DEVELOPMENT OF MULTIMEDIA APPLICATIONS AS MEDIA LEARNING HARDWARE AND COMPUTER NETWORKING FOR CLASS X IN SMK TEKNIK INDUSTRI PEMBAGUNAN CIMAHI

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ABSTRACT

Learning Applications Hardware and Networking is an application built using the method according Sutopo multimedia development and is also equipped with interactive learning methods CAI (Computer Assisted Instruction), which aims to menangai problems that occur in the process of teaching and learning activities Computer Hardware and Networking. Model CAI used consists of three, namely models Tutorial, Simulation and Drills and Practice. Some of the features available in the application, consisting of the material, simulations and exercises.

Based on the results of interviews with teachers Computer Hardware and Networking declare that applications built to help teachers in the learning process, especially in the case of material simulating Computer Hardware and Networking. Then from the pretest and posttest to 69 students of class X to get the pretest and posttest with the results of the percentage increase in the average value of 15% and the results of the questionnaire with the results of a percentage of 78% state approve of the questions posed.

Kata Kunci : Computer Hardware , Computer Networking, Multimedia, Computer Assisted Instruction, SMK Teknik Industri Pembangunan Cimahi.

1 PRELIMINARY

1.1 Background

Vocational Hight School (SMK) in Industrial Engineering pembagunan Cimahi is one private vocational secondary educational institutions in the city of Cimahi, West Java. Vocational Industrial Engineering Development Cimahi has four vocational competence that the Network Computer Engineering, Software Engineering, Industrial Electronics and Mechanical Refrigeration. Geographically Vocational Industrial Engineering pembagunan Cimahi is situated in the industrial area, which can be reached from any corner of the city of Cimahi, both of Bandung or from outside the city of Bandung. So that access can be done to the benefit of both academic learning in school or out of school (World Business / Industrial World) can be done well.

In SMK Teknik Industri Pembagunan Cimahi in computer engineering courses have subjects network hardware and computer networks for class X that has two learning the theory and practicum. In the process of learning theory students to listen and understand the teacher teaching the material. While in the process in the lab practicum students to practice in accordance with the material taught during classroom theory. Based on the results of the questionnaire data gathering as many as 74 male and female students who are having trouble understanding the material hardware and computer networks reached 76.2% as the initial data collection on students in SMK Teknik Industri Pembagunan Cimahi program studi Computer network Engineering class X, it can be concluded that students have difficulty understanding the material taught on the subjects of computer hardware and networks. The results of interviews with the teacher concerned that concluded the difficulties faced by teachers in the teachers' in SMK Teknik Industri Pembagunan Cimahi program studi Computer network Engineering class X is during the process of teachers' lessons in theory only explained the theories contained in the book and does not give an illustration or picture on the material being studied, such as when introducing and computer hardware, computer network. This resulted in students often encounter difficulties when doing lab activities hardware and computer networks as well as a tough teacher gives an illustration or picture at the time of introducing and assembles computer hardware, computer network. And yet the learning media as a tool to understand the material science and computer networking hardware.

Therefore, a solution that can be used to overcome this problem is to use interactive media-based learning tutorials and simulations. By implementing interactive learning media-based simulations and tutorials it is expected that students of engineering courses computer network can have a

picture or illustration clearer view of hardware and computer networks conducted in the lab as when assembling or configuring hardware and computer networks as well as be able to understand the material lessons hardware and computer networks with different concepts with a dish more interesting with desktop-based. And teachers can give an idea or an illustration of the hardware and computer networks. So that conducted this research with the title "*Application Development Of Multimedia As Media Learning Hardware And Computer Networking For Class X In Smk Teknik Industri Pembagunan Cimahi"*.

1.2 Purpose and Objectives

Based on the problems studied, the purpose of this research is to build multimedia applications as a medium of learning on the subjects of computer hardware and networks for students of class X in SMK Teknik Industri Pembangunan Cimahi.

The objectives to be achieved in this study are:

1. Assist students in understanding the learning materials and computer hardware network using interactive learning media.
2. Make it easier for teachers to provide an overview or illustrations in instructional materials and computer networking hardware.
3. Making learning media applications and computer hardware network as an additional medium / media to help students to learn on the subjects of computer hardware and networks to class X.

