DEVELOPMENT OF INTERACTIVE LEARNING APPLICATION ENVIRONMENTAL EDUCATION (EE) CLASS XI IN SMA NEGERI 1 BALEENDAH *BASED ON DESKTOP*

Luky Nurdiansyah[1], Irawan Afrianto[2]

[1,2] Teknik Informatika – Universitas Komputer Indonesia
Jl. Dipatiukur 112-114 Bandung
E-mail : luky.nurdiansyah@yahoo.co.id[1], irawan@unikom.ac.id[2]

ABSTRACT

Interactive Learning Application Environmental Education is an application that was built using the method according Sutopo application development and 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 Environmental Education. Some of the features available in the application, composed of matter, videos, simulations and exercises. Testing applications is done by using a black box, questionnaire and interview.

Based on the results of interviews with Environmental Education teachers stated that an application built to help teachers in the learning process, especially in the case of material 10 simulation Environmental Education. Then from the pretest and posttest to 40 students of class XI obtain pretest and posttest results with the results of the percentage increase in the average value of 10% and the results of the questionnaire with the results of a percentage of 77% state approve of the questions posed.

Keywords: Environmental Education, Multimedia, Computer Assisted Instruction

1. PRELIMINARY

1.1 Background

Environmental Education (EE) is a process to build the world's human population is aware and concerned about the environment in total (overall) and all the problems associated with it, and the people who have the knowledge, skills, attitudes and behavior, motivation and commitment to work Similarly, both individually and collectively, in order to solve various environmental problems today, and prevent new problems. Environmental education studying environmental issues particularly the issue and management of pollution, environmental damage and resources and conservation [1].

Based on the interview with Dra. Euis Sutarsih as EE teacher who taught the class XI SMA Negeri 1 Baleendah said that during the teaching and learning activities are the problems encountered. The problems faced by the simulation on the subject matter EE not portrayed well. Conditions that occur at this time, teachers can only simulate one of the 10 simulations contained in the materials EE. The rest is only described in theory. As a result, the delivery of simulation cases is not conveyed clearly.

The second problem, based on the results of the initial research questionnaire on students SMA Negeri 1 Baleendah can be concluded that the subject matter presented EE less interactive. This is motivated because learning methods are running at the moment only runs conventionally ie by conveying the material through lectures and course material to write on the blackboard. As a result, many students who have difficulty in understanding all the material presented.

Solutions that can be used to solve these problems is to utilize as a learning multimedia interactive media. According to Research Computer Technology Research (CTR) observations of the human ability to accept and remember the information received. Humans are able to remember 70% of what he saw, heard and done. Interactive multimedia based application is one proper way to accelerate and facilitate the delivery of information in the form of a visual or audiovisual [2]. Interactive multimedia has changed the way people interact with computers is through the medium of text, images, audio, animations, and videos that interact and integrate to form a more interesting information. It is expected to use the interactive multimedia, students will more easily absorb knowledge so as to improve the understanding, stimulate attention and allows teachers to deliver lessons.

Based on the background that has been described, it is proposed the application of interactive learning EE Class XI as an alternative medium of learning to be done in the lab. Multimedia school. Development of this application is also made with their material, 10 case simulations and exercises that can help students in the learning

process. Therefore, the authors intend to provide solutions to problems that have been presented with the title "Interactive Learning Application Development EE In Class XI SMAN 1 Baleendah Based Desktop". Development of this application is expected to be a solution to overcome the problem that exists is to help teachers in the learning process, especially in the case of material simulating 10 EE interactively as well as a media supporting learning processes in order to increase students' interest towards the subject matter EE.

1.2 Purpose and Objectives

The purpose of this research is to build an interactive learning applications EE class XI SMA Negeri 1 Baleendah-based desktop.

The objectives to be achieved in this peneniltian are:

1. Assist the teacher in the learning process, especially in the case of material simulating 10 EE interactively.
2. Improving students' understanding of the subject matter EE.

2. RESEARCH CONTENTS

2.1Multimedia

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.

