Development e-Module (E-Lapen) based Augmented Reality to Increase Students' Interest in Learning

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Abstract

This research aims to test the effectiveness of interactive media in development E-LAPEN based Augmented Reality in increasing students' interest in learning. This research uses Research and Development (Rnd) with the ADDIE development model. The instruments used in this research were interest in learning questionnaires and pre-test as well as post-test. The results of the validation carried out by material and media experts respectively show that the criteria are very feasible, with respective scores of 95% for material and 90% for media. After implementing the media, a questionnaire regarding interest in learning was given before and after using the media. The results of this study show that there is an improvement both before and after useE-module. This is a percentage that previously had 57% of all questions showing high and quite high interest in learning, but after using the module, this percentage increased to 98%. The results are supported by an increase in scores, pre-test and post-test amounting to 20.98%. So, it can be concluded that the useE-Module based Augmented Reality effective for increasing students' interest in learning.

Keywords: Augmented Reality, Development e-Module, E-Lapen

INTRODUCTION

Education is the most important means of improving the quality of teaching about individual development, therefore schools have an important role in guiding students so that they are able to achieve a level of development through fulfilling developmental tasks ideally (Fakhriyah et al., 2021). In the eraSociety 5.0 The Minister of Education applies the latest curriculum, namely the Independent Learning Curriculum, which has a significant impact in the world of education. Teachers are an important component in education because teachers are teachers and educators who must be able to manage classes and students well in the learning process so that teachers are required to be creative in learning (Amaliyah et al., 2019). The Independent Learning Curriculum focuses on developing students' character and morals, so that students are expected to be active, creative, enthusiastic, innovative and skilled. The Merdeka Curriculum itself has a new update from the previous curriculum, namely science and social studies learning which was combined into IPAS (Natural and Social Sciences).
Implementing science and science learning in each material, students must have critical thinking to learn each material. According to Amaliyah & Santoso (2022) critical thinking is reasonable and reflective thinking that focuses on deciding what to believe or do. The availability of learning facilities, utilization of time and use of learning media or teaching materials influence the quality of education to achieve optimal learning outcomes (Amaliyah et al., 2019). Remembering that the learning process cannot be separated from the use of learning media, and the teaching and learning process will be effective if it is supported by supporting media. The development of information and communication technology has had a significant impact on people's lives, one of which is in the field of education. With the use of information technology in the world of education, it can produce quality human resources by improving educational conditions (Fakhriyah et al., 2016)(Putri Ayu Negara et al., 2023)(Kusumawati, 2023).

Information technology in the world of education can be used for learning innovation, to increase interest and motivation in learning, one of which is by improving the development of learning media such as teaching modules. Modules can be used to foster students' enthusiasm for learning and are arranged systematically and interestingly so that students can use them to gain knowledge, understand problems, control the problem solving process, and examine and make generalizations from problems independently (Amaliyah et al., 2022). Following the development of the times, module variations have certainly been developed by various educators, one of which is E-module as the effectiveness of teaching materials that can build competence and assess learning needs according to current developments (Sa'diah et al., 2022). Using E-Modules can reduce paper usage, and also make it easier for students to access learning anytime and anywhere via computers/laptops and smartphones. explains that E-Module can be used as teaching material because it has the advantage that it can be accessed anywhere and is integrated with video, audio and images which help students understand the lesson. Therefore, the teaching materials used by researchers are technology-based and developed into electronic products (Putri & Hendriyani, 2023).

Based on the results of observations, interviews and needs analysis, the results showed that the use of digital media such as E-Module as a reference or other alternative in teaching and learning activities and low interest in learning was found because learning seemed monotonous. Therefore, E-module is a good innovation to develop quality and interest in learning. Development E-Module After going through the needs and curriculum analysis process, ideas emerged E-Module based Augmented Reality which is named E-LAPEN. Use in application E-Module based Augmented Reality You yourself can access or download it first on the Google application play store which can be accessed for free. These applications include desktop and web-based software without using programming that can be used at any time. Learning media/interactive teaching materials based Augmented Reality is a desktop application with HTML5, IoS, and android can be accessed via various devices such as tablet, android or smartphone which can support students to carry out teaching and learning activities both directly and independently is expected to increase students' interest in learning (Saumiet al., 2022). The development of this media aims to foster students' interest in learning which can be used in many ways (Nakhlah, 2023). Based on the discussion above, it can be seen that the main objective of this research is to develop interactive teaching media and how effective the development of interactive teaching media is. E-Module based Augmented Reality towards increasing student interest in learning.