1. RESEARCH CONTENTS

1.1 Multimedia

Definition multimedia in general is the incorporation of information by using the facilities of the computer. Multimedia derived from multi word meaning many or more than one and a media that can be interpreted presentation somewhere. Multimedia is the use of computers to create and combine text, audio, images, moving (video and animation using links and tools that allow the user to navigate, interact, create and communicate [3].

Here is a multimedia sense according to some experts:

A. According to Turban [10] The combination of at least two media input or output. This media can be either audio (voice, music), animations, video, text, graphics, and images.

B. According to Robin and Linda [4] Tools that can create dynamic and interactive presentation that combines text, graphics, animation, audio and video.

C. According to Hofstetter [5] Multimedia in the context of a computer are: the use of computers to create and combine text, graphics, audio, video, using a tool that allows users to interact, create, and communicate.

D According Zeembry [6] Multimedia is a combination of text data, audio, images, animation, video, and interaction.

1.2 Hardware and Jaringan Komputer

Computer hardware is the collection of physical components that constitute a computer system. Computer hardware is the physical parts or components of a computer, such as monitor, keyboard, computer data storage, hard disk drive (HDD), graphic card, sound card, memory (RAM), motherboard, and so on, all of which are tangible physical objects. By contrast, software is instructions that can be stored and run by hardware. Hardware is directed by the software to execute any command or instruction. A combination of hardware and software forms a usable computing system.

A computer network is a group of computer systems and other computing hardware devices that are linked together through communication channels to facilitate communication and resource-sharing among a wide range of users. Networks are commonly categorized based on their characteristics.

1.3 Analysis of the Problem

Problem analysis aims to explain the problems that exist at the time of the study at SMK Teknik Industri Pembangunan Cimahi, before building a learning media application hardware and computer networks. Based on the analysis of the problems that have been done, there are some problems, namely:

1. Students have difficulty in understanding the subject matter of hardware and computer networks.
2. The difficulty of teachers provides a description or illustration on the subjects of computer hardware and networks.
3. There is no additional media or aids students in learning hardware and computer networks for students of class X.

1.4 Analysis of Its Ongoing

The learning process hardware and computer networks that are running in SMK Teknik Industri Pembangunan Cimahi do with the lecture method and practicum. As for the learning process ongoing in SMK Teknik Industri Pembangunan Cimahi consists of several procedures, including:

1.4.1 Learning procedures

Ongoing learning procedure described in activity diagram in Figure 1 Activities performed on the learning procedure includes:

1. Teachers given the lectures to from the classroom
2. When matter finished delivered , teachers give opportunity to students to ask .

3. If there is no asked , the teacher will handle the final exercise about in accordance with the materials given .
4. Then teachers hold exercise about by singling out some students directly and given the questions.
5. students answer the question.
6. When students not enough understand , so the material will explained back .
7. Once a students understand against matter , it will be in advanced in lab work activities.

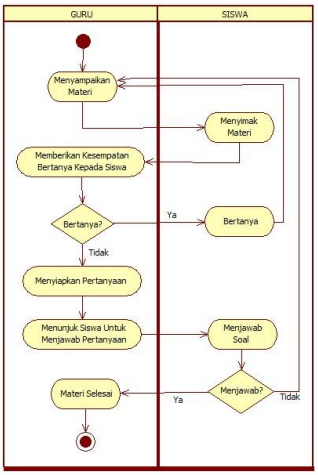


Figure 1 Activity Diagram Learning procedure

1.4.2 Procedure Activity Practicum

The procedure described in the lab activities activity diagram in Figure 2 Activities undertaken in the procedure lab activities include:

1. After following the delivery of the material in class, students go to the computer lab and prepare a toolkit to be used.
2. Students ask for an instruction sheet that will be undertaken to teachers.
3. Teachers provide instruction sheet and provide guidance regarding the instructions given.
4. Students can begin practical activities after getting the instruction sheet from the teacher.
5. Due to the limited device, then the student was given three people in the first group to take turns in doing lab activities.
6. When the allotted time is up, and not all students follow the lab, then prakikum continued at the next meeting.
7. Before concluding prktikum activities students are required to trim back the equipment has been in use.

