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DEVELOPMENT OF INTERACTIVE LEARNING MEDIA FOR CLASS X TKJ STUDENTS AT SMK MUHAMMADIYAH 1 SUKABUMI

Faiz Hamdi *, M Thoriq Aziz and Dadan Rahmat
Fakultas Keguruan dan Ilmu Pendidikan, universitas Muhammadiyah Sukabumi
*e-mail: faizhamdi30@gmail.com

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Abstract

The purpose of this research is to develop and know the feasibility of interactive learning media in computer subjects and basic networks in class X TKJ SMK Muhammadiyah 1 Sukabumi.. The type of research used in this research is Research and Development using Borg and Gall models until the field trial stage. Data collection method used in this study is questionnaire or questionnaire method, using data collection instrument in the form of validation sheet validation sheet of material expert, media expert, and user response questionnaire. The user is a class X student of TKJ SMK Muhammadiyah 1 Sukabumi with a total of 4 people in a small class trial and 15 people in a large class trial. The product feasibility criteria developed in this study were determined with a minimum value of 3.3 out of a scale of 5 with a decent category. Media expert validation results get a score of 4.5 (very feasible), validation of material experts with a score of 4 (feasible), a small class trial assessment by 4 learners namely 4 (feasible) and a large class trial assessment by 15 learners is 4.3 (very feasible). That way, interactive learning media on Computer and Basic Network lessons are very feasible in the learning process.

Keywords: *interactive learning media, basic computers and networks, R&D*

INTRODUCTION

Learning is a system where there is an interaction between educators and students with the aim of helping students' learning process. The result of the learning process is that students gain knowledge or expertise, but in reality it is not certain that all students can receive the results of the learning process. According to (Pane & Darwis Dasopang, 2017) "Learning is essentially a process, namely the process of regulating, organizing the environment around students so that it can grow and encourage students to carry out the learning process.

According to (Ys & Nelmira, 2019) "Learning media is a set of tools or complements used by teachers or educators to convey learning messages and stimulate students to learn." Learning media is a means or aids to convey messages or content of learning material. Accuracy in choosing learning media is very important before it is used in the learning process, because if the learning media used to deliver material to students is incorrect or less interesting, students will tend to feel bored and cannot accept the material content maximally. There are many types of learning media that can be used by educators, one of which is interactive learning media.

"Interactive learning media is a combination of two or more media (audio, text, graphics, images, video) which the user manipulates to control the commands and or natural behavior of a presentation". (Rizqi and Suhartini, 2015). Interactive learning media can be run using personal computers, laptops and Androids, in which students can interact directly with the computer, so that they can freely choose the material they want to study in the media, therefore this media becomes an interesting learning media to use in subjects Theory.

Observations were made to students during the implementation of learning in class X TKJ SMK Muhammadiyah 1 Sukabumi, found several potential problems, namely learning material on computer subjects and basic networks which was quite difficult for some students to understand. When learning using digital media such as video, students seem more interested in learning the material. Then after conducting an interview with one of the teachers in the Computer and Network Engineering vocational, he revealed that the problems experienced by students were that some students found it difficult to receive material, especially regarding computer networks, then the students' low interest in learning, especially in subjects that were material or not practicum, and learning media used by educators in these schools, especially in the competency of network computer engineering expertise is still limited.

The characteristics of students in class X TKJ at SMK Muhammadiyah 1 Sukabumi, they prefer to learn using visual or audio media, one of which is like learning videos, then by doing (psychomotor), which is directly practicing the media used. The current pandemic, which is caused by the covid-19 virus, has led the government to implement the PSBB in every region in Indonesia. PSBB itself stands for Large-Scale Social Restrictions, a regulation issued by the Ministry of Health (Kemenkes) in the context of the Acceleration of Handling COVID-19 so that it can be immediately implemented in various regions. PSBB regulations are recorded in the Minister of Health Regulation Number 9 of 2020. (https://tirto.id/eMXT). Limited community activities or activities, including teaching and learning activities at school, are currently forced to be carried out in their respective homes online (online). This online learning activity has not been effectively implemented, because there are still many obstacles in its implementation, one of which is the need for an adequate internet connection and quota, while during this pandemic the economy of the community has declined.

The researcher concluded from the above problems, that there is a need for new learning media, namely interactive learning media. This media is very suitable to be used during the current pandemic which demands that teaching and learning activities be carried out online. Interactive learning media is a medium that can be given to students to learn independently, without the need for an internet connection to use it.

