showed that the development of STEM-based modules for junior high school students was valid and feasible to use (Zulaiha & Kusuma, 2020). The results also showed that STEM-based teaching materials in building materials met the standards of feasibility aspects and could be used in learning (Hasanah, Mukti, & Aida, 2020). In addition, STEM-based modules on set material were feasible and interesting for students to use (Aminingsih & Izzati, 2020). Besides, the learning module had a very high level of feasibility in terms of presentation, content, and language (Ruliyanti & Wijayati, 2020).

These skills can be achieved in learning mathematics through Islamic-integrated STEM. Although there is a lot of relevant literature related to the development of mathematics learning modules and learning through STEM, there is no relevant discussion about how to use STEM that is integrated with Islam. Based on previous studies, it can be seen that STEM-based learning modules are

interesting and feasible to use. The modules are STEM-based mathematics learning modules and STEM-based mathematics modules integrated with Islam. The reason for conducting this development research is that, in previous studies, researchers have not found any development of ISTEM-based mathematics learning modules on proportion material. ISTEM is Islamic, Science, Technology, Engineering, and Mathematics. Therefore, the purpose of this study is to develop and determine the level of validity of the ISTEM-based mathematics learning module on proportion material.

Method

This research was conducted at a junior high school. The type of research used was development research (RnD) with the ADDIE development model. According to Tegeh, Jampel, and Pudjawan (2015) explaining that in the development of the ADDIE model there are five stages, namely Analysis, Design, Development, Implementation, and Evaluation. The stages of ADDIE development can be seen in Figure 1.
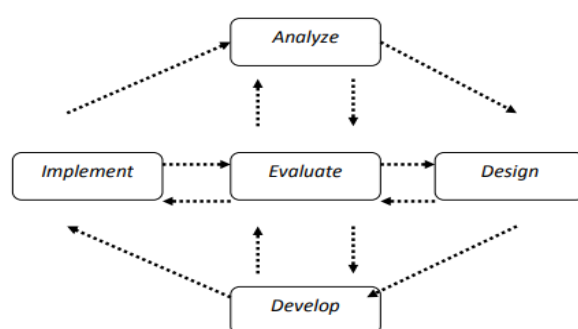

Figure 1. ADDIE Development Stage

The stages of analysis carried out by researchers is a needs analysis. The stages of ADDIE development in this research are 1) analyze stage. At this stage, the researcher analyzes the curriculum used, proportion material, student character, and problems that occur during learning. The analysis was carried out by direct observation, documentation, interviews, and questionnaires. From the results of the analysis, the results obtained are a) the curriculum used is 2013 curriculum, b) the modules or the teaching materials used by the teacher are textbooks or the 2013 curriculum mathematics enrichment module, c) the modules used are not integrated with Islam, d) the approach used is open ended and not in accordance with the characteristics of students and e) The material used is not suitable. Included materials into the module are still incomplete, for example the material listed in the worksheet is not complete or only in the form of a summary, and some of the

formulas presented are only the basic formula, so this makes students have difficulty in learning the module; 2) design stage. The design or planning stage is the stage for designing the learning modules that will be used. This stage aims to design proportion materials according to ISTEM, lesson plans, and prototypes; 3) development stage. At this stage, the researcher carried out three stages. The first stage is module development. Module development is carried out starting from the making of the front cover, introduction, table of contents, instructions for using the module, Core and Basic Competencies, materials, practice questions, formative tests, glossary, answer keys, bibliography and back cover. The second stage is the expert test which aims to determine the level of module validity. Expert tests are divided into two, namely material experts and design experts. The third stage is module revision. The revision of the ISTEM-based mathematics learning module on proportion material was carried out according to input from material and design expert validators; 3) Implementation. At the implementation stage, researchers conducted a limited trial using a revised learning module. Limited trials were conducted on ten seventh grade students; and 4) evaluation stage. The evaluation stage is the last stage carried out by researchers. At this stage an assessment of the ISTEM-based mathematics learning module on proportion material has been carried out with limited trials. The evaluation results are used to describe the level of validity and feasibility of the learning module.