**METHOD**

The research method determined by the researcher is Research and Development (RnD) which is often referred to as development research. This development method is
relevant to research (Amalina, 2020) with the ADDIE model (Analyze, Design, Development, Implementation, and Evaluation).

1. The first stage, namely needs analysis, found that teachers lacked variety in using learning media, which could increase student enthusiasm in learning. Then, the curriculum used can give schools the freedom to choose learning media that suits student characteristics. Furthermore, analysis of student characteristics shows that they have sufficient technological knowledge and skills to support the learning process.

2. The second stage is the media design stage which is carried out in such a way that it is in accordance with the needs analysis that has been carried out. In accordance with the needs analysis, curriculum and student characteristics that underlie development E-Module based Augmented Reality by the name E-LAPEN. E-LAPEN contains 30 pages with various materials and content including main material, AR display media (Augmented Reality), game, quiz, and interesting discussion videos summarized in one module.

3. The third stage is, developing teaching materials by validating learning media to find out whether it is feasible or still needs to be developed and improved. Development E-Module carried out in conjunction with the validation process carried out by media experts and material experts E-module it’s worth using.

4. The fourth stage was implementation carried out on class V students at SDN Kutoharjo 02 Pati who were divided into 5 students for small group trials and 18 students for large group trials.

5. The final stage of the ADDIE model is the evaluation stage. This evaluation stage aims to assess the quality of the product and teaching process both before and after the implementation stage (Cahyadi, 2019). In the context of this research, evaluation was carried out to determine the effectiveness of teaching materials E-Module human digestive system (E-LAPEN) based Augmented Reality.

Then an approach analysis was carried out to determine the effectiveness of using E-Modules in increasing students’ interest in learning. Referring to module development research (Amaliyah, 2020) carried out with Mix Method or mixed methods, namely qualitative and quantitative. The qualitative method was carried out using interviews and observations, then the quantitative method was carried out using questionnaires and pre-test as well as post-test. Furthermore, after implementing the media, an evaluation and analysis of the media’s effectiveness in increasing students’ interest in learning will also be carried out using the Normality test, the Paired Sample T-Test, and an analysis of increasing interest in learning is then carried out Pre-test and Post-test.
The results of the media expert validation test obtained an average assessment score in the software engineering aspect which received an assessment score of 88% in the very appropriate category, the visual communication aspect received an assessment score of 90% in the very appropriate category. Then the average final validity assessment score from the two validators was 90% in the "very feasible" category. Then, material validation carried out by experts also showed that the criteria values were very feasible from both validators with an average score percentage of 95%. Then after knowing these results and the lack of revisions from experts, it can be stated that the media E-LAPEN This has met expert criteria and is ready to be implemented.

Evaluation of learning media E-Module based Augmented Reality This is done by teachers and students after the application of this learning media with the assessment criteria of very appropriate value= 81%-100%, adequate= 61%-80%, less appropriate= 41%-60%, not appropriate= 21-40%, and less than 20% is not feasible. The evaluation process is carried out by distributing media response questionnaires to students and teachers. The results of the student response questionnaire showed a percentage of 82% in the very appropriate category. Meanwhile, the responses given by teachers can be categorized as very appropriate with a total percentage of 88%.

Measuring media effectiveness E-LAPEN To increase students’ interest in learning, this research uses a questionnaire method as a data collection method. Then, for data analysis techniques in this research, 3 data analysis techniques are used: 1) normality test to determine whether the data obtained is normally distributed or not. 2) Test Paired sample T-Test, to find out differences in students’ learning interests before and after implementation E-Module based Augmented Reality. 3) Analysis using manual calculations, to determine the percentage increase in interest in learning before and after media use.