The purpose of this study is to develop and determine the feasibility of interactive flash learning media in Computer and Basic Network subjects in class X TKJ SMK Muhammadiyah 1 Sukabumi. The benefit of this research for students is that it helps students to be more enthusiastic about learning and easier to understand the material, because with the interactive CD learning media students can learn independently and get interesting material such as playing games.

METHOD

The type of research used in this research is research and development or Research and Development (R&D). Borg and Gall, in (Arifin, 2014) stated that *"research and development is a powerful strategy for improving practice. It is a process used to develop and validate educational*

products ". The products referred to in this definition are not always in the form of objects or hardware, such as books, modules, classroom or laboratory learning aids, but can also be software, such as computer programs for data processing or learning media.

This research method includes ten stages, namely (1) potentials and problems, (2) data collection, (3) product design, (4) design validation, (5) usage testing, (6) product revision, (7) testing. product trial, (8) design revision, (9) product revision, (10) mass production. However, researchers will only use this research and development method until the 9th stage due to time and cost limitations.The data collection method used in this observation is the questionnaire method. The questionnaire used in this study was a material expert questionnaire, a media expert and a user or student questionnaire. The type of questionnaire used was a structured or closed questionnaire.

The instrument in this study was used to test the feasibility of the product, namely interactive learning media on Computer and Basic Network subjects. The method used is a questionnaire with a five-choice Likert scale measurement, namely (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. Data analysis in this study is divided into two, namely product development process data and product feasibility data produced. Product development process data is carried out by analysis to improve as well as revise before the development trial is carried out. Then the product feasibility data produced is a questionnaire on the results of the product assessment given to students.

The multimedia eligibility criteria from quantitative data are adjusted to the qualitative data criteria according to (Widoyoko, 2009) which have been modified. The conversion of the actual score to a scale of five after being modified as follows.

Table 3.4 Conversion of the actual score to a scale of five after modification

No	Score Range (i)	Score	Category
1	X > Mi + 1,8 SBi	>4,2	Very Worth it
2	Mi + 0,6 Sbi < X ≤ Mi + 1,8 SBi	> 3,4 – 4.2	Well worth it
3	Mi – 0,6 Sbi < X ≤ Mi + 0,6 SBi	> 2.6 – 3.4	Enough
4	Mi – 1,8 Sbi < X ≤ Mi – 0,6 SBi	> 1.8 – 2.6	Not worth it
5	X ≤ Mi – 1,8 SBi	≤ 1,8	Not feasible

Information:
X: Empirical Score
Mi: 1⁄2 (ideal maximum score + ideal minimum score)
SBI: 1⁄6 (ideal maximum score + ideal minimum score)

The table above is used to determine the feasibility of the resulting interactive learning media products. The product assessment in this study was determined with a minimum value of 3.4, which is the feasible category. If the results of the assessment of media experts and material experts are feasible, then the product is feasible to be tested in the field, then if the results of the student questionnaire produce a decent value then the Computer and Basic Network learning media products on Local Area Network material are suitable for use as learning media in class X TKJ SMK Muhammadiyah 1 Sukabumi.

RESULTS AND DISCUSSION

The products produced in this study are interactive learning media on Computer and Basic Network subjects that are made using the Corel Draw X7 application which is used to design the initial images that will be used as menu, button and animation backgrounds. Adobe Premiere Pro CC 2015 is used to produce video tutorials. Then the resulting images and videos are entered into the Adobe Animate Pro 2015 application to be used as interactive media consisting of 8 scenes, namely soading scenes, intros, menus, materials, videos, quizzes, assignments and profiles. The output file is published so that the resulting media is in the form of .exe which can be installed and operated on the desktop and then .apk which can be installed and operated on Android. The following is the initial appearance of the media developed before validation by experts.

Figure 1. Scene Loading View

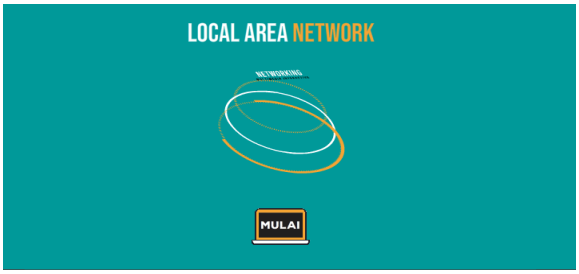

Figure 2. Scene Intro View

Scene loading brings up the text of the name of the media, namely "Interactive Media for Computer and Basic Networks", then the loading animation is below the text that moves from left to right. The intro scene brings up 3D-like animation, a rotating circle and text that reads "Networking Multimedia Interactive". Then the media material titles and buttons began to appear sideways to the center.