1.1 EE (Enviromental Education)

EE is an attempt to change behavior and attitudes conducted by various parties or elements of society that aims to improve the knowledge, skills and awareness of society about environmental values and issues of environmental problems, which in turn can mobilize the community to play an active role in the conservation and environmental safety for the benefit of present and future. Environmental education studying environmental issues particularly the issue and management of pollution, environmental damage and resources and conservation [7].

An important aspect is a EE applied in teaching cognitive and affective. Cognitive aspects include pemahanan process, and maintain the balance of the other aspects. EE materials should be given as a matter that should be known and understood by the students, further developed by the students. Affective aspects that can be applied in the EE includes behavior, values and commitment required to build a sustainable society (sustainable). In EE need to be given the opportunity for students to build skills that can improve the ability to solve problems [7].

1.2 Analysis of the Problem

Analysis of problems will be explained about the problems that exist at the time of the study in SMA Negeri 1 Baleendah, before the construction of a medium of learning. Based on the analysis of the problems that have been done, there are fundamental problems, namely:

1. Based on the interview with EE teachers in class XI, namely Dra. Euis Sutarsih, stating that the conditions that occur when these teachers can only simulate one of 10 cases simulations contained in the materials EE. The rest is only described in theory. From these expressions obtained a problem, namely the simulation process contained in the materials EE has not portrayed well. As a result, the delivery of simulation cases is not conveyed clearly. Therefore, constructing a learning applications. Expected applications that learning can help teachers in the learning process, especially in the case of material simulating 10 EE.
2. Based on the results of the initial research questionnaire to students of class XI SMA Negeri 1 Baleendah, stating that the conditions that occur when this method of learning is running merely conventional. Students have difficulty in understanding the subject matter EE. At the time of question and answer session, that is, after the material has been delivered many students who feel less familiar with the material presented. Hopefully, by the

application of learning, can help students to enhance students' understanding of the subject matter EE.

1.3 Analysis of Its Ongoing

The analysis procedure is to analyze the activities of work procedures that occur on the system is running. Results from this analysis of activities in the form of a real picture of the sequence of learning activities undertaken by teachers who provide materials to students in SMA Negeri 1 Baleendah.

1.3.1 Procedure for Provision of Materials

Here are the steps the provision of material progress, namely:

1. Teachers of subjects to summarize the material that has been adapted to the existing syllabus.
2. Teacher explains the material subjects which have been summarized to students face to face.
3. Students record material that is being described by the teacher.
4. If the students understand the material that has been explained by the teacher, then the process of giving the material is terminated.
5. If not, then the teacher explaining material back.

The procedure for provision of material can be seen in figure 1

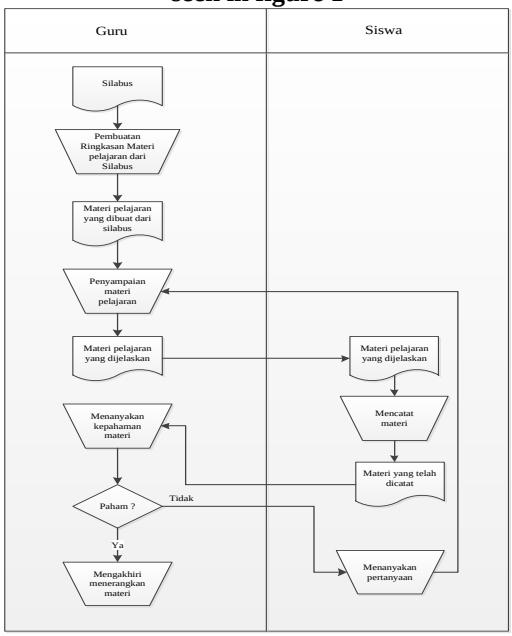


Figure 1 Flowmap Providing Material

Based on the procedures for granting the analysis showed that the simulation process is not visible on the channel. This is consistent with the results of interviews with the teacher, stating that the simulation process is not portrayed well. Conditions that occur at this time, he can only simulate one of the 10 simulations contained in the materials EE. The rest is only described in theory, together with the provision of material. Later in the groove, it appears that the process of learning, proceed conventionally.

