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Development Of Interactive Teaching Media to Improve the Creativity of UHKBPNP Physics Education Students

Fine Eirene Siahaan[1], Aprido Bernando Simamora[2]
[1,2] *Universitas HKBP Nommensen Pematang Siantar, Indonesia*
Corresponding Author : fine.eirene@gmail.com

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ABSTRACT

Interactive media is media that asks students to practice a skill and receive feedback. As previously stated, interactive media is a system for presenting lessons with visuals, sound, and video material, which are presented with controls so that students can not only hear and see images and sound, but also give an active response. Creativity is an ability to create something new, unique, different from before, either in the form of an idea or a real work by combining pre-existing elements. The type of research used is the method of developing interactive learning media. The purpose of this study was to increase the creativity of UHKBNPP physics education students in developing interactive teaching media. The conclusions obtained from the development of interactive teaching media to increase the creativity of UHKPNP physics education students are very high, namely the average percentage is 96%. This is obtained from the average percentage of media experts, namely 83.76%. For the average percentage of material experts is 91.25%. This is very good for students in developing media to increase student creativity.

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INTRODUCTION

In the current era of globalization, information technology plays a very important role in everyday human life, especially in the field of education. Information technology in the field of education can support the learning process to be more meaningful. In the era of the industrial revolution 4.0 and welcoming the 5.0 revolution era, an educator is said to be professional if he can adapt to developments in information and communication technology and can apply them in learning (Hakim et al, 2020).

The development of science and technology, the learning process is seen as a communication process. The goal is to convey messages effectively and efficiently. During the learning process, the media used by educators must be in

accordance with predetermined learning objectives, so as to be able to stimulate and foster students' interest in learning.

The presence of visual animation media technology gives new hope because visual animation learning media displays information through sound, images, movement and color, both naturally and manipulated. Through visual animation media, subject matter can be packaged clearly and completely and increase student interest. By using visual animation media in learning, it is an effort to create a creative and innovative learning atmosphere without reducing the actual educational goals (Mamase et al., 2019).

An educator, both teacher and lecturer, is always required to be able to develop and use learning tools in accordance with the demands of the times. An educator is required to be able to develop skills in making learning media that are appropriate to the material and can be used in learning. Through this problem educators must have sufficient knowledge and understanding about learning media.

One of the benefits if an educator is able to understand and develop a learning media is that an educator can guide teachers or prospective educators such as students in making interactive learning media to increase student creativity. Interactive meaning as a process of empowering students to control the learning environment (Ali et al., 2009). In this context the learning environment is meant by using a computer. Interactive classification in a multimedia learning environment does not lie in the hardware system, but rather refers to the learning characteristics of students in responding to stimuli displayed on a computer monitor screen (Mustika et al., 2017).

On this occasion, the researcher as a lecturer invites or guides prospective teachers (students) to create interactive teaching media in order to add insight and divert and foster student creativity in learning media courses.

The activity that will be carried out is also aimed at producing superior and competitive human resources at the global level, to shape the character of prospective teachers in choosing teaching media to be used during the learning process and to increase the creativity of UHKBPNP physics education students in developing interactive teaching media.

RESEARCH METHODE

The research will be conducted at Universitas HKBP Nommensen Pematang Siantar. The research will be conducted from November 2022 to February 2023. The population in this study is Semester 3 Physics Education Study Program students, Universitas HKBP Nommensen Pematang Siantar. The sample set for this research is a single class of students taking physics

learning media courses selected by purposive sampling. The research sample was conducted in 1 class, namely the experimental class was taught using interactive learning media for students.

The type of research used is the development method. The development of interactive learning media requires software development methods, one of the development methods that can be used is the Multimedia Development Life Cycle (MDLC) method, namely (Sugianto: 2018): (1). Concept (concept), (2). Design (design), (3). Collection of stamp duty materials (collecting material), (4). Manufacturing (assembly), (5). Testing (testing), (6). Distribution (distribution).

Research instrument data collection techniques are divided into two parts, namely:

Product Instrument Data Collection Techniques

Where the data collection technique for media product instruments is carried out by alpha testing, this is carried out by media experts and material experts.

