

## Development of Interactive E-Comic Media for Environmental-Based Religious Moderation In Elementary Schools

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Received: 13-04-2025

Revised: 24-05-2025

Accepted: 21-06-2025

### KEYWORDS

Keyword 1; e comic media  
Keyword 2; religious moderation  
Keyword 3; environment

### ABSTRACT

This study aims to develop e-comic learning media based on religious moderation and the environment for elementary school students in East OKU Regency. The background of this study is the need for media that can improve students' understanding of the values of religious moderation and environmental awareness. The research method used is the ADDIE development model, which includes analysis, design, development, implementation, and evaluation. The results of expert validation show that the developed e-comic has a high level of validity with an average score of 90% for the media aspect and 88% for the material aspect. Limited and extensive trials showed an increase in students' understanding of religious moderation and the environment by 25% and 30%, respectively. Thus, this e-comic is declared effective and can be used in character-based learning in elementary schools. Furthermore, the positive feedback from both educators and students underscores its potential to enhance engagement and comprehension in these critical areas. Future research may explore the integration of interactive elements to further enrich the learning experience.

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### Introduction

Elementary school education plays an important role in shaping students' character from an early age. Religious moderation education and environmental awareness are two main aspects that must be taught from an early age to create a tolerant, inclusive, and environmentally conscious generation (Rochmah & Marno, 2023). Religious moderation teaches students to respect differences and live in harmony (Ahli et al., n.d.), while environmental awareness aims to instill concern for nature and the sustainability of ecosystems (Hefni & Muna, 2022).

However, conventional learning methods that are less interactive are often less effective in conveying these values (Jalil et al., 2016). Learning materials that are only text-based and lecture-based can make it difficult for students to understand abstract concepts, such as tolerance between

religious communities and the importance of protecting the environment. Students understand abstract concepts better if they use interactive visual media (Suminto et al., 2024).

One innovation that can be applied is the use of e-comic media in learning. E-comic is a comic-based digital media that combines visual and narrative elements to convey educational messages (I'zaati, 2022; Kurniawati & Azka, 2022). With an attractive visual display, an interactive storyline, and easy-to-understand language, e-comics have great potential to improve students' understanding of the concepts being taught (Kurniawati & Azka, 2022). In addition, the use of technology in learning can help instill character values such as tolerance and caring for the environment (Sari & Sulisworo, 2023).

Indonesia, as a country with rich religious and cultural diversity, faces challenges in maintaining social harmony amid issues of intolerance and inter-religious conflict (Aceng Abdul Aziz & dkk, 2019). In addition, increasingly worrying climate change and environmental damage require the younger generation to have a strong environmental awareness (Faisal, 2020).

In this context, education in elementary schools plays a crucial role in shaping students' character from an early age through instilling the values of religious moderation and environmental awareness. The education curriculum in Indonesia also increasingly emphasizes character education and environmental awareness, so the development of innovative learning media such as e-comics that integrate both values becomes very relevant (Suparmi, 2018) E-comics, with their engaging visuals and interactive storylines, have great potential to enhance students' understanding of abstract concepts such as tolerance and environmental sustainability, which may be difficult to grasp through conventional learning methods (Prameswari, 2023). The use of e-comics is also in line with the rapid development of digital technology and the needs of elementary school students, who tend to be more interested in visual and interactive learning media (Faradiba & Budiningsih, 2021).

With this background, this study aims to develop an e-comic that integrates the values of religious moderation and environmental awareness. This study is expected to provide innovative solutions in character-based learning in elementary schools and help students understand the importance of tolerance and environmental sustainability in everyday life.

### **The Theory/Literature (write the name of theory or concept that uses in the study)**

This research refers to several main theories. First, the theory of religious moderation developed by (Agus Muhammad & Sigit Muryono, 2021) which emphasizes the importance of balance, tolerance, and respect for differences. Religious moderation can prevent radicalism and intolerance and create a harmonious learning environment (Ajeng Arofah, 2020). Second, the digital-based learning theory explained by (Agus Akhmadi, 2019), which shows that digital media can increase student motivation and participation in learning. Third, the theory of environmental sustainability developed by (Junaedi, 2019), which highlights the importance of environmental education as part of the curriculum to instill ecological awareness from an early age.

### **Method**

This research uses the Research and Development (R&D) method with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). This model was chosen because it allows for the development of systematic and tested learning media (Puspita, 2024). The research stages begin with analysis (Handican & Setyaningrum, 2021) which was conducted through a literature study related to religious moderation and the environment, as well as a survey of teachers and students to determine the need for interactive learning media. In addition, identification of

challenges (Tyas & Gregorius Ari Nugrahanta, 2024) in learning religious moderation and environmental awareness was also carried out at this stage.

After the analysis stage, the design stage is carried out, which includes sketching and storyboarding the e-comic, developing characters and storylines, and selecting a suitable digital platform for implementing the e-comic. The next stage is development, where e-comic production is carried out using graphic design software. At this stage, the e-comic is validated by media and material experts to ensure the quality and relevance of the content before being revised based on feedback from the experts.

The implementation stage was carried out with a limited trial on a small group of students to determine the initial effectiveness of e-comics. Data collection was carried out through observation and interviews with teachers to evaluate the appeal and effectiveness of e-comics in the learning process. The final stage, namely evaluation, was carried out by measuring the effectiveness of e-comics through pre-tests and post-tests on student understanding. In addition, questionnaires were given to teachers and students to determine their experiences in using e-comics. The data obtained were analyzed and used as a basis for improving the final version of e-comics before being recommended for wider application in learning.