1.3.2 Implementation Procedures Training

Here are the steps the implementation of the ongoing exercise, namely:

1. Teachers make exercises.
2. Exercises
3. Sheet distributed to students.Students completing the exercises.
4. When you're done, the answer sheet to the teacher gathered exercises.
5. The teacher checked on the answers and provide value.
6. Results of the value recorded to the score sheet.
7. The results of the answer sheet exercises that have been checked, given to students.

Procedures for granting exercises can be seen in figure 2

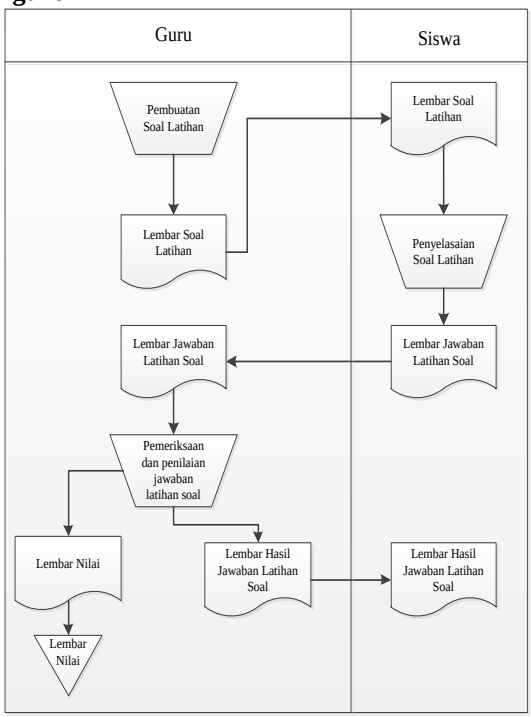


Figure 2 *Flowmap Implementation Exercise*

Based on the procedures for implementing these exercises, exercises which made reference to the chapter material. Exercises are given in the form of multiple choice questions. Source references used, namely the Environmental Education textbooks for high school class XI, published by the PEE and the Environment Agency.

1.3.3 Procedure exercising Evaluation

Here are the steps the implementation of ongoing evaluation, namely:

1. Teachers make evaluation questions.
2. Sheets evaluation questions were distributed to students.
3. Students completing the evaluation questions.
4. When you're done, the answer sheets are collected to teacher evaluation.
5. The teacher checked on the answers and provide value.
6. Results of the value recorded to the score sheet.
7. The answer sheet evaluation results have been checked, given to students.

Evaluation procedure can be seen in figure 3

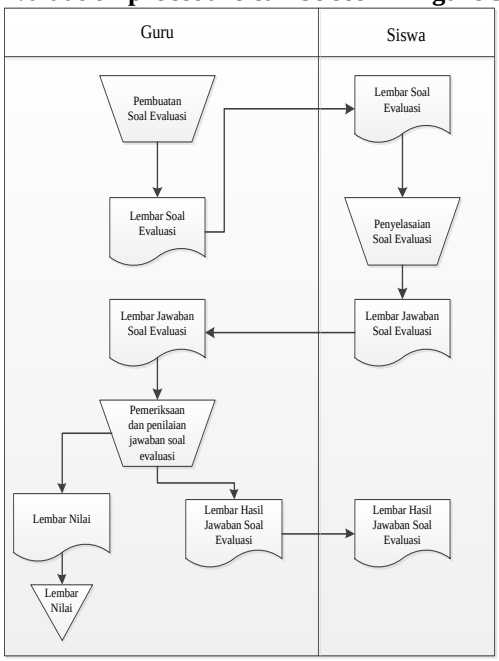


Figure* 3 *Flowmap Implementation Evaluation

Based on the evaluation of the implementation procedures, evaluation questions made reference to chapter 1 sampa chapter 4 for the evaluation of the first half and chapter 5 samapai chapter 7 for the evaluation of the second half. Evaluation questions given in the form of multiple choice questions. Source references used, namely the Environmental Education textbooks for high school class XI, published by the PEE and the Environment Agency.