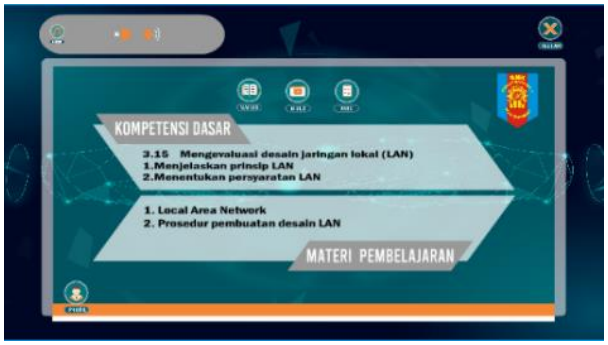

Figure 3. Scene Menu Display

Figure 4. Material Scene View

The main menu *scene* contains the logo of SMK Muhammadiyah 1 Sukabumi, the text *"Basic Competence"* and *"Learning Materials"* which are displayed using animation. Then the material *scene* button, video quiz, profile, exit and buttons to turn off and turn on the music. At the beginning of the Material Scene there are 4 buttons, namely the keys to enter the material on understanding LAN, LAN characteristics, LAN principles and tools for building LANs. Material scenes are packaged using images animated per layer. One by one the pictures appear and move accompanied by the sound of recorded material explanations. At the end of the discussion, a *"Back"* button will appear to return to the initial section of material selection and a *"Home"* button to return to the main menu.

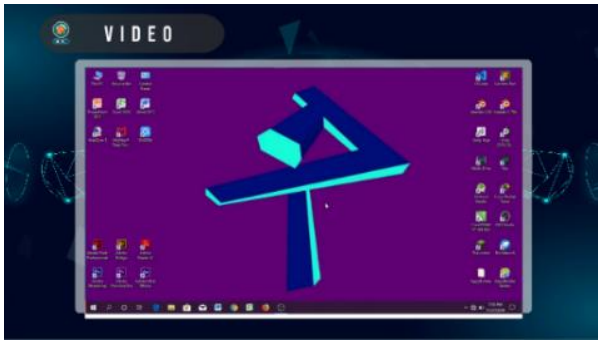

Figure 5. Video Scene Display

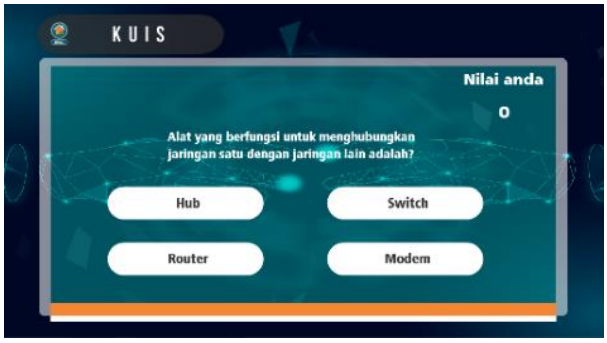

Figure 6. Quiz Scene Display

In the video *scene* the researcher includes a video tutorial on how to create a LAN using the Cisco Packet Tracer application downloaded from YouTube. This video is 8 minutes long. The quiz scene contains multiple choice questions with 4 answer choices. This question is in accordance with the material that has been given in the material and video scene. The answer is selected by clicking on one of the answers, then if it is correct, the value in the upper right corner will increase and then enter the next question. The questions and answers are arranged randomly, when the questions are finished a button will appear to repeat the quiz.

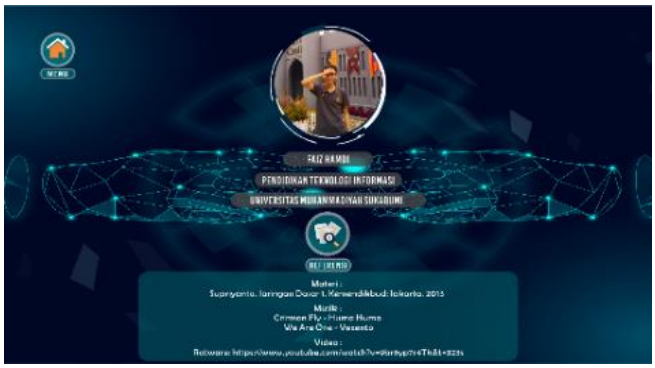

Figure 7. Profile Scene View

Scene profile contains a photo, name and institution for developing computer interactive media and basic networks. Then the reference button to see the sources used in media development.

