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Development of Science E-Modules for Middle Schools Integrated with Al-Qur'an Verses with Virtual Simulation of Solar System Material

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Abstract

This research was conducted to produce a science e-modules for middle schools integrated with the Al-Qur'an versed, assisted by virtual simulations on solar system material. These teaching materials were made to support students learning independently with engaging content in which they were equipped with virtual simulations. The author conducted the research using research and development methods by adapting Borg and Gall's research design. The step in this research was limited by the fifth step, namely the main primary product revision. This was due to the authors' conditions in the development process. The results of the validity of the science e-module product have been declared valid based on the results of validation by Al-Qur'an verses integration experts, learning materials experts, and teaching materials experts, with the category of all assessments being very good or feasible to use. In addition, the science e-module for middle school integrated verses of the Al-Qur'an assisted virtual simulation on the stated practical to use for students in learning. The student responses related to the science e-module product for middle school integrated verses Al-Qur'an assisted virtual simulation on very positive.

Keywords: e-module science, integrated science qur'an, virtual simulation

INTRODUCTION

The curriculum of 2013 is a curriculum that is full of character education. Curriculum 2013 has core competencies (KI) designed to be interrelated, including spiritual attitude (KI-1), social attitude (KI-2), knowledge (KI-3), and skills (KI-4) (Shofa et al. 2020). This becomes a reference in designing essential competencies (KD) and must be developed in every learning event in an integrated manner. Based on the description above, the author concluded that in the 2013 curriculum, students are led to have a balance of attitudes. With this, KI will later become a reference in developing KD learning.

National education aims to develop abilities and shape students' behavior to become human beings who believe in and fear god almighty, have a noble character, is knowledgeable, and are independent (Undang-Undang No. 20 Tahun 2003 Tentang Sistem Pendidikan Nasional 2003). This explains that in the teaching and learning process, there is a spiritual element given to students, but in learning, this is still less given by educators. Thus, there is a need for a learning process that includes various aspects of the purpose of national education that can run optimally by instilling moral values in schools and integrating Al-Qur'an verses into learning materials. That is why the term Islamization of science

emerged, basically a desire to integrate religion and science (Taşkın 2014). Based on the description above, it can be understood that humans are required to study religion in addition to studying science. Moreover, to combine and associate the two in learning. According to Mukaromah as an educator, it is crucial to integrate Islam and Science in education in which the Al-Qur'an works in the construction of science by providing instructions on the principles of science. Integration also has implications for knowing the Creator and leads to increased faith and moral glory (Mogra 2017). In addition, the material with integrated verses of the Al-Qur'an can motivate human reason, be able to bring the principles of Islamic teachings closer to the human soul and reflect on the truth from the perspectives of scientific processes (Saputro et al. 2019).

Based on the results of the analysis of the needs of students, 67% of them had a have trouble learning science. In addition, the learning process was carried out online for more than a year. So, educators cannot use supporting media and teaching aids commonly optimally. According to Hardini et al., one of the efforts made so that science learning in middle school is taught based on integration by providing teaching materials. According to the National Center for Vocational Education Research, teaching materials are all used by teachers/instructors to carry out classroom teaching and learning activities (Lim et al. 2020). Teaching materials used in the science learning process at MTs Hasanah Pekanbaru are in the form of package books that have not been integrated and LKS (student worksheet) and additional from the internet.

Based on these problems, the author's solution is to develop electronic teaching materials designed using specific applications that combine verses of the Al-Qur'an and science to equip students with new knowledge insights. One form of teaching material that can be used as a source of independent learning for students is an electronic module (e-module). The e-module in this research and development will be equipped with virtual simulations. Madlazim stated that virtual simulation is a computer simulation media that presents phenomena that play an essential role in science learning. (Jaya et al. 2015). Virtual simulation media can substitute with simulation. By using simulation, teachers can describe microscopic phenomena with a dynamic approach. The use of virtual simulations can also potentially motivate in significantly improving learning and more effective learning experiences. The explanation of the problem's background makes the author interested in researching '*Development of Science E-Modules for Middle Schools Integrated with Al-Qur'an Verses with Virtual Simulation of Solar System Material*'.