The subjects in this study were one material expert, one learning expert, one design expert, and seventh grade students. The researcher also conducted interviews with A, R, and R (names written in initials) as seventh grade students at SMP Muhammadiyah 10 Turen. Researchers conducted interviews related to the learning methods and teaching materials used. Interviews were conducted in a structured manner. Collecting data using observation, interviews, questionnaires and documentation.

Results

The results of product development are in the form of ISTEM-based mathematics learning modules on proportion material. The module development process carried out is as follows.

Analysis Stage

The analysis stage is the initial stage carried out by researchers before carrying out the development. Obtained results of the analysis are used as guidelines in the preparation of learning modules. From the results of interviews that have been conducted, it was found that the use of teaching materials and approaches was

not appropriate and unattractive, besides that the material listed in the teaching materials had not been integrated with Islam. Therefore, researchers developed an ISTEM-based mathematics learning module on proportion material with the aim of helping students understand the material and solve the problems.

From the results of the evaluation at the analysis stage, it showed that the seven grade students of SMP Muhammadiyah 10 Turen needed a learning module integrated with Islam and based on STEM. Learning modules are designed to attract students' interest and in accordance with the curriculum applied in schools. Thus, the researcher proceeds to the next stage, namely the planning stage.

Planning Stage

The planning stage, the second stage carried out by researchers, needs the learning module designs that will be made as follows:

Material selection and review

Proportion material is the material used to develop the ISTEM-based mathematics learning module. Proportion material consists of 1) Comprehension and Decisive of the Proportion of Two Quantities with the Same Unit, 2) Comprehension and Decisive of the Proportion of Two Quantities with Different Units, 3) Comprehension and Problems' Solution Related to Proportion of Values and 4) Comprehension and Problems Solution Related to Inverse Proportion of Values.

Preliminary Design

This mathematics learning module uses A4 paper size, Times New Roman font with size 14 and 1.5 line spacing. The preparation begins with making design of the front cover, concept map, module content, and back cover. The devices utilized to prepare this module are Microsoft Office 2019, Canva, and a printer for the module.

Instrument Planning

A questionnaire was the instrument used in this research. The purpose of a questionnaire involvement is to find out and test the feasibility of the module before being tested on students. The questionnaire was given to experts of material, learning, and design. In addition, there is a student questionnaire used to determine student responses to the developed modules.

The results of the evaluation at this stage indicate that the learning module needs to be packaged in a more attractive form by being integrated with Islam so that it attracts interest and makes it easier for students to use. In accordance with the results of the evaluation, the researcher will proceed to the next stage, namely the development stage.

Development Stage

At this stage, the researchers developed the following learning modules:

Front cover

Making the front cover aims to make the module look more attractive. In this section there are titles of books and materials that will be studied by students.

Material Display

The display of the material used in this learning module is combined with Islam and STEM. The following is an example of the display of material in the ISTEM-based mathematics learning module on proportion material:


Figure 2. Proportion of Materials in the Module

In Figure 2 it can be seen that the proportion material has been integrated with Islam and STEM or ISTEM-based. The following are the ISTEM values contained in Figure 2, among others: the value I (Islam) is found in people who worship in the mosque, S (Science) is found in prayer movements, T (Technology) is found in the vehicle used to go to the mosque. namely motorcycles, E (Engineering) is found in the design of mosque construction, lighting design in mosques, design of prayer

places and M (Math) is found in the concept of proportion on the height of people who pray in mosques.

Display Practice Questions

The following are examples of practice questions in the learning modules that have been developed:

Figure 5.2 Nino's House

Figure 5.4 Mosque

Figure 5.3 Nina's House
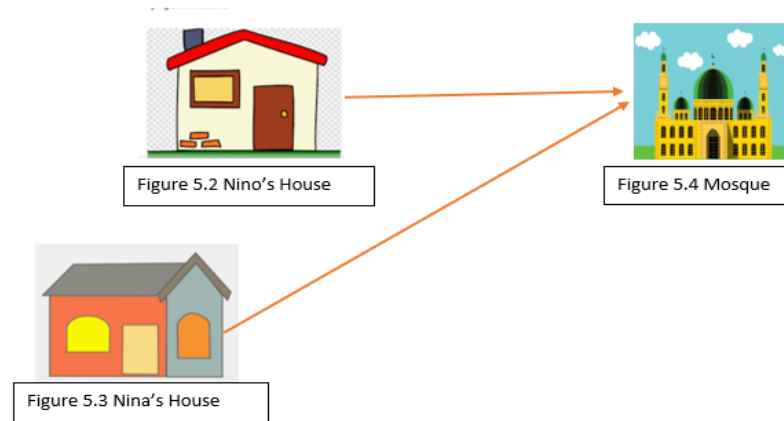
Nino and Nina want to go to mosque by motorbike. The travel time from Nino's house to the mosque is 25 minutes. While the travel time from Nina's house to the mosque is 50 minutes. Determine the proportion of the travel time from Nino and Nina's house to the mosque and simplify the form of the proportion!