The first stage after the data has been collected is a normality test to find out which statistics will be used parametric or non-parametric. This test is carried out using kolmogorov smirnov test with the criteria that if the Sig test statistic value is more than 0.05 (sig > 0.05) then the data is normally distributed (Astuti & Wigati, 2023). The following SPSS processing results are obtained as follows:

**Tabel 1. Uji Normalitas Minat Belajar**

<table>
<thead>
<tr>
<th>Tests of Normality</th>
<th>Kolmogorov-Smirnova</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistic</td>
<td>df</td>
<td>Say.</td>
</tr>
<tr>
<td>For</td>
<td>.176</td>
<td>18</td>
</tr>
<tr>
<td>Post</td>
<td>.201</td>
<td>18</td>
</tr>
</tbody>
</table>

a. Lilliefors Significance Correction

In the normality test above, there are 2 variables used by researchers, namely media use before and after media use which shows a significance figure of 0.143 for pre and 0.052 for post, which means both are greater than 0.05. Therefore, it can be concluded that the data from these two variables are normally distributed so that the next analysis, namely analysis, can be carried out Paired Sample T-Test to find out whether there are significant differences before and after the use of interactive media E-Module (E-LAPEN) based Augmented Reality with the criteria that if the Sig value <0.05 it can be stated that there is a difference and conversely if the Sig value>0.05 it can be stated that there is no difference between the variables. This research uses SPSS Statistic 26 with the following test results.
Analysis results Pairwise Simple T-Test which has been carried out on the variable level of student interest in learning pre and post media use E-module interactive E-LAPEN shows a significance value of 0.00 so it can be interpreted that there is a very significant difference between the two groups of data tested. However, to find out the improvement, researchers carried out manual data analysis to find out the percentage of improvement using assessment criteria with 4 types of answers with 2 types of questionnaire statements, namely positive questions with answers from the high group SL (4), SR (3) and the low group KD (2), and TP (1). Meanwhile, negative statements use the reverse scoring model of positive statements where TP (4), KD (3), SR (2), and SL (1). Furthermore, after determining the assessment criteria, research was carried out with the following results.

Table 3. Recapitulation of Student Interest Questionnaire Results

<table>
<thead>
<tr>
<th>No</th>
<th>Information</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Score Statement(4)</td>
<td>31%</td>
<td>54%</td>
</tr>
<tr>
<td>2</td>
<td>Score Statement(3)</td>
<td>26%</td>
<td>44%</td>
</tr>
<tr>
<td>3</td>
<td>Score Statement(2)</td>
<td>36%</td>
<td>2%</td>
</tr>
<tr>
<td>4</td>
<td>Score Statement(1)</td>
<td>7%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

From the analysis results table above, it can be seen that before using the module, there were only 31% + 26% of all questions that showed high and quite high interest and were interested in learning, but after using the module, this percentage increased to 54% + 44% or 98% of questions with high learning interest scores were answered by students. The same thing happened to statements of low interest in learning where previously there were 36% + 7% of statements with low interest in learning that were answered by students, the percentage dropped to only 2% of statements of low interest in learning that were answered by students. Then, to further ensure the functionality of the media E-LAPEN this is also done pre-test and post-test to further strengthen the usefulness of this learning media. Here are the results pre-test and post-test carried out during the use of this media.

Table 4. Recapitulation of Results Pre-Test and Post-Test student

<table>
<thead>
<tr>
<th>No</th>
<th>Information</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Average value</td>
<td>67.88</td>
<td>88.77</td>
</tr>
<tr>
<td>2</td>
<td>The highest score</td>
<td>77</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Lowest value</td>
<td>54</td>
<td>68</td>
</tr>
<tr>
<td>4</td>
<td>Complete number of students</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>The number of students is incomplete</td>
<td>12</td>
<td>3</td>
</tr>
</tbody>
</table>
6. Completeness of student learning  