2.5 Analysis of Application of Learning Built

Learning applications built contains learning materials, videos, simulations, exercises and evaluations about the EE (Environmental Education) therein. Learning application is intended for students of class XI SMA Negeri 1 Baleedah, which is the main purpose of the media making this learning to produce media applications of learning that can address the problems faced by students and teachers, which helps teachers in the learning process, especially in simulating the cases contained in EE materials and a media supporting the learning process in order to enhance students' understanding.

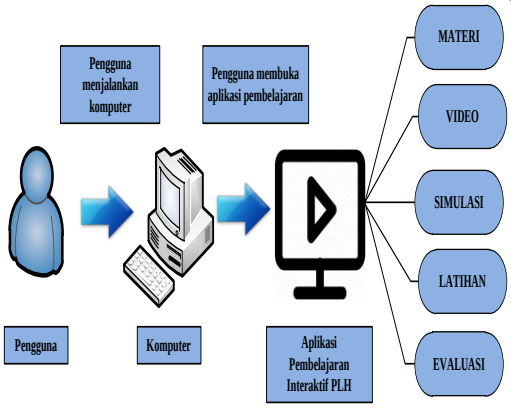


Figure 4 General Architecture Applications

1.4 Description of Instructional Media EE

Media Interactive learning with case studies EE subjects in class XI SMA Negeri 1 Baleedah a desktop based learning media, the subject matter therein explained the whole class XI SMA EE during one school year. Materials used reference book is the textbook of Environmental Education for High School class XI, published by PEE (Environmental Research Center) and the Environment Agency with the basic competencies specified in the curriculum for Environmental Education. Media that will be built will be packaged in the form of two-dimensional (2D) equipped with simulations of some cases of EE with the delivery of interactive for students to play an active role in the learning process so that they can better understand the material being studied.

Instructional media to be built has three functionalities, namely the collection of materials menu, menu simulations, as well as material evaluation menu. As each explanation of this functionality, namely:

a. set material

Material EE will be given a combination of text, images and sound so that students can more easily learn and master the material presented, and can interact using the application as a medium to conduct simulations of the cases contained in the material EE presented interactively to students in 2D.

b. material simulation

Simulations will be given regarding the threat of natural environment (floods, landslides, earthquakes), the threat of man-made environment (B3 waste, air pollution, water pollution), environmentally friendly technologies (biopore and biogas), the disaster and its impact (earthquake and ground Avalanche).

c. Training Evaluation Problem

Training is a training material from each chapter of the materials that have been studied. In it contains

questions about materials related to chapter material selected students.

1.5 Context Diagram

Context diagram is a diagram illustrating the input, process and output of the system software to be built. The following diagram context of the development of EE Applications Interactive Learning In Class XI SMAN 1 Baleendah Based Desktop, can be seen in Figure 5.

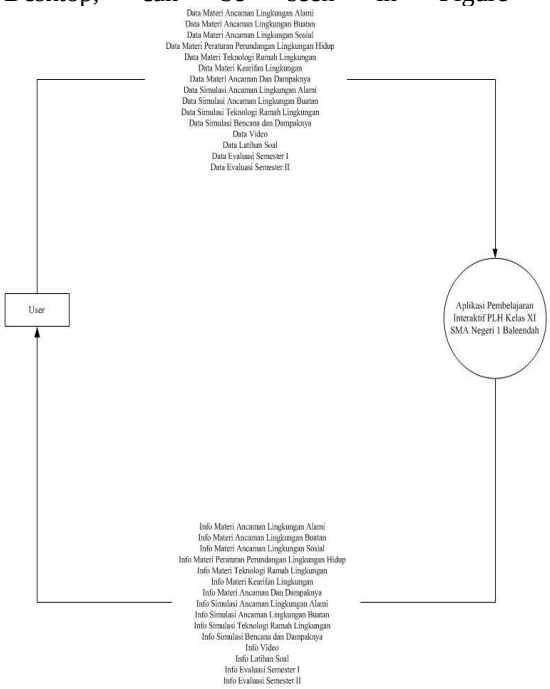


Figure 5 Diagram Application Context Interactive Learning Environmental Education (EE) Class XI In SMA Negeri 1 Baleendah Based Desktop

