

INTERACTIVE MULTIMEDIA AS COMPUTER ASSEMBLY VISUALIZATION MEDIA

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Abstract

This research was based on complex process in implementing computer assembly with the limitation of facilities that cause the low concept mastery and not growing critical thinking skills of students. The purpose of this research was to facilitate the mastery of concepts and improvement of students' critical thinking skills by utilizing visualization techniques in interactive multimedia. The research method used in this study was Lee and Owens (2004) development model consisting of 4 steps namely analysis, design, implementation and development, and evaluation. The development product produced was an interactive multimedia. The results of an interactive multimedia feasibility based on the assessment of the media experts, subject matter experts, and the students received a level of validity of 84.4% from the media expert, 83% from content expert, and 81.6% from students with the interpretation of worthy of use. The concept mastery of students based on the pre-tests gets an average value of 51.7 and gets an average value of 82.3 at post-test. The comparative assessment of critical thinking skills gained from pretests and posttest responses has always shown an increase in each indicator. The results of this study proved that interactive multimedia is effectively used in learning.

Keywords: *Interactive Multimedia, Concept Mastery, Critical Thinking Skills, Computer Assembly*

INTRODUCTION

Computer assembly is a learning material that emphasizes the introduction of the components that exist on the computer and the computer assembly process. (Susanti & Aifan, 2019) explaining computer assembly is a process of framing all components of a computer into a personal computer ready to use. Computer assembly needs strong skills and a realistic foundation of knowledge before studying this material on a complex basis.

The phenomenon in the field shows that students have difficulty understanding computer components and mastering how to assemble computers. This is due to the computer assembly process implemented with the limitation of facilities thus causing the mastery of computer assembly to be ineffective. In addition, the learning process is performed using only textbooks/ebooks as a guide causing students not to see the detailed visualization of how to assemble a computer.

Computer assembly requires critical thinking skills in the event of asking questions and answering an explanation/challenge, observing, making consideration, taking decisions, and determining the action of the component to be used so that the computer complies with

the expected specifications. (Saputra, Setyosari, & Ulfa, 2016) in his research lays out some indicators of critical thinking skills that determine decisions based on reason, determine decisions based on consequences, use logic strategies, do and consider induction, do and consider deductions, identify the question sentences, and make the form of the defendant.

To facilitate the improvement of students' critical thinking skills, appropriate learning media is needed. Armansyah, Sulton, and Sulthoni (2019) explained that interactive multimedia is a solution in making it easier for students to learn the material in comparison with the monotonous textbooks or ebooks. Multimedia is a learning medium that combines several media elements represented in the computer to convey information so that the information is interesting and easy to understand. Nopriyanti and Sudira (2015) explains that multimedia is a collection of media such as interactive text, images, audio, video, and animations used to convey information. Interactive Multimedia is believed to be an alternative solution in solving such problems, as the results of the research of Suyitno (2016) concluded that the interactive media measurement techniques are more effective than conventional media. Other research conducted by Yuniawati and Zuhrie (2019) shows that the average student learning results are greater than the KKM, thus proving that interactive multimedia learning Media is effective in the learning process.

Referring to the above description, it takes an alternative solution in facilitating the improvement of students' critical thinking skills in learning. Interactive Multimedia becomes an interesting conversation to be examined and applied in the learning process. Based on that, it is necessary to be deepening with the visualization of computer assembly using interactive multimedia.

METHOD

The study used the development model of Lee and Owens (2004) consisting of 4 steps, namely analysis, design, implementation and development, and evaluation which in detail can be seen in the following Figure 1.