Figure 3. Exercises on the Module

Figure 3 shows an example of an exercise in the ISTEM-based mathematics learning module on proportion material that has been developed. The practice questions show that there are ISTEM values in it. The following is an explanation related to ISTEM values in Figure 3. Value I (Islam) is found in mosque buildings, value S (Science) is found in prayer movements, T (Technology) is found in vehicles used to go to the mosque, namely bicycles. Motor, E (Engineering) is found in the design of Nina's house, Nino's and the mosque and M (Mathematics) is found in the proportion formula of the travel time from Nina's and Nino's house to the mosque and a simple form of the proportion.

In completing the practice questions above, you can use a proportion equivalent to write a proportion using a colon (:), fraction $\frac{a}{b}$, or with the conjunction "from". The following is the completion of the practice questions in Figure 3:

It is known: Nino's travel time is 25 minutes and Nina's travel time is 50 minutes

Asked: what is the proportion between Nino's and Nina's travel time? What is the simplest form of this proportion?

Answered: Proportion of travel time between Nino and Nina is 25: 50 and the simplest form of the ratio is 1: 2

Formative or Evaluation Test Display

Formative tests or evaluations aim to determine the level of student understanding, problems or obstacles faced by students, the level of learning success, and to decide the follow-up to the learning process in the future. The following are examples of evaluation questions in the module:

2. The ratio of the rice paid for zakat fitrah to Pak Amin and Pak Galih's families is 2: 3. If the amount of rice for both is 100 kg, how many kg of rice are Pak Amin and Pak Galih?

Figure 4. Evaluation Questions

Figure 4 shows that the evaluation questions have been integrated with Islam and STEM or ISTEM-based. The followings are the ISTEM values contained in Figure 4, among others: the value I (Islam) is found in *zakat fitrah* (alms giving), S (Science) is found in rice, T (Technology) is found on the scales used to weigh the mass of rice, E (Engineering) is found in tools used to process rice, and M (Math) contained in the concept of proportion, namely the proportion of rice issued by the families of Mr. Amin and Mr. Galih for issuing *zakat fitrah*.

The evaluation problem in the figure can be solved by using the formula for the inverse proportion of values, namely:

$$\frac{a}{c} = \frac{d}{b} \leftrightarrow ab = cd$$

Here is how to solve the evaluation questions above:

It is known:

a. The ratio of rice owned by Mr. Amin's and Mr. Galik's families is 2: 3

b. The amount of rice of both is 100 kg

Asked: How many kg of Mr. Amin's and Mr. Galih's rice are?

Answered: a. Pak Amin's rice is $\frac{2}{5}$ x 100 kg = 40 kg

b. Pak Galih's rice is $\frac{3}{5}$ x 100 kg = 60 kg

Implementation Stage

At the implementation stage, the researcher conducted a validation test of the ISTEM-based mathematics learning module on proportion material to material experts, ISTEM (Islamic, Science, Technology, Engineering, and Mathematics) experts, media and design experts. In addition, the researcher also conducted a limited trial and tested the effectiveness of the module to improve student learning outcomes on proportion material. The results of the validation test, limited trial, and module effectiveness test are as follows:

ISTEM-Based Learning Module Validation Results on Proportion

The results of the percentage of material expert validation against the learning module can be seen in Table 1.