1.6 Questionnaire Against Student Class XI SMAN 1 Baleendah

Based on the results of the questionnaire given to 40 respondents consisting of 8 pieces inquiries, interactive learning applications for class XI EE does have quite match the existing needs both functionality and overall appearance by using a 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 EE?
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 (layout design, typography, color) is appropriate?
7. Is the administration and evaluation exercises are in accordance with the material provided?
8. Is the use of language in this application is easy to understand?

Table 1 Scale Questionnaire Answers

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

Based on the data from the questionnaire that was circulated, will use the formula H = Z / J * 100% to calculate the percentage of each - each jawabang chosen by the respondent.

Information :

H = Calculation Results

Z = Number of respondents answer each question

A = Number of respondents

Here are the results of the calculation of the percentage of the answer selected by 40 respondents sampled for research on applications that are built.

1. For all questions 1, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 2 Calculation of Question 1

Question	Each	Score	Respondents	Total Score
1.	Strongly Agree	5	13	65
	Agreed	4	25	100
	Simply Agree	3	2	6
	Less Agree	2	0	0
	Disagree	1	0	0
Total			40	171

Based on the data obtained 13 respondents strongly agreed, 25 respondents answered agree and 2 respondents answered quite agree. So in conclusion the majority of respondents agree that these applications are easy to use and learn.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 171. So based on these scores, the level of agreement that these applications are easy to use and learn, namely (171: 200) x100% = 86% of the expected (100%). On the continuum can be seen in Figure 6

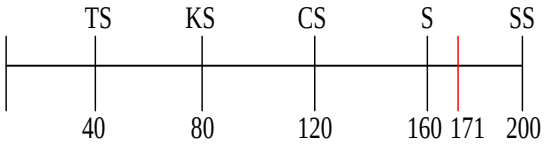


Figure 6 Scale Continuum Question 1

2. For question 2, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 3 Calculation of Question 2

Qustion	Each	Score	Respondents	Total Score
2	Strongly Agree	5	15	75
	Agreed	4	16	64
	Simply Agree	3	9	27
	Less Agree	2	0	0
	Disagree	1	0	0
Total			40	166

Based on the data obtained 15 respondents strongly agreed, 16 respondents answered agree and 9 respondents answered quite agree. So in conclusion the majority of respondents agree that this app helps you understand the material EE.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 166. So based on these scores, the level of agreement that this app helps you understand the material EE is (166: 200) x100% = 83% of the expected (100%). On the continuum can be seen in Figure 7

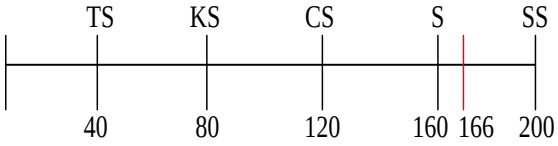


Figure 7 Scale Continuum Question 2

3. For question 3, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 4 Calculation of Question 3

Qustion	Each	Score	Respondents	Total Score
3	Strongly Agree	5	7	35
	Agreed	4	20	80
	Simply Agree	3	13	39
	Less Agree	2	0	0
	Disagree	1	0	0
Total			40	154

Based on the data obtained 7 respondents strongly agreed, 20 respondents agreed and 13 respondents answered quite agree. So in conclusion the majority of respondents agree that this application has been interesting and interactive.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 154. So based on these scores, the rate of approval of this application is already interesting and interactive, namely (154: 200) x100% = 77% of the expected (100%). On the continuum can be seen in Figure 8