METHODS

The type of research used in this research is research and development. Development research is research used to produce a particular product and test the effectiveness of that product (Sugiyono 2019) with Borg and Gall's research design. Borg and Gall's research design consists of ten research steps; Emzir stated that development research could be possible to limit research on a small scale, including restricting research steps (Emzir 2013). In this study, the author determined the research step to the 5th step, namely the primary product revision. This is due to the limited time and costs in research, in line with research by (Dewi et al. 2018), (Husniyah & Pratiwi 2019), (Miraza et al. 2018) & (Novita et al. 2019).

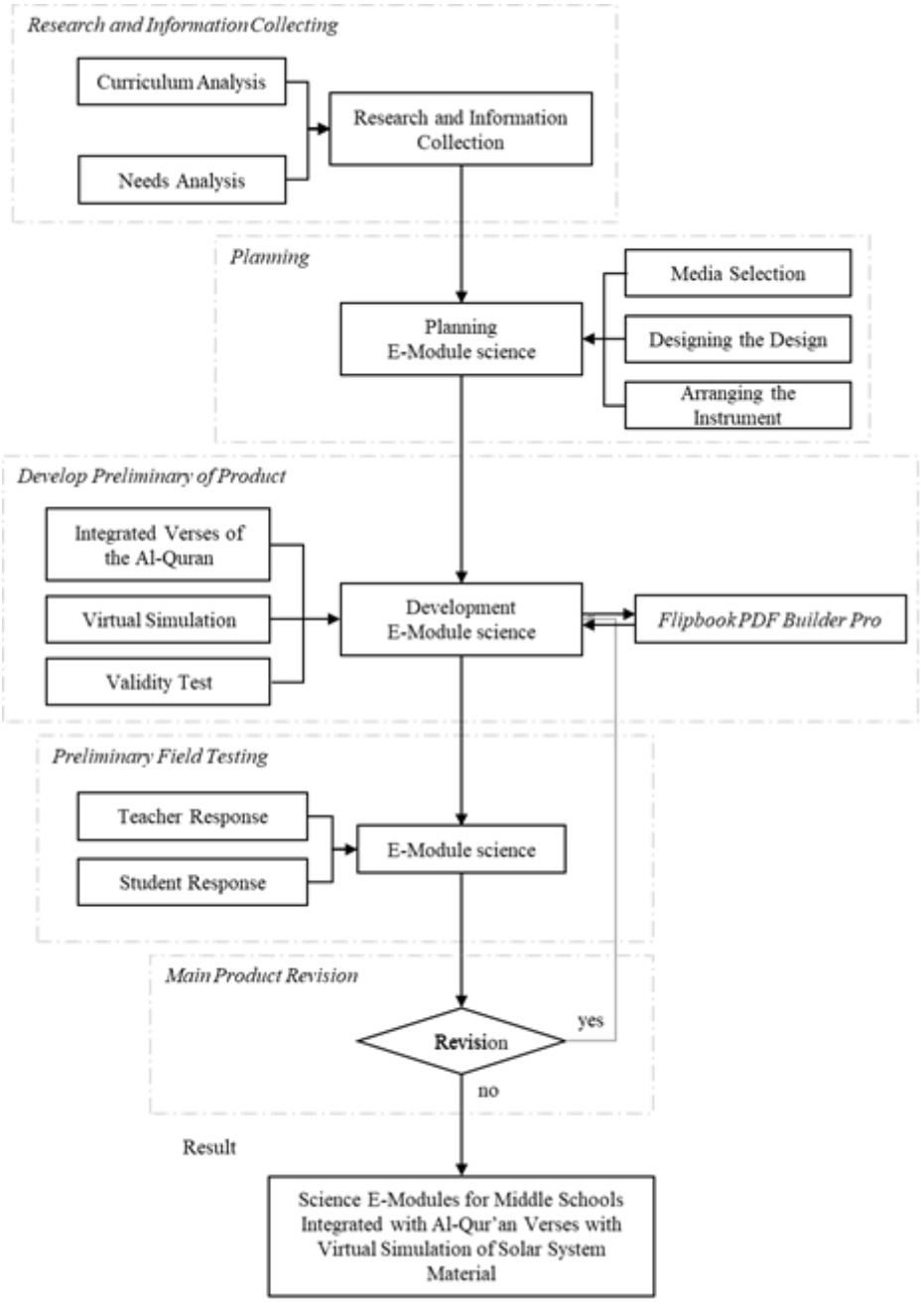

FIGURE 1. Research framework

The data collection technique used in this study is to use questionnaires. Questionnaires are used in the form of questionnaires for validators who are experts in the integration of Al-Qur'an verses, material expert validators, media expert validators, practitioners, and learners who serve to find out the feasibility level of the product to be developed. The questionnaire assessment scale is a 4-point Likert scale for validators and practitioners and a Guttman scale for learners.

The types of data used in this study are qualitative data and quantitative data. Qualitative data is obtained from comments and suggestions in questionnaires filled by expert validators, practitioners, and students. In contrast, quantitative data is obtained from the results of suspension on questionnaires by validators, practitioners, and learners. The results of the scoring obtained will be analyzed using simple data statistical methods in the form of percentages used to get the conclusion of answers given by respondents from questionnaires.

As for the percentage formulation used, namely:

$$\text{Eligibility Percentage} = \frac{\text{overall average}}{\text{highest scoring score}} \times 100\%$$

Data obtained from such percentages were then converted using the reference table interpretation feasibility according to Arikunto as in TABLE 1 (Arikunto 2014).

TABLE 1. Eligibility Score Interpretation

No	Percentage (%)	Assessment Criteria
1	0% - 25%	Less Feasible/Practical/Good
2	26% - 50%	Decent Enough/Practical/Good
3	51% - 75%	Decent/Practical/Good
4	76% - 100%	Very Decent/Practical/Good

RESULTS AND DISCUSSION

The results of research on the development of science e-module for middle school integrated verses of the Qur'an-assisted virtual simulation that the author has carried out will explain in detail as follows:.

Research and Information Collecting

