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

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Abstract

This research aims to give 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 andpre-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 mediapre-test andpost-test. The results of this study show that there is an improvement before and after useE-module This is a percentage that previously had 57% of all questions showing high and quite high interest and interest in learning, but after using the module, this percentage increased to 98% and was supported by an increase in scores.pre-test andpost-test amounting to 20.98%. So, it can be concluded that the useE-Module basedAugmented Reality effective for increasing students' interest in learning.

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

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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 era*Society 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 Relity* 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 (Saumi*et 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. 

Gambar SEQ Gambar * ARABIC 1. Desain Media Interaktif *E-Modul* (Sistem Pencernaan

4. 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.
5. 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.
6. 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*human digestive system (*E-LAPEN*) 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*kolmogrov 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

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Say.	Statistic	df	Say.
For	.176	18	.143	.916	18	.111
Post	.201	18	.052	.890	18	.039

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.

Tabel 2. Hasil Uji *Paired Sample T-Test*

		Paired Differences					t	df	Say. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre - Post	-22.27778	10.96951	2.58554	-27.73278	-16.82227	-8.616	17	.000

Analysis results*Paired 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

No	Information	Test Type	
		Pre-test	***Post-test***
1.	Score Statement(4)	31%	54%
2.	Score Statement(3)	26%	44%
3.	Score Statement(2)	36%	2%
4.	Score Statement(1)	7%	0%
Total		100%	100%

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

No	Information	Test Type	
		Pre-test	***Post-test***
1.	Average value	67,88	88,77
2.	The highest score	77	100
3.	Lowest value	54	68
4.	Complete number of students	6	15
5.	The number of students is incomplete	12	3

6.	Completeness of student learning	33%	83%
Difference in average values*pre-test* and*post-test*		**20,89**	
MOH		**75**	

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 of*E-Module* based learning*Augmented Reality* effective in increasing students' interest in learning accompanied by improving results*pre-test* and*post-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 value*pre-test* and*post-test* amounting to 20.98%. So, it can be concluded that the use*E-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.

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