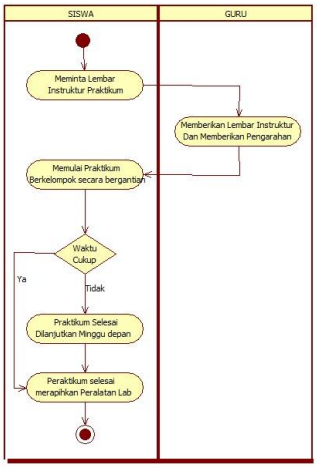


Figure 2 Activity Diagram Procedure Activity Practicum

1.4.3 Practical Procedure LAB

Procedure lab activities described in the activity diagram in Figure 3 Activities performed on lab activities procedure include:

1. The teacher presents the material as practical
2. Students doing practical
3. Teachers provide training for lab
4. Students work practicum teacher gave
5. Teachers fill out the attendance list practicum students

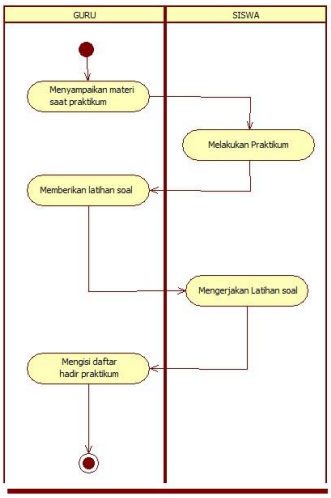


Figure 3 Activity Diagram Practical Procedure LAB

1.4.4 Evaluation procedure

Procedures ongoing evaluation described in terms of the activity diagram in Figure 4 Activities undertaken in the procedure of evaluation include:

1. Once the material is conveyed all or instructional time is up, then the teacher will provide an evaluation.
2. Evaluation held to be kept on file at the same values determine the level of students' abilities
3. Students perform charging evaluation questions and submit answers to the subject teachers after they finish answering

4. The teacher collects the results of the students' answers and examination answers evaluation
5. Teachers shall record the value of the answer sheet that had been checked and made the score sheet evaluation
6. The answer sheets that have been recorded by the teacher returned back to the students to handle students.
7. Sheets evaluation value stored by teachers as teachers handle to be combined with other evaluation value.

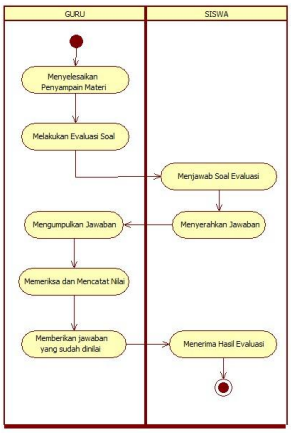


Figure 4 Activity Diagram Evaluation procedure

1.5 Analysis of Application of Learning Built

Application of instructional media and computer network hardware is a computer-assisted learning media contains learning materials on the basics of hardware and computer networks for students vocational hight school in accordance with the curriculum materials used in SMK Teknik Industri Pembangunan Cimahi. This application is intended for students in grade 10 on the network computer engineering in SMK Teknik Industri Pembangunan Cimahi as a medium of learning process in learning the hardware and computer networks.

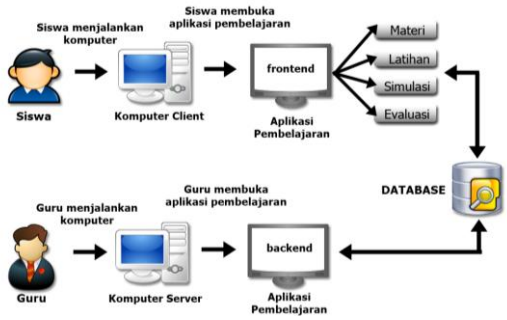


Figure 5 General Architecture Applications

1.6 Description Learning Media Computer Hardware and Networking

Application of instructional media and computer network hardware is a desktop-based learning media in which would explain the material on the basics of computer hardware and computer networks for students of classes 10, and will be described with the components of the material in the delivery of interactive for students to play an active role in the learning process so as to better understand the material being learned. Can be seen in Table 1

