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The Development of E-Comics in Integrated Science and Religious Values for 5th Grade Students

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ABSTRACT

The context for this research project is the insufficient availability of innovative learning materials and the divide between general science and religious knowledge in education. In primary schools, science subjects are taught with a minimal use of technology for teaching materials. This study aimed to outline the steps taken, quality, and feasibility of e-comics in teaching integrated science and religious values to 5th-grade primary school students. The research process followed the ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation. Both qualitative and quantitative data were gathered to support the research. Qualitative data were collected through expert validation, teacher assessments, and feedback from the students who were the subjects of the study. The average score from expert validation, teacher assessments, and student feedback was 3.80. Based on this score, it can be concluded that the e-comic media is suitable for integrated science and religious education for 5th-grade primary school students and falls under the "Good" category for use.

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Introduction

As time progresses, the advancement of technology is followed by the development of knowledge. This phenomenon has led to an increase in society's needs from various aspects, including education. The development of technology in education can push humans to create new discoveries to solve problems in learning, improve the quality and effectiveness of learning, and create excellent human resources for the development of the new generation [1]. The effort and skills of educators are necessary during the delivery of material in learning with new discoveries so that learning goals can be achieved. The new learning media that teachers create can become a means of providing feedback between educators and students so that students can achieve maximum learning results [2].

Learning media is a tool for conveying information aimed at achieving the desired learning outcomes [3]. With learning media, teachers can easily deliver material so that learning can be conveyed optimally, and the quality of students' learning can improve. As explained in research of Ref. [4], to optimize learning in schools, it is necessary to implement learning media that functions to obtain improved learning outcomes and motivate students to learn. In addition, in developing learning media, it is necessary to innovate and follow technological advancements.

Science learning in elementary school needs to be implemented with learning media in the learning process. This is because science learning often involves materials related to objects in the surrounding environment or even in human daily life. Thus, in conducting teaching activities, teachers can package the material so that students can easily absorb the material explained by utilizing learning media.

According to Ref. [5], learning science in elementary school stimulates students to think critically and not just focus on their understanding. However, there are still several issues in the implementation of science education. Ref. [6] stated that the process of science learning in schools is still textbook-oriented, while Ref. [7] found that the use of learning media in science subjects is still not innovative enough, as only visual media such as pictures are used. The use of learning media is important in school learning activities to generate students' interest in learning.

Ref. [8] revealed that students' lack of interest in science subjects was due to the lack of implementation of media by teachers in the learning process. Science education plays an important role in daily activities as it relates to the lives of living creatures on earth, and science is also closely related to religious knowledge. Ref. [9] found that the process of science learning in schools has not been integrated by teachers due to their lack of mastery in integrating science education with religious knowledge.

Ref. [10] suggested that integrating science education with religious values from an early age can help students avoid dichotomy between science and religion and can equip them with a better understanding of both subjects. Previous studies by Ref. [11] evaluated the feasibility of e-comics and e-modules integrated with religious values in science learning, respectively, and found that both were feasible and could increase students' motivation and enthusiasm for learning, particularly in the classroom.

Based on these studies, the researcher aims to develop a learning product of e-comics integrated with religious values for science learning in elementary school, titled "Development of E-Comics in Science Learning Integrated with Religious Values for Grade V Students of Elementary School." E-comics are electronic comics used to deliver information in an attractive and entertaining manner. The use of e-comics as a learning medium includes pictures, stories, and cartoon characters that students like in elementary school. Indriasih et al.'s study in 2020 suggests that the use of e-comics can enhance students' learning motivation.

Methods

The ADDIE model is a Research and Development (R&D) approach that consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. These stages are applied to an e-comic product to obtain data on product quality based on expert validation of language, material, media, and product suitability according to teacher assessments and student responses. Data is collected using observation sheets, and questionnaires are given to validation experts to determine the quality and suitability of the e-comic product.

Qualitative and quantitative data analysis techniques are used to analyze the data. Quantitative data analysis is based on expert assessment sheets, and the data obtained is processed to serve as a guide for assessing the quality and suitability of e-comic media for integrated science and religious values learning. The quantitative data is then converted according to the classification table. See Table 1.

Table 1. Product Classification

Mean Range	Classification
4.20 to 5.00	Excellent
3.40 to 4.20	Good
2.60 to 3.40	Fairly Good
1.80 to 2.60	Poor
1.00 to 1.80	Very Poor

Results

The first stage of the research conducted is the analysis stage. The analysis stage is used to gather data from curriculum analysis, teacher and student needs, and materials analysis. Curriculum analysis is obtained by analyzing the competency standards, basic competencies,

learning objectives, and indicators of theme book 5 on the ecosystem of the 2013 Curriculum. Teacher and student needs analysis is conducted to assess the relevance of the learning media used in teaching and learning activities on the ecosystem material. Teacher and student needs analysis are obtained from journals and previous research on the use of learning media. Material analysis is conducted to determine relevant or suitable material that has been presented in the analysis of teacher and student needs. Relevant or suitable material is the material in Theme Book 5 on the Ecosystem for Elementary School Grade V. In addition, e-comic development not only presents ecosystem material but also integrates it with religious values.

Next is the design stage, which involves designing the e-comic product, including graphic design, collecting objects, collecting materials, exercise questions, answer keys, compiling quality and feasibility tests for the e-comic. The researcher designs characters and panels in the e-comic using Corel Draw 2019 software. Then, objects are collected as support for the e-comic display. The material presented is the material in Theme Book 5 on the Ecosystem of the 2013 Curriculum and is integrated with religious values.

