



E-Comic Oriented to Environmental Care Character Education with Natural Science Content

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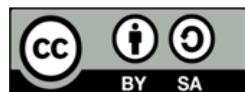
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ABSTRAK

Siswa tidak memiliki kepedulian yang cukup terhadap lingkungan mereka, yang merupakan salah satu masalah yang hangat dalam dunia pendidikan saat ini. Tujuan penelitian ini yaitu mengembangkan Comic berorientasi pendidikan karakter peduli lingkungan. Jenis penelitian ini yaitu pengembangan dengan menggunakan model ADDIE. Subjek penelitian yaitu 2 ahli materi pembelajaran dan 2 ahli media pembelajaran. Subjek uji coba yaitu 2 guru dan 9 siswa uji coba kelompok kecil. Metode pengumpulan data menggunakan observasi, wawancara, kuesioner, dan tes. Instrumen pengumpulan data yaitu kuesioner. Teknik yang digunakan menganalisis data yaitu analisis deskriptif kualitatif dan kuantitatif serta statistik inferensial. Hasil penelitian yaitu penilaian yang diberikan oleh ahli materi pembelajaran yaitu 0,95 (sangat tinggi). Penilaian dari ahli media pembelajaran yaitu 0,92 (sangat tinggi). Hasil respon guru yaitu 97,33 (sangat baik). Hasil uji coba kelompok kecil yaitu 97,03% (sangat praktis). Hasil uji-t terdapat perbedaan yang signifikan sikap peduli lingkungan siswa antara sebelum dan sesudah mengikuti pembelajaran menggunakan e-comic berorientasi pendidikan karakter peduli lingkungan. Disimpulkan penggunaan media e-comic berorientasi pendidikan karakter peduli lingkungan efektif dalam meningkatkan sikap peduli lingkungan peserta didik.

ABSTRACT

Students need to be more concerned about their environment, which is one of the hot problems in the world of education today. This research aims to develop a comic oriented towards character education that cares about the environment. This type of research is developed using the ADDIE model. The research subjects were two learning material experts and two learning media experts. The trial subjects were two teachers and nine students in small group trials. Data collection methods use observation, interviews, questionnaires, and tests. The data collection instrument is a questionnaire. The techniques used to analyze the data are qualitative and quantitative descriptive analysis and inferential statistics. The research results, the assessment given by learning material experts, were 0.95 (very high). The assessment from learning media experts is 0.92 (very high). The teacher's response was 97.33 (very good). The results of the small group trial were 97.03% (very practical). The t-test results showed a significant difference in students' environmental care attitudes before and after learning using e-comics oriented towards environmental care character education. It was concluded that using e-comic media oriented towards environmentally caring character education effectively increased students' environmentally caring attitudes.

1. INTRODUCTION

Education is useful for developing positive potential and forming individuals with character and intelligence. Education can be defined as increasing an individual's potential and ability to understand the realities of life (Daryono & Rochmadi, 2020; Taspinar et al., 2018). A good education builds good character and helps people achieve their life goals (Dike, 2019; Lestari & Harjono, 2021). Therefore, it is clear that educational elements certainly influence the development of students' potential. Character education must be instilled in children from a young age (Ilham, 2021; Laily & Naqiyyah, 2014). One of the keys to successful education in Indonesia is character education. The character instilled in a person from an early age will instill moral values that will become habits when they grow up or continue their education (Nuraini, 2020;

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Rohmah, 2018). Character education is an effort to produce a generation of people who are smart and good (intelligent and good citizens) or have noble morals and an Indonesian personality. According to a circular issued by the Ministry of National Education, one of the 18 character values that must be created for the 2013 Curriculum is an attitude of caring for the environment. Every level of education must instill environmental care.

However, the quality of Indonesian education is currently very worrying. Students need more concern for their environment, which is one of the hot problems in the world of education today (Afiat et al., 2016; Mardiana & Sueb, 2016). The learning process has yet to resolve the various problems, so students' attitudes toward environmental care are low. No understanding is given to students to solve problems in their environment. The lifestyle of modern society tends to ignore the environment, making character education about environmental awareness very important (Mukminin, 2014; Prihastari & Widyaningrum, 2018). The character of caring about the environment is lacking, as shown by the types of delinquency of elementary school students, such as throwing rubbish carelessly. This mischief was carried out deliberately, showing an undisciplined attitude and not caring about the environment (Ismail, 2021; Zain & Gunawan, 2019). Students scribbling on benches school walls, and throwing rubbish in desk drawers were other problems found.