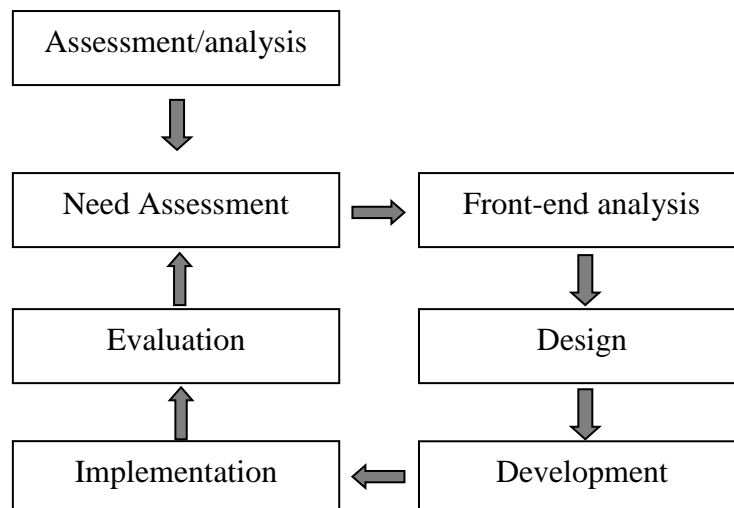


Figure 1. Model of the Development of Lee and Owens (2004)

The subject of this research is the students of class X TKJ SMK Negeri 4 Kendari with a total of 32 people. Data collection is conducted through tests, interviews and questionnaires. Tests are used to determine the student's pre-Test score and post-Test. Interviews are used to know the learning process information that cannot be gathered using questionnaires. Questionnaires were used to determine the developed interactive multimedia.

The data analysis used is qualitative and quantitative analysis. Qualitative Data is obtained from the interview results. Quantitative Data is derived from student test results and questionnaires filled by experts and research subjects.

This research trial design involves the learning media experts, learning materials experts, and students. The test of media experts and learning materials is conducted on each of 1 competent expert in their respective fields. The product feasibility test is conducted in 32 students. The Learning Media test was conducted using a learning Media expert test questionnaire with 20 statements while the learning material test was conducted using a test questionnaire for expert learning materials with 18 items. The product feasibility test is carried out using a questionnaire, which amounted to 25 statements. The processing of questionnaire data was done using Likert scale.

Mastery of the concept of students measured using concept mastery test in the form of multiple choice reasoned 15 questions. Students' critical thinking skills are measured based on indicators of critical thinking skills that have spread in each item of matter. Indicators of critical Thinking Skills include: (1) asking and answering an explanation/challenge; (2) observe; (3) Make consideration; (4) Take the decision; and (5) determine the action.

RESULT AND DISCUSSION

Result

The results of the interactive multimedia feasibility assessment based on the assessment of the media experts, the experts, and the students received the value of the 84.4% media expert, the subject matter of 83%, and students at 81.6%. Referring to the interpretation of the feasibility level then the assessment of the validator indicates that the interactive multimedia developed categorized is feasible for use in the learning process. In detail, these assessment results can be seen in the following Figure 2.

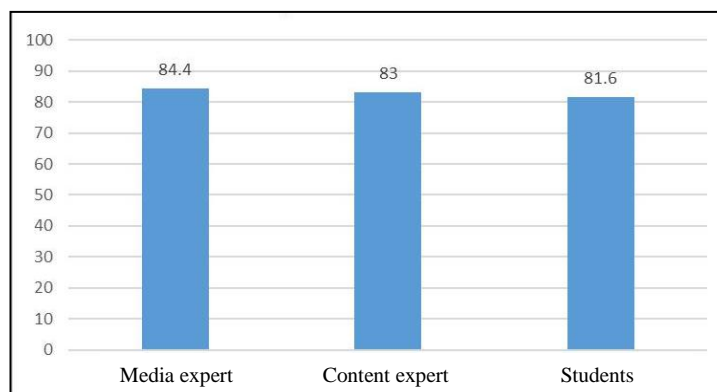


Figure 2. Validation Results of the Interactive Multimedia

The test results on the subject of research, researchers provide pretests and posttest to see improved mastery of concepts and critical thinking skills of students before and after using interactive multimedia. The mastery of the student concept based on the Pretests value gets an average value of 51.73 and gets an average value of 82.34 at the time of Posttest. These results show that interactive multimedia was developed effectively to improve the mastery of student concepts. In detail the average value of the student concept mastery can be seen in the following Figure 3.