The first stage carried out by researchers is research and information collection, namely by conducting a preliminary study on MTs Hasanah Pekanbaru by distributing questionnaire questionnaires for student needs. It was found that students think science subjects are difficult, this is due to physics calculations and understanding of concepts. During learning learners overcome their difficulties by asking the teacher directly. Students also rarely use modules or e-modules in their learning, they always use LKS and package books. Students expect the development of science learning resources as a learning support. So that in this study researchers developed electronic modules (e-modules) as teaching materials that will be used in the teaching and learning process.

The selection of e-module development is because it can be a source of independent learning for students. This is in line with Nurcahaya's opinion, according to him, the learning process using e-modules makes students no longer dependent on educators as the only source of information, to create student-centered learning in accordance with the learning objectives in the 2013 curriculum (Nurcahaya 2020).

In addition to distributing questionnaire questionnaires to students, researchers also conduct analysis related to the curriculum and the Al-Qur'an to determine the material that is suitable for integration with the Al-Qur'an. The results of curriculum analysis and the Al-Qur'an obtained material that can be developed by integrating verses of the Al-Qur'an, one of which is solar system material. In this material there are many signs of the greatness and majesty of Allah that can increase the faith and moral glory of students.

Planning

The second stage is the planning stage. At this stage, researchers plan the initial product to be developed, namely a teaching material in the form of an electronic module (e-module) that is integrated with the verses of the Al-Qur'an with the help of virtual simulations for middle school. Here are some of the stages that researchers do at the planning stage:

First, the selection of media to be used during the development of the integrated Middle school science e-module for Al-Qur'anic verses assisted by virtual simulations took place. The media used includes images, animations, videos, virtual simulations, and software. In this study, the software used was Microsoft Publisher in making the layout of the e-module, then converted into a PDF file and converted into a flipbook form using the Flip PDF Professional application. The images, videos, animations, and virtual simulations used in this science e-module are taken from various websites.

Second, design the initial design of teaching materials. At this stage, the study makes a design related to the type and size of the letters and the content filled in the science e-module. The typeface used in this e-module ish Dimbo and TW Cent MT, whose font size starts from 10 pt. up to 18 pt. The

content of the e-module consists of preface, content, and instructions for using the e-module, KI and KD, table of contents, concept map, QR Code, introduction, learning objectives, check points, info corner, summary, competency test and evaluation, science skills, glossary, and Bibliography.

