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The Development of GEOMIK: Digital Comic as a Media for Geography Learning in Class XI

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ABSTRACT
The purpose of this study was to see if: (1) Feasibility of GEOMIK, assessed by media experts, content experts, and students, (2) Improvement of student learning outcome by using GEOMIK, and (3) Effectiveness of GEOMIK in improving student learning outcome. Subjecting 60 students at senior high school (SMA) Negeri 1 Kretek, this research uses the R&D research method by Borg & Gall and questionnaires as the research instruments. The results of the study by using descriptive analysis and Independent t-Test analysis, as the data analysis technique, indicate that: (1) the feasibility assessment of learning media from: (a) media expert and content expert get a mean score of 3.6 (very feasible), (b) student trials in the experimental class get a mean score of 3.8 (very feasible category), (2) Increasing the score of learning outcome obtained by the control class by 12.12% and the experimental class by 37.28%, (3) Results of the t-test obtained by the F test show a score of 0.399 and a sig of 0.530, it can conclude that GEOMIK is effective in improving the student learning outcomes.

***Keywords**: digital comic, effectiveness, feasibility, learning media, natural resources*

1. INTRODUCTION

Education performance is inextricably linked to the learning process, which influences by three key factors: students, teachers, and learning materials. The current challenge in the educational system is no balance among the three parts. As an educator, one of the teacher's roles is to provide a comfortable environment for students to learn in. One way to make learning fun is to use learning media.

The use of the internet can be combined with the use of learning media. One example of learning media integrated with the internet is "Digital Comics" learning media. In a learning process, digital comics can be used as a learning medium. When Neil William substituted the traditional English as a foreign language (ESL) book with Calvin and Hobbes comics to teach at the American Language Institute at New York University in 1995, comics gained a foothold in the educational sphere. Many librarians believe that comics can distract students from television and video games [1]. In addition, "comics have five advantages when used in learning: motivating, visual, permanent, intermediate, and popular"[2]. Based on the opinions of these experts, digital comics learning media can help teachers and students more easily understand the material described.

The education curriculum that explains the use of natural resources with the principles of sustainable development is contained in geography lessons, namely the 2013 curriculum for basic competencies 3.3 and 4.3. By following the description of the material in the 2013 curriculum, the teacher plays an essential role in implementing the curriculum. Based on observations and interviews conducted at senior high school (*sekolah menengah atas* or SMA) Negeri 1 Kretek on August 20, 2018. discovered if instructors typically utilize books and power points as their learning material, which causes students to become bored with the learning process. The selection of the media by the teacher is based on the fact that books and PowerPoint are easy-to-use media. Students who feel bored during learning activities can make student participation in class low. Students who feel bored can also make it difficult to understand the material presented. It can impact student learning results if students have difficulties understanding the material offered.

Learning media are a vital component of the teaching and learning process, given the importance of education-related innovation. The results of the pre-test and post-test calculations for the experimental class and the control class differ from those of Nuning's earlier research on fourth-grade pupils in Indonesian subjects, as shown in Table 1.

Table 1. Calculation Results of Control Class and Experiment Class Indonesian Language Subject Class VI

Action	Control Class	Experiment Class	Different	Percentage
Pre-test	54.25	54.38	0.18	0.33%
Post-test	64.65	80.24	15.59	24.11%

Source: Wahyu Nuning, Prima Edukasia Journal

The experimental class group has an average post-test of 80.24, while the control class group has an average post-test of 64.65 [3]. The experiment class has a higher average value than the control class. The study's findings demonstrate that the average post-test results of the experiment class and the average post-test score of the control class differ significantly. Learning outcomes can be improved with learning media, and the learning process is made more enjoyable. Teachers are required to perform observations and experiments, as well as development-focused experiments, in order to promote the attainment of learning objectives.

2. RESEARCH METHODS

This research uses a Borg & Gall modified by Sugiyono research and development design (R&D) that includes ten stages: potential and problems, data collection, product design, design validation, design revision, product testing, product revision, usage trials, product revisions, and mass production[4].