<table>
<thead>
<tr>
<th>Difference in average values</th>
<th>33%</th>
<th>83%</th>
</tr>
</thead>
<tbody>
<tr>
<td>andpost-test</td>
<td></td>
<td>20.89</td>
</tr>
<tr>
<td>MOH</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

It can be seen in table 4.17 that the results of the value analysis above show that there is an increase in the average value from pre-test to post-test, which previously was only 67.88, up to 88.77. Then the increase in scores was also supported by the lowest and highest scores during the pre-test of 54 and 77 respectively, rising to 68 and 100 during the post-test and the number of students who completed before and after use also increased from only 6 children who completed to 15 children with KKM "75". Overall, it can be analyzed from the table above that there is a significant increase in values before and after media use with an overall difference value of 20.89.

Thus, a significant increase in the percentage of students who stated they had high interest in learning and a significant decrease in the percentage of students who stated low interest in learning indicated that the use ofE-Module based learning Augmented Reality effective in increasing students’ interest in learning accompanied by improving resultspre-test andpost-test What has been done further proves the effectiveness of learning media E-LAPEN in increasing students’ interest in learning.

**CONCLUSION**

Based on the results of the research that has been carried out, the following conclusions can be drawn: Application of interactive media learning media development E-Module (E-LEPEN) based Augmented Reality using the ADDIE model through several stages, namely: 1) analyze as problem identification by conducting needs analysis, curriculum analysis and student characteristics analysis, 2) design with the stages of planning, designing, preparing validation instruments, responses, and learning interest questionnaires, 3) development with steps for media creation, media validation E-Module (E-LAPEN) based Augmented Reality, design revision, 4) implementation by conducting limited and wide scale trials, 5) evaluation is a form of assessment of expert validation, student and teacher responses, as well as media effectiveness testing E-Module (E-LAPEN) based Augmented Reality. Instructional Media E-Module (E-LAPEN) based Augmented Reality effectively used in science learning which contains material on the human digestive system. On test Paired Sample T-Test there is a difference/increase in students’ interest in learning which is obtained by the t count of 8.616 with a significance of 0.00 which is less than 0.05. Then, based on the analysis of interest in learning, there was an increase in interest in learning, before using the module, there were only 57% of all questions that showed high and quite high interest and were interested in learning, but after using the module, this percentage increased to 98% of questions with an interest score. high learning answered by students. The same thing happened to statements of low interest in learning where previously there were 43% of statements with low interest in learning that were answered by students, the percentage dropped to only 2% of statements of low interest in learning that were answered by students. and supported by an increase in valuepre-test andpost-test amounting to 20.98%. So, it can be concluded that the use ofE-Module based Augmented Reality effective for increasing students’ interest in learning.

Based on the research results, suggestions that can be taken in this research are as follows, Media development E-Module (E-LAPEN) based Augmented Reality More attention must be paid to the correlation between materials to make it easier to understand. Media development E-Module (E-LAPEN) based Augmented Reality Pay more attention to the layout of images/animations as well as color selection so that they are comfortable to
read. Consideration of the intermediary tool used is using a laptop rather than a smartphone. This is because students are more effective when using laptops.

REFERENCE


Amaliyah, F. (2020). TRAINING ON THE USE OF THE PUBLISH OR PERISH APPLICATION TO IMPROVE THE QUALITY OF THE SCIENTIFIC WORK OF PRIMARY 2 KESAMBI TEACHERS. *Training On The Use Of The Publish Or Perish Application To Improve The Quality Of The Scientific Work Of Primary 2 Kesambi Teachers*.


Mathematics Lessons to Improve Elementary School Student Achievement, 2(2).
DEVELOPMENT OF AUGMENTED-BASED INTERACTIVE E-MODULES. 13(April), 21–29.
Saumi, F., Muliani, F., & Amalia, R. (2022). Development of Augmented Reality Based E-
Modules Using Guided Discovery Learning Models on Vector Material.
LAKSIOMA: Journal of the Mathematics Education Study Program, 11(4), 3850.
https://doi.org/10.24127/ajpm.v11i4.6066

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