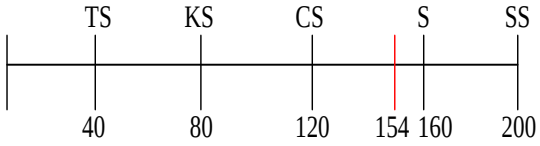


Figure 8 Scale Continuum Question 3

4. For all four questions, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 5 Calculation of Question 4

Question	Each	Score	Respondents	Total Score
4	Strongly Agree	5	6	30
	Agreed	4	18	72
	Simply Agree	3	16	48
	Less Agree	2	0	0
	Disagree	1	0	0
Total			40	150

Based on the data obtained six respondents answered strongly agreed, 18 respondents agreed and 16 respondents answered quite agree. So in conclusion the majority of respondents agree that the placement of buttons on the navigation or the application is easy to understand and use.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 150. So based on these scores, the level of agreement that the navigation or the placement of buttons on these applications are easy to understand and use, namely (150: 200) x100% = 75% of the expected (100%). On the continuum can be seen in Figure

9

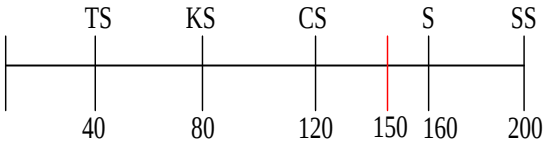


Figure 9 Scale Continuum Question 4

5. For all 5 questions, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 6 Calculation of Question 5

Question	Each	Score	Respondents	Total Score
5	Strongly Agree	5	3	15
	Agreed	4	21	84
	Simply Agree	3	16	48
	Less Agree	2	0	0
	Disagree	1	0	0
Total			40	147

Based on the data obtained three respondents strongly agreed, 21 respondents agreed and 16 respondents answered quite agree. So in conclusion the majority of respondents agree that the presentation of the material is in conformity with the existing subjects.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 147. So based on these scores, the level of agreement that that the presentation of the material is in conformity with the existing subjects ie (147: 200) x100% = 74% of the expected (100%). On the continuum can be seen in Figure 10

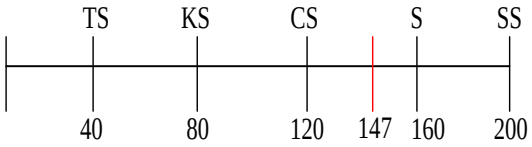


Figure 10 Scale Continuum Question 5

6. For questions to 6, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 7 Calculation of Question 6

Question	Each	Score	Respondents	Total Score
6	Strongly Agree	5	5	25
	Agreed	4	18	72
	Simply Agree	3	16	48
	Less Agree	2	1	2
	Disagree	1	0	0
Total			40	147

Based on the data obtained five respondents strongly agreed, 18 respondents agreed, 16 respondents answered quite agree and 1 respondents disagree. So in conclusion the majority of respondents agree that the clarity of the visual (design layout, typography, color) is appropriate.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 147. So based on these scores, the level of agreement that the visual clarity (layout design, typography, color) is appropriate, namely (147: 200) x100% = 74% of the expected (100%). On the continuum can be seen in Figure 11

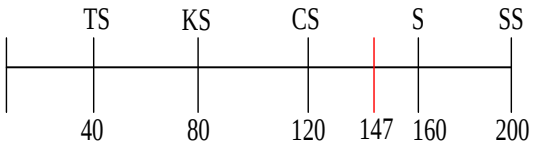


Figure 11 scale continuum Question 6

7. For questions 7th, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 8 Calculation of Question 7

Question	Each	Score	Respondents	Total Score
7	Strongly Agree	5	5	25
	Agreed	4	19	76
	Simply Agree	3	16	48
	Less Agree	2	0	0
	Disagree	1	0	0
Total			40	149

Based on the data obtained five respondents strongly agreed, 19 respondents agreed and 16 respondents answered quite agree. So in conclusion the majority of respondents agree that giving exercises and evaluation systems are in accordance with the material provided.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 149. So based on these scores, the level of agreement that the administration and evaluation exercises are in accordance with the

material provided is (149: 200) x100% = 75% of the expected (100%). On the continuum can be seen in Figure 12