Table 1. The Validation Results by Material Experts

Aspect	Average Percentage	Criteria
Eligibility of Content	92,75%	Very Feasible
Presentation	91,75%	Very Feasible
Language	86,75%	Very Feasible
Average	90,42%	Very Feasible

Based on Table 1. it is known that the average percentage of assessments from material experts is in the "Very Feasible" category. The percentage of assessment indicators from eligibility of content is 92.75%, from presentation indicators is 91.75%, and from language indicators is 86.75%. The average percentage of the feasibility of ISTEM-based mathematics learning module material on proportion material from material experts is 90.42% with the "Very Feasible" category, so that the developed mathematics learning module is declared suitable for use. Thus, the material in the mathematics learning module is in accordance with the 2013 Curriculum, the Core Competencies (Kompetensi Inti or KI), and the Basic Competencies (Kompetensi Dasar or KD) in Indonesia. This is because in the preparation of the module, the material refers to the learning objectives and indicators that are also adjusted to KI and KD. The existence of basic competencies will support the learning process for students as well as the information on the achievement of students' abilities after carrying out the mathematics learning process. The presentation of the material in this learning module is feasible since it has been adjusted to the KI that must be achieved. KI-1 learning activity is about admiration and gratitude for God Almighty, KI-3 and KI-4 are places to develop, KI-1 is in the form of spiritual attitudes and KI-2 is social attitudes through the available reflection columns.

On the aspect of language use, this module is written in simple, clear, and easy language adapted to the developmental stages of junior high school students. With the hope of that it will be easier to understand when students use the module, so that they do not frequently ask the teacher for things they do not understand. The language of the module follows the rules of PUEBI (Pedoman Umum Ejaan Bahasa Indonesia), uses standard language, and does not contain double meanings.

ISTEM Learning Module Validation Results by Media and Design Experts

The results of the percentage of media and design expert validation on the learning module carried out two steps, can be seen in Table 2 and Table 3.

Table 2. The Validation Results by Media and Design Experts (Step 1)

Aspect	Average Percentage	Criteria
Cover design	72%	Feasible
Overview	78,67%	Feasible
Content Suitability	76,67%	Feasible
Average	75,78 %	Feasible

Table 3. The Validation Results by Media and Design Experts (Step 2)

Aspect	Average Percentage	Criteria
Cover design	82%	Very Feasible
Overview	85%	Very Feasible
Content Suitability	83,67%	Very Feasible
Average	83,57 %	Very Feasible

Based on Table 2 and Table 3 above, the data shows that the validation results of the Media and design Experts from step 1 and step 2 have increased in each aspect. First, the cover design aspect, which obtained a percentage average of 72% in step 1 with the feasible criteria, has increased to 82% with the very feasible criteria in step 2. Second, the aspect of the overview, which gets a percentage average of 78,67% with the feasible criteria in step 1, has raised in step 2 with a percentage average of 85% with the very feasible criteria. Third, the content suitability aspect, which initially obtained a percentage average of 76,67% with the feasible criteria in step 1, has become 83,67% with the very feasible criteria at the second validation step.

Table 2 and Table 3 are evidence that the cover design of the Islamic-Integrated STEM-based Mathematics learning module has represented its concept and content. Besides, the identity and suitability of the pictures could provide the figure of the contextual object manifested in daily life and Islamic characters. The

module is also structured systematically with interesting colors. This creativity is intended to attract students' reading habits.

Based on the graphics, the composition of the title size, illustration of the images and the logos on the cover of the module have been arranged systematically, clearly, creatively, and dynamically. A good picture for a learning module is that can give clarity of the contents or messages of the picture as a whole, and convey them effectively to module users (Ruliyanti & Wijayati, 2020).

ISTEM-Based Learning Module Validation Results by Islamic Integration and STEM Experts

In the validation of the Expert of Islamic Integration and STEM, the expert provides suggestions for the evaluation of ISTEM-based mathematics learning module so that validation was carried out in two steps. In the expert's assessment of the ISTEM, there are five aspects, which are Islamic integration, Science, Technology, Engineering, and mathematics. The results of the validation of the two steps can be seen in Table 4 and Table 5 below.