The observations and interviews at SD Negeri 4 Peguyangan show that students' environmental care still needs to be fully implemented. Many things change during the transition from online to offline learning, including changes in students' attitudes, such as their lack of concern for environmental cleanliness. The class teacher also said that around 60% of students were still less sensitive to their environment. Students still do not care about the environment where they study in the field, even though they are often advised to maintain cleanliness. Teachers have asked students to look after the plants in the garden and clean the classroom daily through picket activities. However, many students need help to do so. The classroom where learning activities are carried out needs to be cleaner. Students also do not turn off fans when they come home from school, which means they use much electricity. When learning activities are finished, the tables and chairs become messy. Children also often buy food in the canteen, but it can be seen that food and drink wrappers remain on the table even though trash bins have been categorized based on the type of waste: organic or inorganic.

The educational process best instills character education in students (Masuroh, 2018; Yanti & Yusliani, 2020). Schools, as educational institutions, must have the ability to maximize all student potential, such as cognitive, affective, and psychomotor aspects. Character education is integrated with lessons in all subjects, allowing character formation through education (Dalimunthe, 2015; Ilham, 2021; Khamalah, 2017). Children at elementary school age need real examples to understand what the teacher is saying. Therefore, learning media are needed to encourage students and attract their attention to learning (Inawati & Puspasari, 2021; Umbara et al., 2020). Instilling the value of environmental awareness in students can be achieved through the use of learning media. Thus, educational learning media is needed for teachers to be able to convey lesson material and, at the same time, instill the value of environmental awareness in their students.

One of the factors that supports successful learning is learning media. Teachers use media to convey information to students and enable more effective communication between teachers and students (Halimah et al., 2021; Widyaningrum, 2015). Learning media are an important part of the learning process in schools because they are communication tools, whether print, video, audio, or audio-visual, that can be seen, heard, and read (Herawati et al., 2018; Ridha et al., 2021). Interesting media will help students understand the material and keep them from getting bored and motivated to learn. Therefore, choosing the right media will produce quality education. Comics created for learning activities, such as educational comics, have moral messages and learning material (Angga et al., 2020; Kanti et al., 2018; Khasanah et al., 2021). Therefore, digital comics are the most effective learning media for building characters who care about the environment.

Previous findings stated that class teachers need accompanying media for textbooks that attract students' attention to reading books (Halawa, 2021; Pinatih et al., 2021; Wicaksono et al., 2020). Other findings also reveal that E-comics make it easier for students to learn and improve student learning outcomes (Saputro & Soeharto, 2015; Wicaksono et al., 2020). It was concluded that E-comics can be used in learning. Apart from that, teachers hope that e-comics, which include environmental care character education, will help them convey lessons and instill environmental care character values in students from an early age. The advantage of this research is that e-comic media is flexible, making it easy to include issues related to environmental concerns in everyday life. No studies regarding comics are oriented toward character education that cares about the environment. This research aims to develop a comic oriented towards character education that cares about the environment.

2. METHOD

This type of research is developed using the ADDIE model, analysis, design, development, implementation, and evaluation (Wirganata et al., 2019). At the analysis stage, problems in learning and analysis of learning needs are carried out. At the design stage, E-Comic learning media was developed, oriented towards character education that cares about the environment. The development stage carried out the development of E-Comic learning media oriented towards character education that cares about the environment and validation tests. At the implementation stage, a trial was carried out on an E-Comic learning media product oriented towards character education that cares about the environment. The evaluation stage was conducted to test the effectiveness of the E-Comic learning media oriented towards character education that cares about the environment. The research subjects were two learning material experts and two learning media experts. The trial subjects were two teachers and nine students in small group trials. Data collection methods use observation, interviews, questionnaires, and tests. Observations and interviews were carried out to collect the necessary needs. Tests are used to test product effectiveness. Questionnaires are used to collect assessments from experts and students. The data collection instrument is a questionnaire. The instrument grid is presented in Table 1, and Table 2.

Table 1. Material Expert Instrument Grid

No	Aspect	Indicator	Total Item
1	Curriculum	Conformity of material with Basic Competencies Suitability of material to purpose	3
2	E-Comic Material	Conformity of material with Indicators Depth of material Material truth Material attractiveness The importance of material Suitability of material to student characteristics Material accuracy The material is easy to understand The material represents real life. E-Comic can motivate students.	9
3	Grammar	The language used is easy to understand The language used is appropriate to the characteristics of the students Use of appropriate and consistent language	3
Total			15

(Modified from Laksmi & Suniasih, 2021)

Table 2. Learning Media Expert Instrument Grid

No	Aspect	Indicator	Total Item
1	Appearance	Attractive e-comic cover design Illustrations are presented clearly The layout of text and images is balanced. Select the appropriate typeface. Color proportions are appropriate. Attractive background display Instructions for using the media are clear. The sentences used are simple.	8
2	Media	E-comic media is easy and safe to operate Simple and accessible anywhere	2
3	Learning	E-comics correspond to the level of cognitive development E-comic media can motivate	2
Total			12

(Modified from Laksmi & Suniasih, 2021)

The techniques used to analyze the data are qualitative and quantitative descriptive analysis and inferential statistics. Qualitative descriptive analysis is used to analyze data through reviews from experts

and students. Quantitative descriptive analysis is used to analyze data in the form of scores from experts and students. Inferential statistics are used to test the effectiveness of E-Comic media oriented toward character education that cares about the environment.