Table 1 Application of Multimedia Learning Concepts

The Building Elements	Description
Title	Application Development As Media Learning Hardware And Computer Networking
Audiens	Students and teachers SMK Teknik Industri Pembangunan Cimahi
Image	Images that are on this learning media is of a 2D image
Audio	Audio consists of vocal narration by the narrator and backsound instrument
Animasi	Animation in this learning media is a 2D
Video	Video in learning media is a music video at the chapter material
Interkative	Interkativitas on this learning media is the key to the displacement scene with one another, further button, back button, home button, button login, logout button, key materials, training, simulation and evaluation

1.7 Use Case Diagram (Aplikasi Frontend)

Use case diagram illustrates the process of each procedure runs contained in the application of learning media and computer networking hardware.
Use case diagrams learning media application hardware and computer networks, can be seen in Figure 6

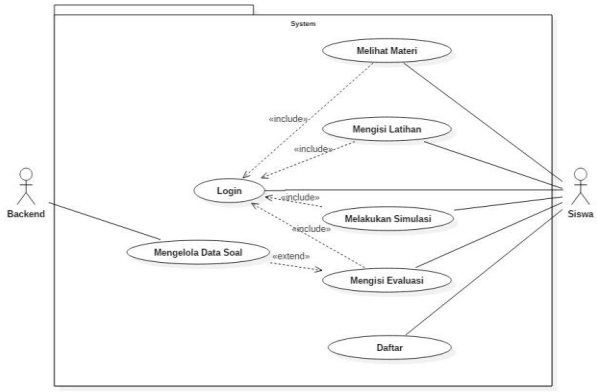


Figure 6 Use Case Diagram Learning Media Applications Hardware and Networking

1.8 Diagram Konteks (Aplikasi Backend)

Context diagram is a diagram that consists of a process and describe the scope of a system, in which there is input, process and output. The following diagram context for this application

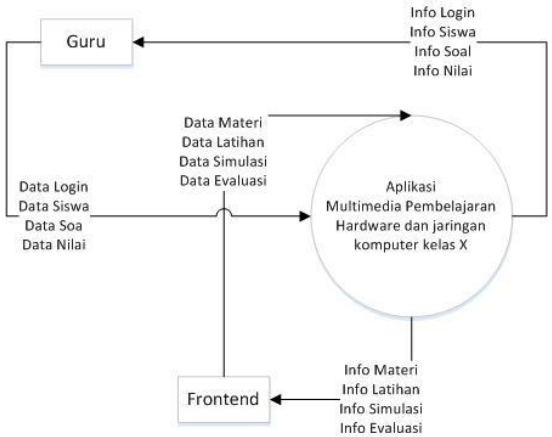


Figure 7 Diagram Konteks Learning Media Applications Hardware and Networking

1.9 Questionnaire Against Student Class X SMK Teknik Industri Pembangunan Cimahi

Based on the results of a questionnaire that given to 69 respondents consisting of 7 fruit question , for the application of learning hardware and the computer network class x whether it had reasonable facsimile need arose both in the functionality and the appearance of overall with answers using the scale of 1 to 5. The following answers the question list.

1. Is the application easy to use and learn?
2. Does this application can help you understand the material hardware and computer networks?
3. Is this application is already interesting and interactive?
4. Navigation or placement of buttons on this application is easy to understand and use?
5. Presentation of the material is in conformity with the existing subjects?
6. Clarity visual design layout, typography, color is appropriate?
7. Do the provision of exercise about and evaluation is in line with the material given?
8. Do the use of language on the application is readily understood?

Table 2 Scale Questionnaire Answers

Value	Answer
5	Strongly Agree
4	Agreed
3	Simply Agree
2	Less Agree
1	Disagree

Here are the results of calculation of the percentage of the answer selected by 69 respondents to sampled studies on the applications that are built.