Table 4. The Validation Results by Islamic Integration and STEM Experts (Step 1)

Aspect	Average Percentage	Criteria
Islamic Integration	80%	Feasible
Science	75%	Feasible
Technology	77%	Feasible
Engineering	73,67%	Feasible
Mathematics	81%	Feasible
Average	77,34 %	Very Feasible

Table 5. The Validation Results by Islamic Integration and STEM Experts (Step 2)

Aspect	Average Percentage	Criteria
Islamic Integration	88,34%	Very Feasible
Science	85%	Very Feasible
Technology	81%	Very Feasible
Engineering	82%	Very Feasible
Mathematics	87%	Very Feasible
Average	84,67 %	Very Feasible

Based on Table 4 and Table 5 above, the data shows that there are increases in every aspect from assessment by Islamic Integration and STEM expert. In step 1 the average percentage was 77,34%, while in step 2 it increased to 84,67% with the criteria of "very feasible" for two validation steps.

The learning components in this module are ISTEM-based. Besides, the feasibility aspect of the content analysed by learning experts includes ISTEM learning concepts structured by Islamic as motivation (integration), Science as scientific method, Technology as the use of technology, Engineering as product design, and Mathematics as data analysis. Learning experts analyse and validate the results of the products before finally being tested to students for their feasibility to anticipate problems that might arise in learning mathematics on proportion material. Through this ISTEM, the teacher gives problems for the students who are required to prove them through experiments. In these experiments, the students will construct their own knowledge and understanding (Trianto, 2014). Thus, students will be directed to think deeply with careful consideration.

The Effectiveness of ISTEM-Based Mathematics Learning Modules in Improving Learning Outcomes of Proportion Material

The effectiveness of the ISTEM-based mathematics learning module to improve the mathematics learning outcomes on proportion material is seen from two indicators, namely 1) the achievement of learning implementation through individual mastery and classical completeness; and 2) observation of student activities in learning. Based on the data from the analysis of the use of ISTEM-based mathematics learning modules, it has been tested in a limited class group of ten students. Based on the results of the experiment, the average score was 85.50 with a total completion percentage of 86.25%.

Data Interpretation of final values of ISTEM-based mathematics learning modules on effective improvement of learning outcomes on proportion material are presented in Table 6. While the data on the percentage of completeness of classroom learning outcomes on the effectiveness of mathematics learning modules can be seen in Table 7.

Table 6. Interpretation of Comparative Learning Outcomes on the Utilization of ISTEM-Based Mathematics Learning Modules

The Value of Learning Outcomes	Category	Frequency	Percentage
81,25 < x ≤100	Very high	18	64,29
71,5 < x ≤ 81,25	Tall	7	25
62,5 < x ≤ 71,5	Currently	3	10,71
43,75 < x ≤ 62,5	Low	0	0
0 < x ≤ 43,75	Very Low	0	0
Total		28	100

Table 7. Percentage of Mastery Classroom Learning Outcomes through the Effectiveness of ISTEM-Based Mathematics Learning Modules on Proportion Material

The Value of Learning Outcomes	Category	Frequency	Percentage
0 – 74	Unfinished	4	14,29
71,5 < x ≤ 81,25	Finished	24	85,71
Total		28	100

The Trial Results of the Development of ISTEM-Based Mathematics Learning Modules for Limited Groups for Learning Outcomes Improvement on Proportion Material

A limited group trial was conducted at SMP Muhammadiyah 10 Turen. The trial was carried out on 28 students of class VII. Table 7 shows that 85.71% of students completed or finished their learning outcomes (24 students) and there were 4 students who unfinished their learning outcomes with a percentage of 14.29%. The value of 74 is the minimum completeness criteria in mathematics learning. Some students get incomplete results because the results of the work get low scores, so that the value obtained is less than the Minimum Completeness Criteria.

Based on Table 7, it can be seen that the students who are in the very low category ($0 < x < 43.75$) and the low category $43.75 < x \ 62.5$ are none. Student learning outcomes are categorized from moderate to very high. Students in medium category ($62.5 < x \ 71.5$) are 3 students or 10.71%. Students who have learning outcomes in the high category ($71.5 < x \ 81.25$) are 7 students or 25%, and in the very high category ($81.25 < x \ 100$) are 18 students or 64.29%. This former category has the most students in comparison to the other categories.

The average score of student learning outcomes on proportion material is 83.50 with a total mastery percentage of 85.71%, which is in the very high category. Thus, it can be concluded that the learning is successful classically with a minimum of 85% of students achieving completion. The ISTEM-based mathematics learning module with proportion material that was tested on a limited class was significantly effective to improve student learning outcomes on proportion material for class VIII of Junior High School.