The finished initial media product is then given to media experts and material experts to then be given an assessment and suggestions for improvements if any. The results of the assessment

and suggestions from the two experts were then used as material for product improvement to make it better before field trials were carried out on students.

Based on the results of validation by media experts, comments and suggestions were obtained, namely that the back sound used in the media is recommended to use music that evokes enthusiasm for learning, not using songs, so that the back sound does not interfere with the recording of the material explanation. Then add the Task scene for users or students. Furthermore, the results of the assessment were analyzed by the researcher and revised on the learning media according to the suggestions. After the revision was made, the overall score obtained from the validation results by media experts can be seen in table 1.

Table 1. Validation Results of Media Experts

No	Assessment Aspects	Number of Grains	Score obtained	Ideal Score	Appropriateness
1	Software engineering	6	27	30	4,5
2	Visual Communication	11	49	55	4,45
	total	17	76	85	4,47
	Category				Very Worth it

Based on the calculations in the table, validation by media experts gets a value of 4.47 from a scale of 5 with the category of "very feasible", so that it can be tested on users or students without revision.

Based on the results of validation by material experts, comments and suggestions were obtained, namely the multiple choice on the quiz scene only had 4 answer choices, while for the SMK level it had a standard, namely 5 answer choices. Then there are no instructions for filling out and KKM standards in the quiz scene. Furthermore, the results of the assessment were analyzed by the researcher and revised on the learning media according to the suggestions. After the revision is made, the overall score obtained from the validation results by material experts can be seen in table 2.

Table 2. Results of Material Expert Validation

No	Assessment Aspects	Number of Grains	Score obtained	Ideal Score	Appropriateness
1	Theory	9	36	45	4
2	Question	5	20	25	4
3	Language	3	8	10	4
	total	16	64	80	4
	Category				Well worth it

Based on the calculations in the table, validation by material experts gets a value of 4 out of a scale of 5 with the "feasible" category, so that it can be tested on users or students.
Revisions were made by researchers based on comments and suggestions from media experts and material experts. Backsounds on the menu *scene*, quizzes, profiles and assignments initially used music containing songs, namely *Linko - Goodbye*, later changed to use *Crimson Fly - Huma Huma* music, which did not contain songs. Initially there was no task scene in the media, then a task *scene* was added to be given to students. The quiz *scene* does not have instructions for handling KKM questions and information on KKM, then there are only 4 answer choices, then instructions for solving questions are added before starting the quiz which contains KKM information in it, then the answer choices are added to 5, according to the SMK standards. Initially there was no deadline for work in the assignment *scene*, then added a deadline for the task, which was 2 weeks.

Small class trials in the field, carried out on 4 users or class X TKJ students of SMK Muhammadiyah 1 Sukabumi, in order to know user responses regarding interactive learning media on computers and basic networks, to be used as a reference for product improvement before large class trials are carried out. The response that the researchers received from students was that there were still errors in the video scene, the video playing stopped at half the duration. Then the button size is not big enough, so there are some students having a little difficulty when pressing buttons on the media. The results of the small class field trial assessment results can be seen in table 3.

Table 3. Results of Student Assessment in Small Class Trials

No	Aspect	Average	Criteria
1	Software engineering	4,42	Very Worth it
2	Learning Design	3,92	Well worth it
3	Visual Communication	4	Well worth it
	Total Mean	4,11	
	Total Criteria	Well worth it	

Based on the calculations in the table, the results of the assessment of 4 students in the small class trial got a value of 4.11 from a scale of 5 with the "feasible" category, so that interactive learning media is feasible to be tested in large class trials.

After making improvements based on responses and suggestions in small class trials, then interactive learning media Computers and Basic Networks were tried out through large classes with 15 class X TKJ students of SMK Muhammadiyah 1 Sukabumi. The results of large class field trial assessments can be seen in table 4.