Third, compiling research instruments, research instruments compiled in the form of questionnaires used in research to assess the products developed. The questionnaire consists of expert validation questionnaires, practicality questionnaires, and student response questionnaires. Before use, this research instrument is first validated. Instrument validation is carried out twice.

Develop Preliminary Product

At this stage, the author developed a product of teaching materials as an e-module of science for middle school integrated verses of the Al-Qur'an assisted by virtual simulation. Here are some of the stages that the author does at the development stage:

First, design the integration of Al-Qur'an verses into the material of the solar system. This is based on the interpretation of the Ministry of Religion Affairs of the Republic of Indonesia. This stage is carried out by providing narration and explanation/interpretation of verses closely related to the solar system material.

Second, the design of the science e-module for middle school integrated verses of the Qur'an-assisted virtual simulation of solar system material can be seen in TABLE 2.

TABLE 2. Design E-Module Science

No	E-Modul Design	Information
1		The cover contains: a. Author's name b. E-module title c. Subject name d. Material Title e. Class description f. Logo
2		comprise: a. Table of contents of the e-module science b. Concept map
3		The material page, contains: a. Learning objectives b. Introduction c. Content of the material d. Video e. Simulation f. Quiz g. Summary, as well as h. Competency test

No	E-Modul Design	Information
4		Competency test and evaluation

Preliminary Field Test

The fourth stage is conducting a preliminary field test, where an expert assesses the product, then carries out practicality tests and student responses—the results of expert validation that each expert has filled.

Expert Validation

Expert validation is carried out by 7 (seven) expert validators from various fields, including media experts consisting of 3 (three) validators, material experts consisting of 3 (three) validators, and experts in the integration of Al-Qur'an verses 1 (one) validators. This validation aims to find out the feasibility of display and design as well as practicality in operation, the feasibility of materials and various things related to the material, and to find out the suitability and integration of Al-Qur'an verses contained in the science e-module of middle school that was developed. The results of data analysis by expert validation can be seen in TABLE 3.

TABLE 3. Recap of Expert Validator Analysis Results

No	Indicator	Results	Criteria
	Media		
1	E-module layout	93%	Very Worthy
2	Multimedia and language	83%	Very Worthy
3	Practicality and operation	95,83%	Very Worthy
	Average	90,44%	Very Worthy
	Learning Materials		
1	Material feasibility	96%	Very Worthy
2	Presentation of materials	95%	Very Worthy
3	Integration of Al-Qur'an verses	92%	Very Worthy
	Average	94,33%	Very Worthy
	Integration of Al-Qur'an Verses		
1	Combability to the use of Al-Qur'an verses	100%	Very Worthy
2	Integration of verses of the Al-Qur'an	63%	Worthy
3	Religiosity of Leaners	75%	Worthy
	Average	79,33%	Very Worthy

Based on the recap related to the results of the validator analysis in TABLE 2. Overall, the average obtained is very feasible, with a note that there is an improvement in the science e-modules of middle school. So later, this science e-module can be a good and exciting teaching material for teaching and learning. In addition, it can increase the value of students' faith in majesty Allah. This is in line with the statement of (Permana et al. 2021) that the values and character of students can be developed by integrating verses of the Al-Qur'an following the topic discussed. The Qur'an has many verses whose meaning can be proven empirically following the scientific theory of science.

Practically by Educators

The Practicality Test by educators aims to determine the feasibility and practicality of the science e-module for middle school integrated with Qur'anic verses with a virtual simulation. The results of data analysis by learning material experts on each indicator can be seen in FIGURE 2.