Evaluation Stage

The results of the assessments from material experts, learning experts, and design experts showed that the ISTEM-based mathematics learning module on

proportion material obtained the eligibility criteria so that the module could be used in learning. In addition, the effectiveness test and limited trial showed that the module was effective to use and was able to improve student learning outcomes on proportion material.

Figure 5.11 Small Qu'an

Figure 5. 12 Large Qur'an |

In the picture above there are 5 small Qur'an and 4 large Qur'an. If the price of 5 small Qur'an is Rp. 82,500, - and the price of 4 large Qur'an is Rp. 308,000, -. How much does 1 small and large Qur'an cost? Write a proportion between the prices of the two!

Figure 5. The Results of Student Work on the ISTEM Learning Module

Based on the result of the students' work, to be able to solve the problem, students are given contexts related to religious symbols in the form of the Holy Qur'an. Students are required to identify available information and missing information. After that, students are required to be able to determine the price of each book of the Qur'an, after which a comparison is made between the prices of the two. Students finally can do the task well.

Discussion

The use of new Education and technology can be beneficial in integrating 21st century skills and key competencies in Education (Kurt & Benzer, 2020;

Weinhandl, Lavicza, & Houghto, 2020). Science, Technology, Engineering, and Mathematics (STEM) is a new educational approach that integrates science, technology, engineering, and mathematics in the learning process focusing on problem solving in everyday life (Davidi, Sennen, & Supardi, 2021; Pane et al., 2021). STEM provides students with an effective learning environment to improve their mathematics and other modern skills (Doğan Gürbüz, Çavuş-Erdem, & Şahin, 2019; Dwita & Susanah, 2020; Khotimah Adnan, Ahmad, & Murtiyasa, 2021; Kurniawan, 2020; Stehle & Peters-Burton, 2019). Based on the results of the research above, STEM is very good to develop, to implement in schools, and to integrate with Islam. This is because STEM integrated with Islam will provide a new direction, and will improve existing conditions. This study seeks to develop a mathematics learning module on proportion material that is integrated with Islam, Al-Quran, and Hadith, hereinafter abbreviated as ISTEM. The development process of the ISTEM-based mathematics learning module in proportion material was conducted by the researcher using ADDIE model consisting of analysis, design, develop, implementation, and evaluation. the analysis stage carried out needs analysis, student analysis, material analysis, and Islamic integration analysis. Based on the results of field observations, it was found that mathematics learning at SMPM 10 Turen Malang has not been integrated with Islam. There have been efforts to internalize the universal values of the Quran, but the efforts have not been continuous and comprehensive. In addition, the factor of students who have poor motivation and interest in mathematics is because the students do not attract to the modules used in learning so that it creates a stigma that mathematics and Islam do not compromise each other and mathematics is dry from Islamic teachings or values (value-free mathematics). In accordance with the demands of the current curriculum, namely the 2013 curriculum in which students are required to become more independent and creative learners, an existed independent learning curriculum requires an integration project and the character of Pancasila included in student profile. Therefore, based on this initial analysis, this module is very necessary to developed, primarily to facilitate the improvement of students' mathematics learning achievement. In the second stage, the design of this proportion material learning module is based on I-STEM that is a collaboration between STEM learning and Islam, a religion that highly upholds character education.

At the develop stage, this proportion material learning module is developed in the way of incorporating Islamic values into the module. Besides that, verses of the Qur'an and hadith related to the material are also inserted to the module. In addition, this module was developed with special characteristics, namely the Islamic

context and religious symbols. After the module is developed in accordance with the basic competencies, and is assessed through the validation from three experts, material experts, media and design experts, and ISTEM experts (Islamic integration in STEM), as well as is agreed upon to meet the criteria for use, then the module is ready to implementation. This learning module is implemented or tested on students at SMPN 10 Turen class VII. The results of the implementation of the ISTEM-based mathematics learning module on proportion material were that, from 28 students in the class, 24 students passed or scored above the minimum completeness criteria, while the remaining 4 students did not meet the minimum completeness criteria. The use of ISTEM-based mathematics learning modules on proportion material for Junior High School class VII is quite effective in students' learning mastery improvement. The results of this study are in line with the research of Anwari et al (2015), Firman (2015); Asmuniv (2015) which stated that education with a STEM approach is innovative and able to foster student understanding and creativity on four disciplines in an integrated manner.