1. For questions 1th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 3 Calculation Question 1

Question	Each	Score	Respondents	Total Score
1.	Strongly Agree	5	20	100
	Agreed	4	40	160
	Simply Agree	3	9	27
	Less Agree	2	0	0
	Disagree	1	0	0
Total			69	287

The number of a score ideal for all items that is 5x69 = 345 and if all said totally agree) .The number of the score obtained from research = 287 .So for the score so level an agreement that this application easy to use and studied which are (287 / 345) x100 % = 83 % than expected (100 %) .In continuum is presented in figure 8

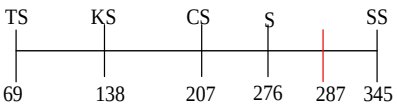


Figure 8 scale continuum Question 1

2. For questions 2th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 4 Calculation Question 2

Question	Each	Score	Respondents	Total Score
2.	Strongly Agree	5	20	100
	Agreed	4	32	128
	Simply Agree	3	17	51
	Less Agree	2	0	0
	Disagree	1	0	0
Total			69	279

The number of a score ideal for all items that is 5x69 = 345 and if all said totally agree) .The number of the score obtained from research = 279 so for the score so level an agreement that this application help you understand matter hardware and the computer network which are (279 / 345) x100 % = 81 % of expected (100 %) .In continuum can be seen in figure 9

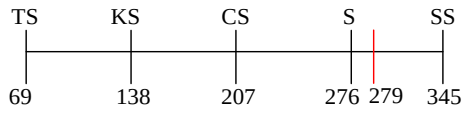


Figure 9 scale continuum Question 2

3. For questions 3th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 5 Calculation Question 3

Question	Each	Score	Respondents	Total Score
3.	Strongly Agree	5	17	85
	Agreed	4	28	112
	Simply Agree	3	24	72
	Less Agree	2	0	0
	Disagree	1	0	0
Total			69	269

The number of the score ideal for all items namely 5x69 = 345 (if all answer really agree) .The number of the score obtained from research = 269 .So for the score and the level of approval the appearance of this application had yanked and interaktif which are (269 / 345) x100 % = 77 % than expected (100 %) .In the continuum of can be seen from figure 10

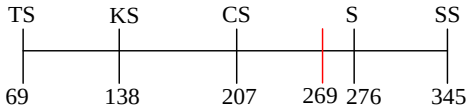


Figure 10 scale continuum Question 3

4. For questions 4th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 6 Calculation Question 4

Question	Each	Score	Respondents	Total Score
4.	Strongly Agree	5	14	70
	Agreed	4	29	116
	Simply Agree	3	26	78
	Less Agree	2	0	0
	Disagree	1	0	0
Total			69	264

The number of a score ideal for all items that is 5x69 = 345 and if all said totally agree) .The number of the score obtained from research = 264 .So for the score so level an agreement that navigation or placement button on the application is readily understood and used which are (264 / 345) x100 % = 76 % than expected (100 %) .In continuum can be seen in figure 11

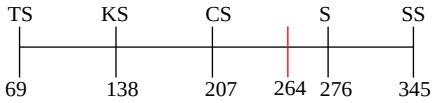


Figure 11 scale continuum Question 4

5. For questions 5th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 7 Calculation Question 5

Question	Each	Score	Respondents	Total Score
5.	Strongly Agree	5	17	85
	Agreed	4	29	116
	Simply Agree	3	23	69
	Less Agree	2	0	0
	Disagree	1	0	0
Total			69	270

The number of the score ideal for all items namely 5x69 = 345 (if all answer really agree) .The number of the score obtained from research = 270 .So for the score and the level of an agreement that the presentation of material that is in line to the subject being there those are (270 / 345) x100 % = 78 % than expected (100 %) .In the continuum of is presented in figure 12

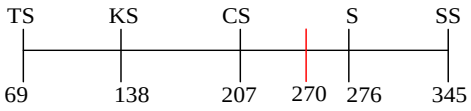


Figure 12 scale continuum Question 5

6. For questions 6th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 8 Calculation Question 6

Question	Each	Score	Respondents	Total Score
6.	Strongly Agree	5	19	95
	Agreed	4	25	100
	Simply Agree	3	24	72
	Less Agree	2	1	2
	Disagree	1	0	0
Total			69	264