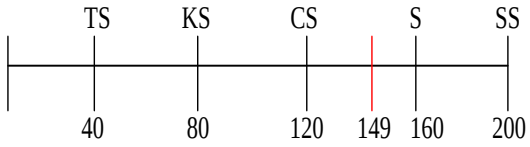


Figure 12 scale continuum Question 7

8. For questions 8th, based on questionnaires given to 40 respondents, then get the result of the calculation as follows:

Table 9 Calculation of Question 8

Question	Each	Score	Respondents	Total Score
8	Strongly Agreed	5	2	10
	Agreed	4	20	80
	Simply Agree	3	18	54
	Less Agree	2	0	0
	Disagree	1	0	0
Total			40	144

Based on the data obtained two respondents strongly agreed, 20 respondents agreed and 18 respondents answered quite agree. So in conclusion the majority of respondents agree that the use of language in this application is easy to understand.

Total score ideal for all items is 5x40 = 200 (if all answered strongly agree). The number of scores obtained from research = 144. So based on these scores, the level of agreement that the use of language in this application is easy to understand that (144: 200) x100% = 72% of the expected (100%). On the continuum can be seen in Figure 13

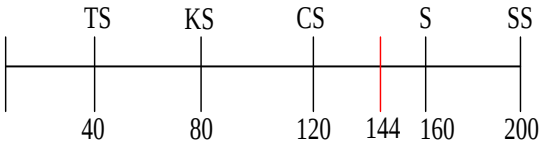


Figure 13 scale continuum Question 8

1.7 Questionnaire Results Against Students

Any questions on the questionnaire distributed to 40 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 percentage of sample questions / Σ percentage of overall

By using the formula then obtained the overall percentage was calculated as follows:

PK = (86% + 83% + 77% + 75% + 74% + 74% + 75% + 72%) / 800%

PK = 616% / 800% = 77%

It can be concluded that the calculation results of questionnaires from 40 students stated 77% of respondents approve the questions given.

3. CLOSING

3.1 Conclusions

Based on the results of implementation and system testing is done, then the conclusion of a thesis entitled "Development of Interactive Learning Application EE Class XI In SMA Negeri 1 Baleendah Based Desktop" is as follows:

1. Interactive Learning EE applications that have been built to help teachers in the learning process, especially in the 10 cases interactively simulate. It can be concluded based on the results of interviews conducted to Dra. Euis Sutarsih as EE teacher in SMA Negeri 1 Baleendah.
2. Interactive Learning EE applications that have been built to help the students of class XI in improving the understanding of the subject matter EE. This was concluded based on the results of pretest and posttest were given to 40 samples with the results of the percentage increase in the average value of 10% and the results of the questionnaire with the results of a percentage of 77% state approve of the questions posed.

3.2 Advice

In EE Application Development Interactive Learning In Class XI SMAN 1 Baleendah Based Desktop 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 pembelajran application.

BIBLIOGRAPHY

[1] D. Prianka, “kompasiana”, kompas, 27 November 2013. [Online]. Available: http://www.kompasiana.com/dhenimprianka/adiwiyata-program-pendidikan-lingkungan-hidup_552fa2126ea834d9058b456e.

[2] Dr.Rusman,M.Pd., Belajar dan Pembelajaran Berbasis Komputer. Bandung: Alfabeta, 2013.

[3] M.IT Prof. Dr. Munir, Multimedia Konsep & Aplikasi dalam Pendidikan. Bandung: Alfabeta, 2013.

[4] Turban., dkk, Aplikasi Multimedia Interaktif, Paradigma, Yogyakarta, 2002.

[5] Robin, Linda, Menguasai Pembuatan animasi dengan Macromedia Flash. Elek Media Komputindo. Jakarta, 2001.

[6] Hofstetter, F. T. Multimedia Literacy. Third Edition. New York : McGrawHill International Edition, 2001.

[7] Zeembry, Animasi Web dengan Macromedia Flash 5, PT. Elex Komputindo, Jakarta, 2001.

[8] Sunarko, Lingkungan Hidup dan Pencemaran, Jakarta: PEE, 2013.