The trial design in this study was divided into two parts; product trials in a limited group and product trials in the experimental class. The experimental subjects in this study were students of class the twelfth grades of IPS 1 class, the eleventh of IIS 2, and the eleventh of IIS 1 SMA Negeri 1 Kretek, as many as 60 students. Data collection was filled out with questionnaire sheets and test instruments in this study. The instruments were test questions and questionnaires. The data analysis technique in this research is descriptive and independent t-Test analysis.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1 GEOMIK Eligibility from Media and Content Expert Assessment

Mrs. Arsianti Latifah, Lecturer in Fine Arts Education, Universitas Negeri Yogyakarta (UNY), is the media specialist on the GEOMIK feasibility assessment. Media specialists' evaluations are divided into material elements and integration aspects. There are four assessment indicators: the material aspect and three for the integration element. This media expert's evaluation received 3.6 on a scale of one to ten, placing it in the very good category.

Dr. Bambang Syaeful Hadi,. lecturer in Geography Education, UNY, is the subject expert on the GEOMIK feasibility assessment. Content experts' evaluations are divided into material and linguistic factors. There are five assessment indicators for the material aspect and four for the linguistic aspect. This content expert's evaluation received 3.6, indicating a very plausible category. Table 2 shows the overall assessment of media specialists and content.

Table 2. Recapitulation of Assessments of Media and Content experts

No	Expert Assessments	Score	Average
1	Media	69	3.6
2	Material	61	3.6
Average Amount			7.2
Mean Score			3.6
Category			Very Feasible

Source: Primary data

An average score of 3.6 is included in the very feasible category based on table 2 recapitulation of the judgment of media professionals and content experts. According to table 2, the judgments of media experts and content specialists both receive the same average score of 3.6, putting them in the extremely feasible group.

3.1.2. GEOMIK Eligibility of Student Assessment

3.1.2.1. Limited Trial Student Group

The students' evaluations of the GEOMIK digital comics were divided into two parts: during the limited trial and during the experiment class. The three aspects that evaluate students are material, language, and media. Student assessment in the limited trial can be seen in Table 3.

Table 3. Student Assessments of GEOMIK in Limited Trials

No	Aspect	Score
1	Material	3.7
2	Language	3.8
3	Media	3.6
Average Amount		55.1
Mean Score		3.7
Category		Very Feasible

Source: Primary data

According to Table 3, the material aspect receives a score of 3.7. The language component had a score of 3.8, while the media component received 3.6. In the brief experiment, the student assessment received an average score of 3.7, putting it in the "very feasible" category.

3.1.3 Experiment Class Student Group

The second assessment carried out was the use trial in the experimental class. Student assessments during the use trial in the experimental class can be seen in Table 4

Table 4. Recapitulation of Student Assessments of GEOMIK in the Experimental Class

No	Aspect	Score
1	Material	3.8
2	Language	3.8
3	Media	3.8
Average Amount		56.9
Mean Score		3.8
Category		Very Feasible

Source: Primary data

Table 4 shows that the material aspect, language aspect, and media aspect of GEOMIK digital comic received an average point of 3,8, which is a "very feasible" category.

3.1.4. Improving Student Learning Outcomes

Student learning outcomes are split into two groups: those are in the control class who do not use digital comic learning medium, and those are in the experimental class who do. The following are the student learning outcomes obtained in the control and experimental classes, as shown in Table 5.

Table 5. Comparison of Improved Learning Outcomes for Control Class and Experiment Class

No	Class	Average		Improved Learning Outcomes	Percentage
		Pre-test	*Post-test*		
1	Control	66	74	8	12.12%
2	Experiment	59	81	22	37.28%

Source: Primary data

The control class has a higher average score of 66 than the experimental class, which has an average score of 59. Table 5 compares the improvement in learning outcomes between the control and experimental classes on the use of natural resources with the principles of sustainable development. The experimental and control classes had a 0.7 difference in pre-test scores. The experimental class had a lower pre-test score than the control class, while the experimental class had a higher post-test score than the control class. The experimental class had an average post-test score of 81, while the control class received an average post-test score of 74. The control class received an 8 in the column for increasing learning outcomes, whereas the experimental class received a 22. The following bar chart illustrates a comparison of the average results of student learning between the control and experimental classes in Figure 1.