The number of a score ideal for all items that is 5x69 = 345 and if all said totally agree).The number of the score obtained from research = 264.So for the score so level an agreement that clarity visual (layout design, typography, color) is in line which are (264 / 345) x100 % = 76 % than expected (100 %).In continuum is presented in figure 13

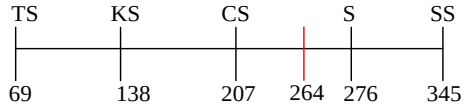


Figure 13 scale continuum Question 6

7. For questions 7th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 9 Calculation Question 7

Question	Each	Score	Respondents	Total Score
7.	Strongly Agree	5	17	85
	Agreed	4	29	116
	Simply Agree	3	23	69
	Less Agree	2	0	0
	Disagree	1	0	0
Total			69	270

The number of a score ideal for all items that is 5x69 = 345 and if all said totally agree) .The number of the score obtained from research = 270 .So for a score the approval so level that the exercise about and evaluation is in line with matter is (270 / 345) x100 % = 78 % than expected (100 %) .In continuum is presented in figure 14

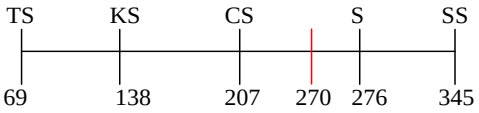


Figure 14 scale continuum Question 7

8. For questions 8th, based on questionnaires given to 69 respondents, then get the result of the calculation as follows:

Table 10 Calculation Question 8

Question	Each	Score	Respondents	Total Score
8.	Strongly Agree	5	12	60
	Agreed	4	32	128
	Simply Agree	3	25	75
	Less Agree	2	0	0
	Disagree	1	0	0
Total			69	263

The number of a score ideal for all items that is 5x69 = 345 and if all said totally agree) .The number of the score obtained from research = 263 .So for the score so level an agreement that the use of language on the application is readily understood which are (263 / 345) x100 % = 76 % than expected (100 %) .In continuum is presented in figure 15

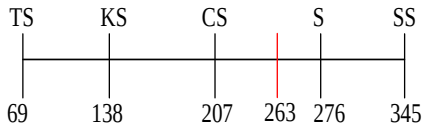


Figure 15 scale continuum Question 8

1.10 Questionnaire Results Against Students

Any questions on the questionnaire distributed to 69 students have a number of different percentages. Based on the results obtained by calculating the percentage of each statement questionnaires are used to determine the percentage of the overall questionnaire with the following formula:

PK = Σ presentation of sample questions / Σ overall percentage

PK = (83+81+77+79+78+76+78+76) / 8

PK = 628 / 800 = 78

It can be concluded that the calculation results of questionnaires from 69 students stated 78% of respondents approve the questions given.

2. CLOSING

3.1 Conclusions

Based on the results of implementation and system testing is done, then the conclusion of a thesis entitled "Development of Multimedia Applications For Media Learning Hardware and Computer Networks For Class X in SMK Engineering Development indistri Cimahi" is as follows:

1. Multimedia Applications For Media Learning Hardware and Networking Computer which has been built to help students of class X in improving the understanding of the subject matter of hardware and computer networks. This was concluded based on the results of pretest and posttest were given to 69 boys and girls with the results of the percentage increase in the average value of 15% and the results of the questionnaire with the results of a percentage of 78% state approve of the questions posed.
2. Multimedia Applications For Media Learning Hardware and Networking Computer which has been built to help teachers in the learning process, especially in simulating the assembly of computer hardware and computer networks. It can be concluded based on the results of interviews with the teacher concerned.
3. Multimedia Applications For Media Learning Hardware and Networking Computer which has been built to be an additional medium to help boys and girls in particular subjects of computer hardware and networks.

3.2 Advice

In the Multimedia Application Development For Media Learning Hardware and Computer Networks For Class X in SMK Engineering Development indistri Cimahi that has been built is still far from perfect and there are still many shortcomings. Therefore, it is necessary for the development and further improvement in order to meet the growing needs of users. As for suggestions on the development of instructional media for the future are as follows :

1. Adding more animations move, to be more attractive.
2. The addition of the element of interaction with the user, so that users are increasingly active on the learning applications.

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