The development stage involves two activities: media creation and media validation. Media creation is done gradually by designing comics per page containing dialog panels, characters, images, and backgrounds using Corel Draw 2019 software. Next, the comic design is converted to the .pdf format to be presented in the form of a web flip HTML5 for publication by sharing the available link. Next, media validation is carried out by expert validation, including language experts, media experts, and material experts. The results obtained from expert validation based on assessment, suggestions, feedback, criticism, and solutions are used as a guide to revise the product.

The implementation stage is applied to determine the feasibility of the developed e-comic product. The activity carried out is limited field testing. Then, the data obtained is processed to determine the feasibility of the developed e-comic product.

The final stage is evaluation. In this stage, the evaluation process is carried out based on the results of data analysis from the expert validation assessment. This is done to identify errors so that revisions can be made according to the suggestions and feedback of language experts, material experts, media experts, as well as teacher assessment and student responses. Based on the stages in the ADDIE model, the e-comic product developed is suitable for use in teaching and learning activities in elementary schools. The following are examples of the display of the developed e-comic product.



Fig. 1. E-Comic Cover in Flip HTML5



Fig. 2. E-Comic Content Display



Fig. 3. Exercise Display

Media validation testing is conducted as a guide to determine the quality and feasibility of the developed e-comic product. Media validation is obtained from language experts, media

experts, material experts, teacher assessment, and student responses. The results of media validation are presented in the following table.

Table 2. Product Validation Results

Assessment	Score	Category
Expert Validation (language, media, material experts)	3.58	Good
Teacher Assessment	4.43	Very Good
Student Response	3.41	Good
Total	11.42	
Average Score	3.80	Good

Based on the results of expert validation, which include language, media, and material experts, using an evaluation form/questionnaire, a score of 3.58 with a "good" category is obtained. Overall, based on the ADDIE model and the results of the validation process, the e-comic product developed is considered suitable for use in elementary school teaching and learning activities, particularly for the topic of ecosystem. It provides relevant and integrated material with religious values, and the design and graphics are visually appealing and engaging. The validation process involving language experts, media experts, and subject matter experts, as well as the feedback from teachers and students, ensured the quality and suitability of the product.

Discussion

The researcher has developed an e-comic that contains science learning integrated with religious values for fifth-grade elementary school students. The material contained is the ecosystem material in the 2013 Curriculum for elementary school. The use of innovative media has attractive power between teachers and students [12]. One of the media favored by students in school is e-comics/electronic comics. This is supported by research stating that using e-comics in conveying material has a high impact on learning outcomes compared to not using e-comic media [13]. Based on this, it can be concluded that the use of e-comics can increase enthusiasm for learning, make learning fun and still maintain students' focus in the class.

E-comics were chosen based on child development theory according to Jean Piaget [14], which explains that children aged 7 to 11 years are classified in the concrete operational stage. Elementary school students in Indonesia generally aged 7 to 11 years. Based on Piaget's theory, elementary school students in grades I-VI are classified in the concrete operational stage. At this stage, it means that children can only deal with concrete problems. Therefore, researchers chose e-comics to be developed in the learning process. Because e-comics contain pictures and

stories related to the material. This is supported by research stating that to clarify the material, illustrations are needed as supporting material to provide concrete descriptions to students.

E-comics as a media used in learning and teaching activities have been proven to provide students' learning motivation. Supported by research stating that comic strips can increase learning motivation in classroom learning [15]. The research also states that comic learning media using picture clips method can improve mathematical literacy skills in students [16]. The research explains that the use of digital comics in the Indonesian language subject can provide an increase in learning interest. According to the explanations above, it can be concluded that using comics media in learning can motivate students' learning spirit and improve learning outcomes.

In this study, the researcher developed e-comics integrated with religious values. This was done so that learning in school does not only focus on secular knowledge but also on religious knowledge. The integration carried out by the researcher is by inserting verses of the Qur'an that discuss ecosystem material in science learning. In fact, there is still a dichotomy between secular knowledge (science) and religious knowledge in the field. This is in line with research conducted by stating that science learning in schools has not been integrated, so there is still a dichotomy between secular knowledge (science) and religious knowledge [15].

The results of this study are in line with previous studies showing that the use of e-modules in respiration material integrated with religious values obtained a feasibility test score of 96.36% with a very good category. The development of e-comics to increase students' interest in learning obtained very satisfying research results with a feasibility test score of 91.30%. Based on previous research, the use of e-comics integrated with religious values can be implemented in learning activities in the classroom and get quite high feedback from field tests aimed at students [17]. Based on the above discussion, the application of e-comics integrated with religious values can be implemented in learning in elementary schools. The results of the study explain that the use of e-comics media can make learning in the classroom more conducive, maintain students' focus, and increase learning outcomes.

Conclusion

In conclusion, based on the presentation discussed above regarding the development of e-comics in integrated science learning with religious values for 5th grade elementary school students, the researcher can conclude that the research and development method used in this study was the ADDIE model by Robert Branch. The steps taken were analysis, design, development, implementation, and evaluation. The quality and feasibility of the product were assessed using validity tests from experts, teachers, and feedback from students who were the object of this study. The results showed that the quality and feasibility of the e-comics in

integrated science learning with religious values for 5th grade elementary school students were good. Therefore, it can be suggested that e-comics can be utilized as a medium to assist teachers in delivering learning materials during lessons. The researcher hopes that students can take advantage of technological advancements through the use of this comic-based learning medium. Furthermore, it is recommended that future researchers continue to develop interactive e-comics for more engaging and effective learning experiences.

Conflict of Interest

The authors declare that there is no conflict of interest.

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