Table 1.
Media Expert Instrument Grid

Aspect	Indicator	No. Instrument Item	Number of Items
Technical/System Quality	Navigation Structure	1,2	2
	User Ease	3,4	2
	Media Management	5,6	2
	Operating System	7	1
Media Integration	The program integrates with the appropriate material	8,9,10	3
Artistic and Aesthetics	Display (Audio, Visual, Animation, Text, Graphics)	11,12	2
	Display Convenience	13, 14	2
	Appearance is relevant to content	15, 16	2
Overall Function	The program is developed according to the capabilities of the user	17,18	2
	The program presents the learning required by the user	19,20	2

(Source: Putrianaaulia Syafatulloh: 2022)

Table 2.
Material Expert Instrument Grid

Aspect	Indicator	No. Instrument Item	Number of Items
Aspect of Content/ Material/ Content of Cognition	Material Accuracy	1,2	2
	Material Completeness	3,4	2
	Providing Learning Opportunities	5	1
	Provide assistance with learning	6,7	2
Information Presentation	Clarity of delivery of information	9,10	2
	Meet user needs	11,12,13	3
	Systematic presentation of material	13,14	2
	Facilitate teachers in delivering material	15,16	2
	Content Linkage	17,18	2
	Truth and accuracy of content	19,20	2

(Source: Putrianaaulia Syafatulloh: 2022)

The creativity assessment collection technique that will be carried out for students is used by using a questionnaire. Where indicators of creativity are assessed as follows:

Table 3.
Student Creativity Measurement Grid

No.	Assessment of Creativity Indicators	Activity	Skore
1.	Fluency	Students are able to identify problems in making interactive media	5
		Students are able to create interactive learning media and can adjust according to the needs of the subject matter in physics.	5
2.	Flexibility	Students are able to make learning media by themselves.	5
3.	Originally	Students can be responsible for	5

		the authenticity of media products that have been developed.	
4.	Elaboration	Students are able to collect information as a source/reference about the media development they are doing.	5
5.	Sensitivity	Students are able to present and make conclusions from the media development that has been made.	5

(Source: Putrianaaulia Syafatulloh: 2022)

Processing of alpha tests and student creativity, namely testing whose goal is to validate media by media experts, material experts, and student creativity. Alpha testing is done using the Guttman scale. The Guttman scale has two statements in the answer choices on the instrument. The Guttman scale is a scale that has two answer choices such as yes-no, good-bad, accepted-needs change and others (Bahrun et al., 2018) in (Pranatawijaya et al., 2019). There are 2 choices in the alpha testing instrument used in this study, namely the statement "accepted" and "requires change". This statement is interpreted with the number 1 given when selecting the statement "accepted" and the number 0 is given when selecting the statement "needs change" (Arikunto, 2010) in (Putra, 2016). For validation calculations in alpha testing using the equation formula (1) as follows:

$$Persentase\ hasil\ validasi = skor\ total\ skor\ maksimal \times 100\%$$

With the following information:

Total score = The score obtained is based on the assessment of each item

Maximum Score = Maximum score of all item questions

RESULT AND DISCUSSION

Based on the development research that has been carried out, the results obtained include the entire process in the development used, namely the Multimedia Development Life Cycle (MDLC) development method. The results of the development research are summarized into stages based on the MDLC method consisting of 5 stages, namely (Sugianto: 2018): Concept, design, material collecting, assembly, and testing).

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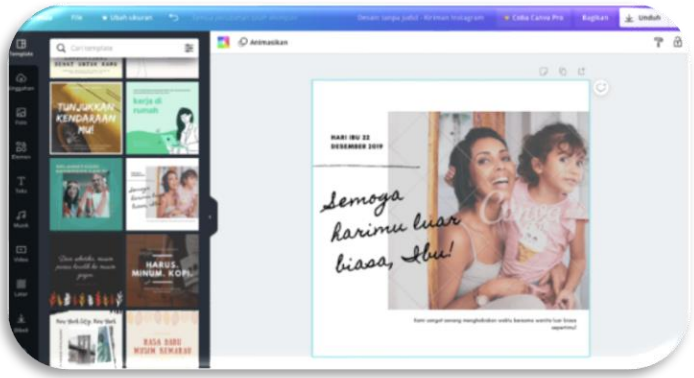
Concept

At this stage, the researcher conceptualizes, among other things: Determines the goals and benefits of the project management methodology learning media application, Determines who are the users of the project management methodology learning media application (students of the physics education study program at HKBP University Nommensen Pematang Siantar), Describes the concept of the application of Interactive Learning Media IT Project Management to be built (i.e. media based on animaker and canva).