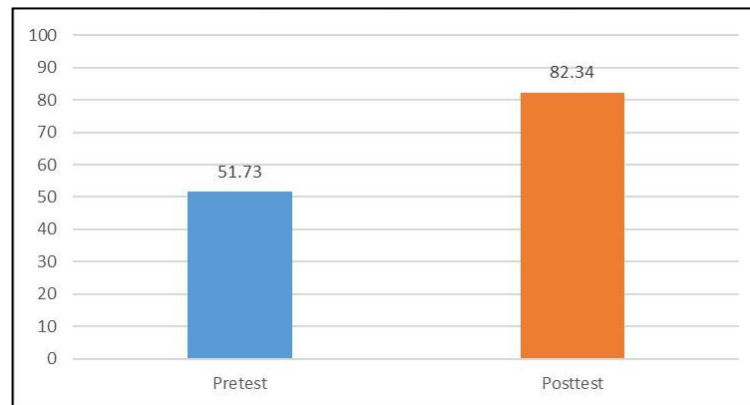


Figure 3. The Average of Students' Conceptual Improvement

Assessment of students' critical thinking skills is based on indicators of critical thinking skills which include: (1) asking and answering an explanation/challenge; (2) observing; (3) Make consideration; (4) Take the decision; and (5) determine the action. Assessment of critical thinking skills assessed from pretests and posttest students who have been adapted to the indicator. The percentage comparison of students' critical thinking skills can be seen in the following Figure 4.

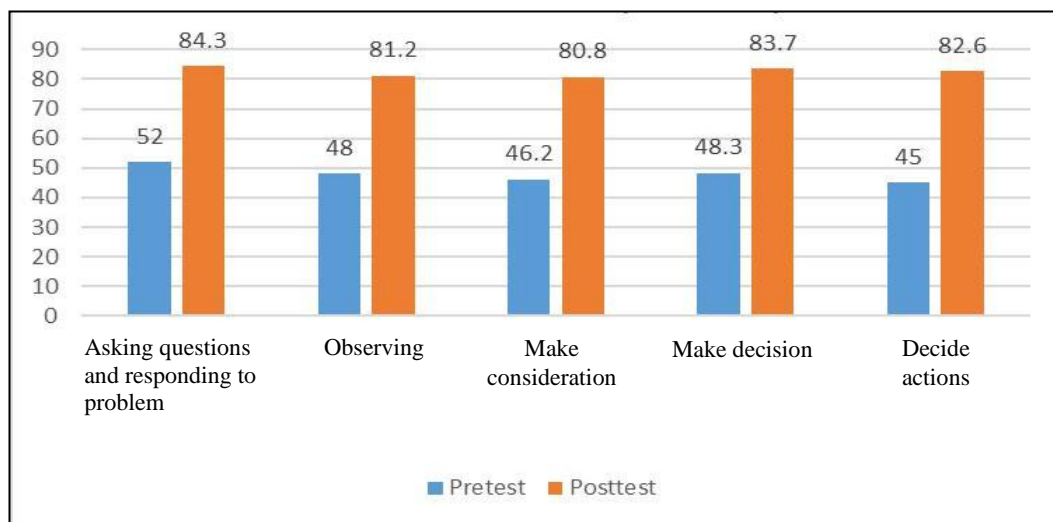


Figure 4. The Ratio of Improvement of Students' Critical Thinking Skills

Discussion

Multimedia is a combination of text, images, graphics, animation, audio and video, and interactive delivery so that it can create a learning experience for students like in real life around them (Claudia & Harimurti, 2016). Praheto et al. (2017) shows when identified with learning, multimedia can be interpreted as a multimedia application used in learning to transmit messages, in the form of knowledge, skills and attitudes and can stimulate the choice, feeling, attention, and willingness of students so that the process of learning happens, aimed and controlled.