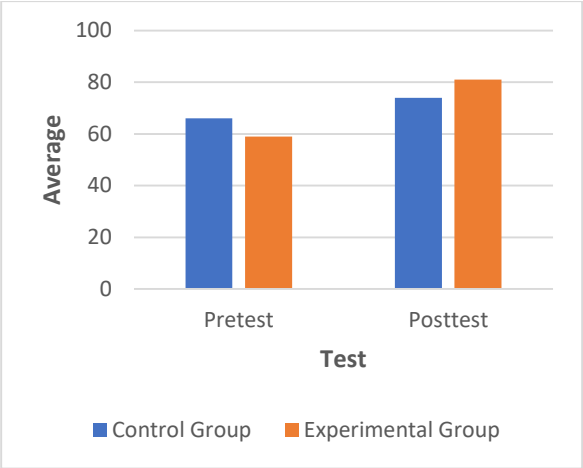

Figure 1 Comparison Diagram of Pre-Test and Post-Test Results for Control Class and Experiment Class

Figure 1 shows that the control class's scores were better than the experimental class's during the pre-test. The control class, which is colored blue, has a longer diagram than the experimental class, which is colored orange and has a shorter picture. The lengths of the different sorts of post-test tests can also be observed in the bar chart. The control class, shown in blue, has a shorter diagram than the experimental class, shown in orange, which has a longer diagram.

The difference between the pre-test and post-test scores students' achievement in the control and experimental classes are used to calculate learning outcomes. These results are also used in the input analysis of the t-test (independent t-Test) to compare student learning outcomes in the control and experimental classes. Prior to doing the t-test, a normality test is performed to check that the data obtained has a normal distribution. The normality test results show that the Asymp value. Sig. (2-tailed) in the experimental class was 0.149, while it was 0.407 in the control class, according to the normality test in Table 6. The data distribution is deemed to be normal if the Asymp value. Sig. (2-tailed) is 0.05 and not normal if it is less than 0.05. The experimental and control classes have Asymp. Sig. (2-tailed) 0.05, indicating that the distribution of the data acquired is normal, according to the normality test. Following the normality test, the t-test is the following stage. The following are the outcomes of data processing utilizing independent t-Test analysis,

3.1.5. Analysis of Student Learning Results Using Independent t-Test

The F value for Levene's Test for Equality of Variances column is 0.399, with a sig of 0.530. The t-value for the Equality of Means t-test is 4.983 for equal variances assumed and 5.020 for equal variances not assumed in the t-test for Equality of Means column. Equal variances assumed and Equal variances not assumed have the same value, namely 0.000, in addition to the value of sig. (2-tailed). The 0.05 significance level was chosen. Suppose the significance value is less than 0.05. In that case, it can be concluded that GEOMIK digital comic learning media improves student learning outcomes. However, if the significance value is greater than 0.05, it can be concluded that GEOMIK digital comic learning media does not improve student learning outcomes. In the test results, it shows that the value of sig. (2-tailed) Equal variances assumed and Equal variances not assumed have the same value, namely 0.000. So it can be concluded from the score obtained that the results of testing the effectiveness of GEOMIK state that it affects improving student learning outcomes in class XI IIS at SMA N 1 Kretek.

3.2. Discussion

The Permendikbud, which regulates the 2013 curriculum for high school geography subjects for class XI IIS, contains basic competencies 3.3, which contains material, namely examining how forestry, mining, marine, and tourism resources are distributed and managed in accordance with sustainable development principles[5]. Students are encouraged to participate in resource management based on sustainable development ideas in this material. According to this educational resource, the introduction of sustainable development is critical for life's survival. Teachers must be creative and original in how they deliver information in the classroom, according to the 2013 curriculum, for students to be more engaged. Developing learning media is an example of creativity in action. The development of learning media is also based on the issue of the importance of innovation in education.

According to the study Use of Multimedia Malik and Agarwal, educational innovation in multimedia devices is needed because multimedia devices have succeeded in developing psychomotor and strengthening students' visual processing[6]. This study focused on learning media development, particularly for geography classes on natural resource management based on the idea of sustainable development and the limited learning media available. In line with the research conducted by Sambada, the selection of GEOMIK digital comic media is based on the fact that comics with images attract readers from various circles[7]. In addition, easy access to digital reading via smartphones or PCs can make it easier for readers to read anywhere. and whenever.

The material in the GEOMIK digital comic includes material that contains the management of natural resources with the principles of sustainable development contained in basic competence 3.3, specifically, assessing and managing forestry, mining, marine, and tourism resources in accordance with sustainable development principles. The grid of questions obtained from the development of indicators is carried out by discussing with the supervising lecturers and geography teachers at the school. The development of indicators obtained 20 items to assess student learning outcomes. The problem grids that have been created are used in the classroom and on the GEOMIK digital comics, and media and material specialists afterward confirm them. This is in line with Andika & Ananda's research, which claims that expert validation is used to verify the feasibility of a product before it is used for testing[8]. The expert validation results serve as the foundation for improving the developed material.