Design

At this stage, specifications are made regarding program architecture, style, appearance, and material requirements for the program. The design will be made using the interface design from the application menu display. The software used to design the interface is Microsoft Visio.



Picture 1.
Canva's Editing Features

Material Collecting

This stage is the stage of collecting materials according to the needs that are being worked on. These materials include clip art images, photos, animations, videos, audio, and others which can be obtained free of charge or by ordering from other parties according to the design. This stage can be done in parallel with the assembly stage. However, in some cases, the material collecting stage and the assembly stage will be carried out in a linear manner and not parallel.

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Figure 2.
The Expressions Menu in Canva

Assembly

The assembly stage is the stage of making all multimedia objects or materials. Application creation is based on design stages, such as storyboards, flowcharts, and/or navigation structures.

Testing

The testing phase is carried out after completing the assembly stage by running the application / program and seeing whether there are errors or not. The first stage at this stage is also known as the alpha testing stage (alpha test) where the test is carried out by the manufacturer or the manufacturer's own environment. After passing alpha testing, beta testing involving end use will be carried out.

Figure 3.
Media Testing Results for Comic-Shaped Canva

Discussion

Media Expert Due Diligence Results

The purpose of conducting a feasibility test by media experts is to find out whether the media made by students of the Physics Education Study Program

at HKBP University Nommensen Pematang Siantar is appropriate and can be a support for the material to be presented. The media expert feasibility test was carried out by a teacher who is competent in his field, namely Mr. Togar Marbun, M.Pd. Media experts filled out a questionnaire containing 20 questions which were reviewed from 4 aspects including technical/system quality, media integration, artistic and aesthetics, overall function. From the results of the media expert's due diligence assessment, it can be observed in the following table:

Table 4.
Media Expert Due Diligence Results

No.	Aspects assessed	Media Expert Score	
1	Consistency in the location of navigation in the media	3	4
2	Navigation can provide assistance to users when using media	4	4
3	Ease of navigation in selecting material	4	4
4	Ease of navigation in the operation of the media	4	3
5	Flexibility and ease in the use of media	4	3
6	No bugs/hangs/errors when using media	3	3
7	Precise navigation with the desired menu	4	4
8	The material contained in the media is in accordance with the learning objectives	3	3
9	Material can increase students' knowledge and abilities with the features in the media	4	4
10	The material presented is packaged well in the media	4	4
11	Proportional use of text, graphics, audio and animation	4	4
12	Compatibility of text, graphics, animation, and audio	3	4
13	Readability of writing on media	3	3
14	Compatibility of visualization with the material	4	3
15	There is a visualization aid for understanding the material	4	4
16	There are supporting elements in the discussion of the material (illustrations and	3	4

	audio)		
17	Achievement of the media in improving students' abilities	4	4
18	Media suitability with user capabilities	4	4
19	Media can increase learning independence for users	4	4
20	Learning comfort can be obtained through the media	4	4
Total Score		60	74
Percentage of Total Score		75%	92,5%
Average Percentage		83,72%	

Percentage of Eligibility I by Media Expert = (Total Score obtained)/(Maximum Score) x 100%
= 60/80 x 100%
= 75 %
Percentage of Eligibility II by Media Expert = (Total Score obtained)/(Maximum Score) x 100%
= 74/80 x 100%
= 92.5 %
Average Percentage of Eligibility of Media Experts
= (75%+92.5%)/2
= 83.72%