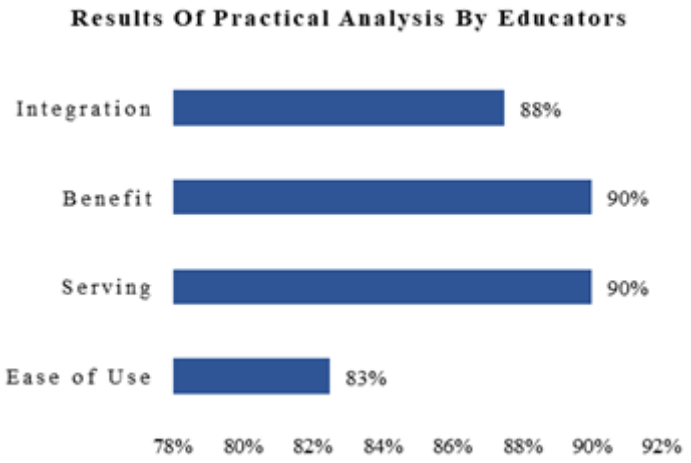

FIGURE 2. Result of practically analysis by educators

Based on the results of the analysis of practicality tests by educators on the science e-module in FIGURE 2, there is an improvement in every aspect/indicator of its assessment. Overall, the average obtained at the final assessment of practicality by educators is very decent in terms of ease of use, serving, benefits, and integration. Thus, making this science e-module can be practical for use in the process of teaching and learning activities in the classroom.

Students Response

The assessment of student response aims to determine the appropriateness of students' appearance and interest in the science e-module of middle school integrated with verses of the Qur'an with a developed virtual simulation. The results of the data analysis of student responses on every aspect/indicator can be seen in FIGURE 3.

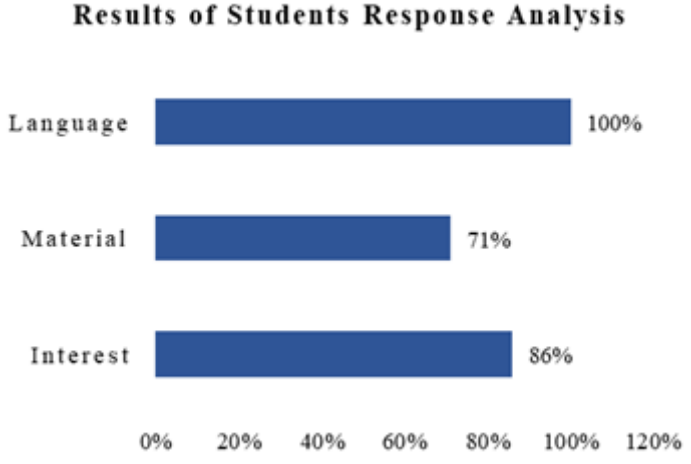

FIGURE 3. Result of student's response analysis

Based on the analysis of students' responses to the science e-module in FIGURE 3, there is an improvement in every aspect/indicator of its assessment. Overall, the average obtained in the final assessment of the student's response, the science e-module of middle school integrated verse of the Qur'an with virtual simulation received a positive/good response, both from the aspect of interest, material, and language.

Main Product Revision

The fifth stage, in this development research, is the revision of the initial product. After conducting preliminary field trials to find out the attractiveness of the science e-module for middle schools integrated with al-qur'an verses with virtual simulation of solar system material Researchers revised the e-module based on input and suggestions from validators to produce a final product in the form of an for science e-module of middle schools integrated with al-qur'an verses with virtual simulation of solar system material with a decent and practical. So that later this e-module can be used as a learning resource for students and educators in Middle school on class VII solar system material.

(Hajaprana et al. 2021), (Oktaviana et al. 2020) & (Sakarti et al. 2020) stating that the product developed can be called feasible and practical if the product gets a positive response from validators, practitioners and students judging from the percentage of the product assessment questionnaire score. Based on the test of validity, practicality, and student response, it can be said that the e-modules developed have reflected good and valid teaching materials.

CONCLUSION

Based on research and development of science e-module of middle school integrated by Qur'anic verses with virtual simulations that have been carried out. It can be concluded that the product development result is declared valid or feasible based on an assessment by expert validators and declared very practical by practitioners and gets a positive response from students. However, this e-module still needs to be reviewed regarding integrating Al-Qur'an verses into the material. Therefore, further research is needed to perfect this science e-module. Other research is also needed to see the influence and effectiveness of science e-modules in middle school integrated with Al-Qur'an verses with virtual simulations; this teaching material can be used by teachers in the teaching and learning process.

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