Table 4. Results of Student Assessment in Large Class Trials

No	Aspect	Average	Criteria
1	Software engineering	4,17	Well worth it
2	Learning Design	4,45	Very Worth it
3	Visual Communication	4,34	Very Worth it
	Total Mean	4.32	
	Total Criteria	Very Worth it	

Based on the calculations in the table, the results of the assessment of 15 students in the large class trial got a value of 4.35 from a scale of 5 with the category of "very feasible", so that interactive learning media is feasible for use in Computer and Basic Network learning at SMK Muhammadiyah 1 Sukabumi.

Product revisions were made again, this time based on comments and suggestions from users, namely students. The video used in the media initially used someone else's video downloaded from Youtube, but an error occurred when it was played in the middle of the duration, then it was converted into a video recorded by the researcher and edited using the Adobe Premiere Pro application, the result was no error when the video was played in the media . The button size on the menu scene is slightly enlarged, so that it is easy to press the button when opening media via Android.

DISCUSSION

The development of interactive learning media was developed using the Corel Draw X7 application to design the initial images that will be used as buttons and animation, then Adobe Premiere to produce a video tutorial for making LAN networks, then using Adobe Flash CS 6 and Adobe Animate Pro 2015 to produce application files. interactive learning media that can be installed on desktop and android and then ready for use by students.

The feasibility of interactive learning media is determined using an assessment instrument of media experts, material experts and students in small and large class field trials, with a scale of 1-5 and the terms of the results of the assessment, namely: ≤ 1.8 = not feasible; > 1.8 - 2.6 = less feasible; > 2,6 - 3,4 = adequate; > 3,4 - 4,2 = feasible; and> 4,2 = very feasible. The following is a description of the results of the assessment in this study.

Assessment by media experts aims to determine the feasibility of the product from the aspects of software engineering and visual communication in interactive learning media. This assessment at least gets the criteria of "proper" for later field trials. Based on the results of validation by media experts, the final assessment of interactive learning media got a mean score of 4.47 from a scale of 5 so that the media was very feasible to be tested in the field.

Assessment by material experts aims to determine the feasibility of the product from the material aspects, questions and language in interactive learning media. This assessment at least gets the criteria of "proper" for later field trials. Based on the results of validation by material experts, the final assessment of interactive learning media gets a mean score of 4 out of a scale of 5 so that the media is feasible to be tested in the field.

The field trial aims to determine the feasibility of the product from the aspects of software engineering, learning design and visual communication in interactive learning media. This assessment at least gets the criteria of "worthy" to achieve the research objectives. Based on the results of students' assessments in small class field trials, the final assessment of interactive learning media got a mean score of 4.11 from a scale of 5 (feasible). Then the results of the assessment of students in large class field trials, the final assessment of interactive learning media got a mean score of 4.32 from a scale of 5 (very feasible).

Based on the feasibility assessment of interactive learning media by media experts, it is in the very feasible category and material experts are in the feasible category, then the assessment by students in small class trials is included in the feasible category and in large class trials it is included in the very feasible category, with that purpose This research is to develop and determine the feasibility of interactive learning media on the subject of Computer and Basic Networks in class X TKJ SMK Muhammadiyah 1 Sukabumi has succeeded with the criteria of "very feasible",

CONCLUSION

The results of the product in this study were interactive learning media on Computer and Basic Network subjects with Local Area Network (LAN) material for class X TKJ students of SMK Muhammadiyah 1 Sukabumi. The research and development steps for interactive learning media refer to the development model according to Borg and Gall, namely: Potentials and Problems, Data Collection, Product Design, Design Validation, Design Revision, Product Trials, Product Revisions, Field Trials, Product Revisions, and Mass Production. Of the ten steps, researchers can only complete up to stage 9, due to limited time and cost.

The feasibility of interactive learning media for computers and basic networks was obtained from the validation instruments of media experts and material experts as well as the results of students' assessments in small and large class field trials. The media expert's assessment gets a score of 4.5 out of a scale of 5 with the very decent category. The assessment of the material expert gets a score of 4 out of a scale of 5 with a decent category. The assessment of students in the small class trial got a score of 4.05 out of a scale of 5 in the Eligible category. Then the assessment by students in large class trials got a score of 4.35 on a scale of 5 with the very feasible category. Thus the interactive learning media in this study is "very feasible" to be used in learning in the subjects of Computer and Basic Networks at SMK Muhammadiyah 1 Sukabumi.

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