Interactive learning Media is designed to clarify message presentation, information, and can overcome the limitations of senses, space, time, and object (Zulhelmi, Adlim, & Mahidin, 2017). Another explanation is presented by Armansyah et al. (2019) that interactive multimedia can clarify the presentation of the material, facilitate the learning process, direct the attention, cause motivation, and enable independent learning.

The research of Cahyono, Sajidan, and Sarwanto (2014) concludes the achievement of student learning outcomes after the interactive multimedia has been applied to a considerable increase. Other research conducted by Khotimah and Santosa (2016) concluded that interactive multimedia learning media deserves use in learning. In line with the study, Kurniawati and Nita (2018) in his research concluded that interactive multimedia-based learning media has been judged to be theoretically viable.

Interactive Multimedia is not merely feasible to use and can improve learning outcomes, but it helps students to master concepts and improve critical thinking skills. Research from Husein, Herayanti, and Gunawan (2015) concluded the use of interactive multimedia affects the critical thinking skills of students. In line with the research, the research results of Pramuji, Permanasari and Ardianto (2018) demonstrated that learning using interactive multimedia is effective in enhancing students ' critical thinking skills. Other research conducted by Oktaviani, Hartono, and Marwoto (2017) concluded interactive multimedia effectively to improve the skills of critical thinking and social skills of the students.

Interactive Multimedia becomes the solution in the complex learning computer assembly, because it facilitates the students in understanding the computer assembly process. Students can study independently with the help of interactive multimedia, so students can perform the individual computer assembly process. Interactive Multimedia has a dynamic look that has its own appeal for students to keep learning. The principle of learning anytime and anywhere can be facilitated with interactive multimedia.

Interactive Multimedia can provide a real visualization of computer components and assembly processes. Visualization is a learning technique that can make a concept of material can be seen with a real sense of vision (Harsalinda & Wijayati, 2018). Budiman (2016) exposing the use of visual media in learning can eliminate the feeling of saturation, eliciting a spirit of learning, creativity, critical thinking, motivation, and increasing student learning achievements. Rosidah (2016) Displays visual learning media can improve the understanding of student concepts.

The development of interactive multimedia as a visualization tool in this study can help improve the mastery of concepts and critical thinking skills of students. This is evident from the results of field trials, the mastery of the concept of students based on pretests scores get an average value of 51.73. The average student value increased to 82.34 at the time of Posttest. Improvement of students ' critical thinking skills also always increased as seen in Figure 4. The results of this study proved that interactive multimedia is effectively used in learning. Visualization of computer components and computer assembly processes in interactive multimedia is proven effective to improve mastery of concepts and critical thinking skills of students.

CONCLUSION

The complex of learning material computer assembly requires a solution to facilitate students in Mastering computer assembly concepts and processes. Interactive Multimedia as a visualization tool becomes one of the media that is an alternative solution. The results of the interactive multimedia feasibility assessment based on the assessment of the media experts, the expert, and the students receive a level of validity from the media expert at 84.4%, a material member of 83%, and a student of 81.6%. The mastery of the student concept based on the Pretests value gets an average value of 51.73 and gets an average value of 82.34 at the time of Posttest. The percentage comparison of critical thinking skills indicators always shows improvement when compared to pretests and posttest values. The results of this study proved that interactive multimedia is effectively used in learning. Visualization of computer components and computer assembly processes in interactive

multimedia is proven effective to improve mastery of concepts and critical thinking skills of students.

Based on the research done, it is advisable to other researchers to make the same development on other learning materials. It is recommended that teachers teach computer assembly subjects to use interactive multimedia in the learning process so that they can assist students in enhancing their mastery of concepts and critical thinking skills.

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