Material Expert Feasibility Results

Table 5.
Material Expert Due Diligence Results

No.	Aspects assessed Material	Expert Score	
		I	II
1	The suitability of the subject matter with the material presented	4	4
2	The suitability of the material with the learning objectives	4	4
3	Presentation of the material as a whole	3	4
4	There are learning support elements (images/audio/video and practice questions)	3	4
5	Packaging materials can help students to solve problems related to internet computer	4	3

	networks		
6	Ease of understanding material in learning media (application)	4	3
7	Learning support elements (pictures/audio and practice questions) can help in understanding the material	3	3
8	Clarity of material on learning media (applications)	4	4
9	Clarity of evaluation on learning media (applications)	4	4
10	Ease of understanding material in learning media (by users)	4	4
11	Availability of evaluation for users for self-assessment	3	4
12	The delivery of the material meets the needs of the user	3	3
13	Presentation of material in a coherent manner	4	4
14	Writing systematic material	4	3
15	The layout of the material is in accordance with the teacher's manual	4	4
16	Facilitate teachers in conveying information	4	4
17	Linkage of material with the achievement and flow of learning objectives	4	4
18	The attachment of questions to the material	3	3
19	Material coverage accuracy	4	3
20	The use of language is easy to understand	4	3
Total Score		74	72
Percentage of Total Score		92,5 %	90 %
Average Percentage		91,25 %	

Percentage of Eligibility I by Material Experts = (Total Score obtained)/(Maximum Score) x 100%
= 70/80 x 100%
=92.5 %

Percentage of Eligibility II by Material Experts = (Total Score obtained)/(Maximum Score) x 100%
= 72/80 x 100%
= 90 %
Average Percentage of Eligibility of Material Experts
= (92.5%+90%)/2
=91.25%

The purpose of conducting feasibility tests on material experts is to find out whether the discussion of material in the instructional media displayed covers aspects of material needs as a whole both in terms of suitability, completeness, grammar, and presentation. The material expert feasibility test was carried out by a competent person in the field, namely Mr. Sahat Pangaribuan. Material experts filled out a questionnaire containing 20 questions reviewed from 3 aspects. The average percentage of feasibility of material experts is 91.25% of the average results indicating that the material that has been compiled in the media is very good to apply.

Student Creativity Measurement Results

Tabel 6.
Student Creativity Measurement Results

No	Measured value	Rating Score									
		1	2	3	4	5	6	7	8	9	10
1	Able to describe events based on reality	5	4	2	3	5	4	3	5	4	4
2	Can think outside the boundaries of thinking	5	2	4	4	4	4	4	3	4	3
3	Can give their own opinion or ideas on each issue	5	4	5	5	5	3	5	5	3	5
4	Can think of more than one solution to solve a problem	4	5	3	4	4	5	3	5	4	5
5	Can learn something from various points of view	5	4	5	5	3	5	5	4	5	3
6	Being able to create or think of something that no one else has thought of	5	3	4	3	3	3	5	3	5	5
7	Consistent in doing something	5	3	5	5	4	5	5	2	5	3

8	Can think of the worst conditions before doing something	4	4	4	4	5	5	5	5	4	4
9	Able to present and make conclusions from the media development that has been made	5	5	3	5	5	4	4	5	3	5
10	Able to account for the authenticity of media products that have been developed	5	3	3	5	5	5	5	4	5	5
Amount		48	37	438	43	43	43	44	41	42	42
Percentage of Total Score		96	74	76	86	86	86	88	82	84	84
Average Percentage		96%									

The purpose of doing student creativity is to see how far the creativity of physics education study program students at HKBP Nommensen Pematang Siantar University in the development of learning media that is displayed includes aspects. From the results obtained, the average percentage of students' creativity in physics education at the University of HKBP Nommensen Pematangsiantar was very high in developing learning media, namely 96%.

CONCLUSION

The conclusions obtained from the development of interactive teaching media to increase the creativity of UHKPNP physics education students are very high, namely the average percentage is 96%. This is obtained from the average percentage of media experts, namely 83.76%. For the average percentage of material experts is 91.25%. This is very good for students in developing media to increase student creativity.

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