In the implementation phase, this ISTEM-based mathematics learning module was tested on a limited basis to class VII students of SMPN 10 Turen. Based on the results of the trial, information was obtained that of the 28 students who were the research subjects, 85.71% or about 24 students could pass with scores above the minimum completeness criteria and the remaining 4 students had not completed the proportion material (see Table 7).

The results of this study are in line with the research results of Tsai, Chung, and Lou (2018) which explained that STEM learning combined with other aspects would be useful in improving student learning outcomes. STEM provided students with an effective learning environment to improve their mathematics and other 21st century skills (Doğan, Gürbüz, Çavuş-Erdem, & Şahin, 2019; Dwita & Susanah, 2020; Khotimah, Adnan, Ahmad, & Murtiyasa, 2021; Kurniawan, 2020; Stehle & Peters-Burton, 2019). In addition, Mubarok, Safitri, and Adam (2020) also combine STEM with religion and art.

Even in the Qur'an, it is explained about the procedures for children education so that they have a positive and simple character as stated in the QS. Luqman verses 12-19. Among the important points related to the procedures for children education are believing in God, being patient and devoted to both parents, doing good and leaving evil, being humble and polite in speaking. Thus, the combination of STEM education and Islam could be a good learning model to create a generation of people who master science and technology, be able to solve problems, and have a positive character so that they can compete in the global arena without losing their noble personality.

Mathematics as a science that focuses on logical thinking process in problem solving has a very important role in achieving 21st century skills (Dewanti et al., 2020). In addition, mathematical skills are also indispensable in human life in general because of their role (Mason et al., 2016). Therefore, mathematics learning must equip students with aspects of knowledge, attitudes, and skills that can be used for their future in dealing with the complex world of work (Kristanto & Santoso, 2020). According to Dewanti et al. (2020) 21st century mathematical skills that must be developed in learning are critical thinking, problem solving, creativity, communication skills, and the ability to work collaboratively.

Kang (2019) in his research states that STEAM has a great impact on students' abilities at school, both on students' cognitive and affective domains. In addition, teachers need to start linking and teaching mathematics with other disciplines to prepare students to compete in this increasingly complex industrial 4.0 era. This is also in line with the statement which states that learning with the STEAM approach is able to help students face challenges in the industrial era 4.0 (Azzahra & Lumbantobing, 2020). Therefore, STEAM learning is the right choice for students so that they are more aware of the current developments.

Conclusion

Based on the results and discussion of ISTEM-based Mathematics Learning Module Development on proportion material for class VIII, it can be concluded that the development of ISTEM-based Mathematics Learning Modules based on material expert assessments obtained an average percentage of 90.42% with very feasible criteria, learning expert assessments obtained an average percentage of 81,67% with proper criteria, the assessment of design experts obtained an average percentage of 81.08%. According to the results of the study, the use of ISTEM-Based Learning Modules can improve learning outcomes on proportion material with an average score of 85.71% with a total of 24 students who completed the test. The ISTEM-based mathematics learning module for proportion material that has been developed has a very high assessment criteria, and has met the requirements for effective use in improving mathematics learning outcomes, as well as is suitable for use in the mathematics learning process on proportion material.

This development research was developed by using the ADDIE model and was based on ISTEM (Islamic, Science, Technology, Engineering and Mathematics). What has been developed is a learning module for comparison materials for junior high school students. The drawback of this development research is that this research is only limited to proportion material, so that further research can be carried out by taking other mathematics materials. In addition, the clarity of

integration between mathematics material with other subjects, Al-Quran, Hadith, and STEM, must be further strengthened.

The use of Islamic-integrated STEM in the development of proportion material mathematics modules should choose a theme that is explored from various multidisciplinary sciences, and is associated with technology. This is done in order to stimulate students to create new ideas, think critically, improve communication skills, and collaborate in problem solving process. The integration of I-STEM in mathematics learning is able to improve 21st century mathematical skills, especially in critical thinking and problem solving.

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