3. RESULT AND DISCUSSION

Results

This research was conducted to develop an E-Comic oriented towards environmental care character education using ADDIE. First, analyze. The analysis results show that students' environmentally caring nature has yet to be fully implemented. Many things change during the transition from online to offline learning, including changes in students' attitudes, such as their lack of concern for environmental cleanliness. The class teacher also said that around 60% of students were still less sensitive to their environment. Students still do not care about the environment where they study in the field, even though they are often advised to maintain cleanliness. Teachers have asked students to look after the plants in the garden and clean the classroom daily through picket activities. However, many students need help to do so. The classroom where learning activities are carried out needs to be cleaner. The results of the curriculum analysis are that this research uses material contained in Theme 8, Subtheme 1, "Humans and the Environment," especially on the water cycle topic. The researcher took Theme 8 Subtheme 1 because of the theme and learning contained in it. The character that can be developed in students is caring for the environment.

Second, planning. At this stage, an E-Comic design oriented towards character education that cares about the environment is carried out. The design begins by creating a storyboard and flowchart. The design uses Microsoft PowerPoint and the Pixton and Pinterest websites to design characters and look for backgrounds that suit the story in the e-comic. On the front page or the cover display, the design is quite busy with various characters, combining several bright colors such as green, yellow, blue, and red. The conversation column containing writing in comic media uses the conversation balloons found in Microsoft PowerPoint in the menu bar shape. The color white is used in the conversation column for this comic media to make it easier to read. The characters from this comic media are Nara, Yoga, Pak Oka, Bu Siti, Pak Rafli, Pak Sam, Employees, and Pak Yuda. The E-Comic storyboard oriented towards environmental care character education is presented in [Figure 1](#).

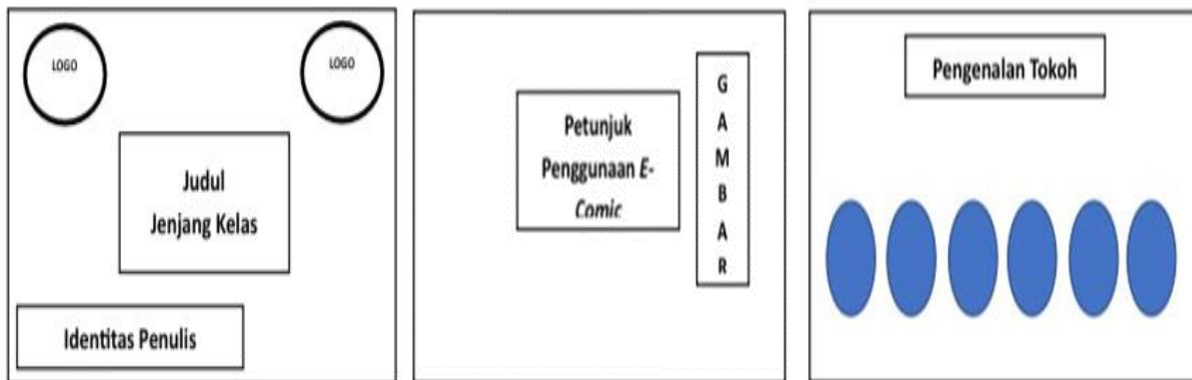


Figure 1. E-comic Storyboard Oriented Towards Character Education that Cares About the Environment

Third, development. At this stage, the development of an E-Comic oriented towards character education that cares about the environment is carried out based on the storyboard that has been developed. Development is adjusted to plans that have been previously designed. In developing this e-comic media, the Pixton application created characters. Second, the Pinterest application is a popular platform, especially for collecting photos and other visual creations, and can be downloaded for free. The e-comic being developed requires different background settings such as rural houses, rural environments, rivers, farms, etc. Third, a PowerPoint application to combine all comic media components into one and change the comic format to PDF. After the comic has been converted into PDF format, the next step is to convert the comic into a flipbook display by changing the PDF format to HTML5. The development results are presented in [Figure 2](#).