## Result

The development of learning media in the form of e-comics was carried out through research and development (R&D) stages that include needs analysis, product design, expert validation, revision, and field trials. Based on the results of the needs analysis, it was found that elementary school students' understanding of religious moderation and environmental preservation is still low. In addition, teachers need interactive learning media to support the thematic learning process.

Media and material expert validation was conducted to ensure the quality of the developed e-comic. After revisions based on expert input, the media was tested on fourth-grade students in several elementary schools in East OKU Regency. The trial results showed an increase in students' understanding of the material taught, as well as positive responses related to the aspects of interest, relevance, and ease of use.

Research Results Table

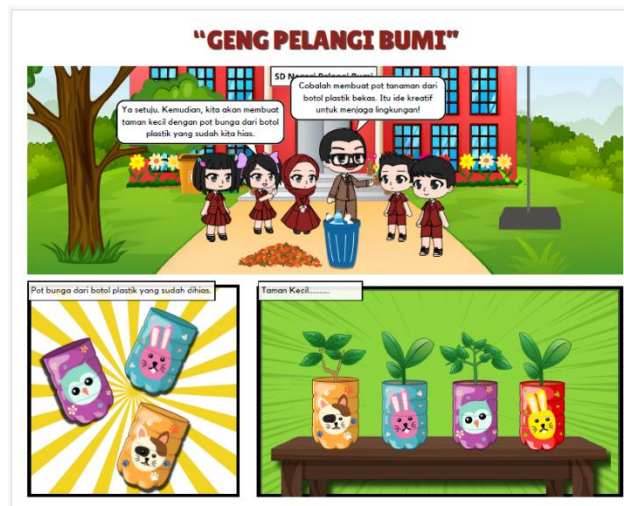
Research Aspect	Results
Media Expert Validation	The average score was 90% (categorized as very good), covering aspects of design, navigation, and readability.
Material Expert Validation	The average score was 88% (categorized as very good), covering content relevance and alignment with the curriculum.
<b>Limited Trial</b>	Conducted on 20 students, improving students' understanding from an average of 60% to 85%.
Wider Trial	Conducted in three schools, showing an average increase in students' understanding by 30%.
<b>Teacher Response</b>	The majority of teachers (95%) stated that the media is highly relevant and innovative for learning
Student Response	A total of 90% of students stated that the e-comic is engaging, easy to understand, and enjoyable for learning

Here is a look at the comic Religious Moderation Based on the Environment:

Figure 1 Comic Cover



Figure 2 Core Parts of Comics



## Discussion

The results of this study include expert validation, limited trials, extensive trials, and analysis of responses from teachers and students to the use of e-comics in learning. Expert validation was carried out by two categories of experts, namely media experts and material experts. The results of the media expert validation showed that e-comics have very good visual quality, with an average score of 90%. Meanwhile, the validation of material experts showed that the content of e-comics is very relevant to the curriculum and has content suitability with the level of student understanding, with an average score of 88%.

A limited trial was conducted on 30 elementary school students in East OKU Regency. Before using the e-comic, students were given a pre-test to measure their understanding of religious moderation and the environment. After using the e-comic, a post-test was conducted to see the increase in their understanding. The results showed that the average pre-test score was 60%, while the post-test score increased to 85%, indicating a 25% increase in understanding.

After the limited trial results showed positive results, a large trial was conducted in three elementary schools with a total of 90 students as research subjects. The pre-test and post-test results were re-analyzed, with an average increase in student understanding of 30%. In addition,

observations during the use of e-comics showed that students were more enthusiastic and actively involved in learning compared to conventional learning methods.

Teachers who teach at the school where the research was conducted gave positive responses to e-comics. As many as 95% of teachers stated that e-comics helped them in delivering material more interestingly and easily understood by students. In addition, 90% of teachers felt that this media was very relevant to support character education and digital-based learning.

Teachers' beliefs about their ability to use e-comics in learning (technology self-efficacy) influence the acceptance and use of the technology. Recent research highlights the importance of training and support to improve teacher self-efficacy (Setyaputri & Blasius Bolilasan, 2016).

Students also gave very positive responses to the use of e-comics in learning. As many as 90% of students stated that e-comics were interesting, easy to understand, and made them more interested in learning about religious moderation and the environment. Several students also stated that they found it easier to remember material presented in the form of stories and illustrations compared to plain text. Students' positive responses to e-comics indicate that this media is effective in reducing cognitive load, as explained in the Cognitive Load Theory. The combination of visuals and narratives in e-comics helps simplify abstract concepts and facilitates students' understanding (Yohanes & Yusuf, 2021).

In addition to improving conceptual understanding, this study also found that the use of e-comics contributed to improving students' positive attitudes towards tolerance and the environment. Observation results showed that students discussed the values of tolerance and diversity more often after using e-comics and were more concerned about the cleanliness of the environment around them.

## Conclusion

Based on the results of the research that has been conducted, it can be concluded that the development of e-comics based on religious moderation and the environment is effective in improving elementary school students' understanding of both concepts. Expert validation shows that e-comics have a very good level of validity both in terms of media and material. Limited and extensive trials prove that there is a significant increase in student understanding after using e-comics. In addition, positive responses from teachers and students indicate that this media is interesting, easy to understand, and suitable for character-based learning. Therefore, this e-comic can be used as an alternative innovative learning media and is recommended for use in elementary education more widely.

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