The feasibility of GEOMIK was confirmed by media specialists and content experts in this study, and it received an average score of 3.6, putting it in the "extremely viable" category. The viability of GEOMIK digital comics is determined using the average score received from the validation results of media professionals and content specialists. Following expert validation, a small trial of 10 students in class XII IPS 1 was undertaken. The limited trial was conducted on October 23, 2019, which was attended by ten students in class XII IPS 1. During the limited trial of GEOMIK digital comics, the student assessment results obtained a score on the material aspect of 3.7, the language aspect of 3.8, and the media aspect of 3.6. The average score obtained in the limited trial of GEOMIK digital comics is 3.7, which is included in the very feasible category.

Following a limited trial, enhancements were made to the GEOMIK digital comics, which were subsequently employed in future testing in the experimental class. GEOMIK was tested for the first time on November 1, 2019. With 26 students in attendance, the use trial was conducted in class XI IIS 2. The experimental class students' evaluation of GEOMIK digital comics yielded an average feasibility assessment score of 3.8, placing it in the very feasible category. Comparing the results of students' assessment of GEOMIK digital comics during the limited trial and the usage test in the experimental class can increase the average score. In the limited trial, the overall average score obtained was 3.7, including the very feasible category. During the trial use in the experimental class, the average score was 3.8, which was included in the very feasible category. Then there is a difference of 0.1 in the results of the improvements that have been made. Assessment of the success or failure of learning activities is seen from

students' achievement of learning outcomes. Student learning outcomes can be influenced by the learning media used. This was also conveyed in a previous study by Listiyani, which stated that an assessment of the feasibility of digital comics as learning media impacted student learning outcomes[9].

The impact of learning media on student learning outcomes was investigated in this study. According to Ziden & Rahman's research, media effectiveness testing is required to determine the level of student accomplishment when using learning media. According to Ziden and Rahman, using multimedia media for students is the most effective way since it is practically identical to reality in the field, involving students' cognitive, emotional, and psychomotor elements[10]. Students were asked to fill out pre-test and post-test questions as part of a study to see how successful GEOMIK is. There were 20 multiple-choice questions in both the pre-test and post-test. To examine the influence of employing digital comics GEOMIK on student learning results, the t-test using the SPSS program calculated learning outcomes compared to control and experimental classes. The first step is to find the difference (gain score) by decreasing the post-test value to the pre-test value. The difference between this value and the reduced value is used in the t-test analysis.

The control class has an average pre-test score of 66 and an average post-test score of 74, according to the computation of the average pre-test and post-test scores between the control and experimental classes. The experimental class averaged a 59 on the pre-test and an 81 on the post-test. According to the findings, the control class's pre-test score was higher than the experimental class, with a difference of seven points. However, the control class was lower than the experimental class in the post-test score. There was a difference in score 7. Each class experienced an increase in the average score of learning outcomes. There was an increase in learning outcomes worth eight in the control class, and in the experimental class, an increase in learning outcomes worth 22. Despite similarities, there was an increase in learning outcomes between the control and experimental classes. However, the experimental class had more learning outcomes than the control class.

The F test findings reveal 0.399 with a sig of 0.530, according to the test results utilizing SPSS independent t-test analysis. As a result, the variance of the two groups is homogeneous when the sig value is greater than 0.05. The t-test revealed that the t value was 4.983 with a sig (2-tailed) of 0.000. Because the value of sig is less than 0.05, it can be argued that the control and experimental classes had different learning results. According to the computation of the increase in student learning outcomes, the control class received an eight while the experimental class received a 22, indicating that the experimental class's score increased by 14 points over the control class. As a result, it can be concluded that using GEOMIK digital comics can help students learn more effectively.

4. CONCLUSION

Based on the results of research and development of GEOMIK digital comics as learning media, we could draw some of the conclusions: (1). Media experts have given GEOMIK digital comics an average score of 3.6, putting them in the "extremely practical" category. (2). The feasibility assessment of GEOMIK digital comics obtained from content experts received the same average score of 3.6, placing them in the "very feasible" category. (3). GEOMIK digital comics received an average score of 3.8 from students, putting them in the "very feasible" category. (4).In the control class, the improvement in student learning outcomes scored an 8, while in the experiment class, it received a 22. The experimental group saw a 14-point improvement in learning outcomes when compared to the control group. (5).Based on the learning outcomes score obtained in 4, we can conclude that the GEOMIK digital comic learning medium is successfully enhancing student learning outcomes in the use of natural resources under the principle of sustainable development.

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