Figure 2. Results of E-Comic Development Oriented Towards Environmental Care Character Education

The e-comic oriented towards environmental care character education that has been developed is then tested for validity. The assessment results from learning material experts were 0.95, so they were highly valid. The assessment from learning media experts is 0.92, which is highly valid. The teacher responded 97.33, so he got a very good qualification. Fourth is implementation. An E-Comic with an Environmental Care Character Education Orientation was tested at this stage. The results of the small group trial were 97.03%, so getting a very practical qualification.

Fifth is evaluation. At this stage, a test of the effectiveness of E-Comic oriented toward character education that cares about the environment is carried out. The normality test results obtained a significance value (Shapiro-Wilk) for pretest data of 0.564 and posttest data of 0.104, so both groups were normally distributed. The homogeneity test result is a significance value of 0.102, so the data is homogeneous. The t-test results show a Sig value. < 0.05. So, it can be concluded that H0 is rejected and Ha is accepted. In other words, there is a significant difference in students' environmentally caring attitudes before and after learning to use e-comics oriented towards environmentally caring character education, so using environmentally caring character education-oriented e-comic media effectively increases students' environmentally caring attitudes.

Discussion

Data analysis shows a significant difference in students' environmental care attitudes before and after learning using e-comics oriented towards environmental care character education. Several factors cause this. First, e-comics focus on education and are tailored to students' needs and cognitive development. According to Piaget, elementary school students are usually in the concrete operational phase from seven to eleven years old (Basri, 2018; Rahmiani et al., 2021). This phase shows the ability of the thinking process to operate logical rules while remaining limited to concrete objects (Basri, 2018; Marinda, 2020). As educators, teachers should be able to use learning methods that suit each student's circumstances. Teachers need to know how each student is different to use learning media that suits each student's learning style and characteristics (Inawati & Puspasari, 2021; Muzayyanna Zatulifa et al., 2018). This comic can be used as a solution to the problem of low levels of environmentally conscious characters. Additionally, integrating character values that care about the environment into learning media as training material can help students become more concerned about their environment. It is in line with previous research, which shows that comics are a medium that is quite effective in improving the cognitive and affective aspects of learning and increasing attitudes toward care about the environment (Angga et al., 2020; Kanti et al., 2018).

Second, the storyline in the e-comic is adapted to the water cycle material in the science content. This material is linked to each indicator of environmental care and contextual problems from students' daily lives, making it easier for students to accept the material. The suitability of the material can help students utilize the material packaged in learning media (Febriyandani & Kowiyah, 2021; Ruiyat et al., 2019; Saputro & Soeharto, 2015). Apart from that, the characters attract students' attention because picture illustrations support the storyline. It can help students understand material concepts and make it easier to explain abstract concepts into concrete ones (Ruiyat et al., 2019; Suwarti et al., 2020). Apart from that, the content presented in the media is systematic. Systematic material can help students understand their learning (Darmayanti & Abadi, 2021).

Third, e-learning comics focusing on character education and caring about the environment can improve students' learning atmosphere. A good color composition can support students' learning conditions and change their learning atmosphere (Handayani, 2021; Pinatih et al., 2021). Additionally, color visualization helps students read and understand better. Color can create a sense of separation or emphasis or establish cohesion, enhancing the realism of the objects or situations depicted, indicating similarities and differences, and triggering certain emotional responses. E-comics make it easy for students to understand the translation of stories so that they feel faced with real events and can remember stories for a long time

(Astutik et al., 2021; Megantari et al., 2021). E-comic media that focuses on character education and cares about the environment can allow students to participate actively in learning. It aligns with research findings stating that learning media can be seen from their ability to support teacher explanations, attract and direct students' attention to learn actively and increase students' interest and desire to learn (Azizi & Prasetyo, 2018; Suparmi, 2018).

Compared with similar products developed previously, the advantage of e-comic learning media is its focus on teaching environmentally caring characters and media content that contains values. Digital-based media makes it easy to access anytime and anywhere (Abdurrohim et al., 2020; Angga et al., 2020). Digital media can also provide students a new atmosphere, increasing their interest and desire to learn (Hobri et al., 2019; Udayani et al., 2021). This is because current learning demands environmentally oriented learning. One of the advantages is incorporating environmentally caring character values into learning media. This research implies that e-comics media is a digital-based media with several indicators that can increase environmental care attitudes to make learning activities more enjoyable and student-centered. Teachers can use this e-comic media consistently in learning to foster an environmentally caring attitude in their students.

4. CONCLUSION

The results of data analysis show that E-Comic with an Environmental Care Character Education Orientation has very high validity from experts. The assessment results from teachers and students also show that the E-Comic is oriented towards environmentally caring character education, which is very good and practical. The t-test results show a significant difference in students' environmental care attitudes before and after taking part in learning using e-comics oriented towards environmental care character education. E-comics oriented towards environmentally caring character education can effectively increase students' environmentally caring attitudes.

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