

Improving Learning Outcomes Through Interactive Learning Media Based on Macromedia Flash

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Abstract

In order to adapt to the curriculum changes from 2016 to 2020 in the Air Navigation Engineering D3 Program, an innovative approach utilizing interactive learning media is required. This aims to support curriculum transformation due to technological advancements and the needs of the professional world. Therefore, the objective of this research is to assess the improvement of learning outcomes through the use of interactive learning media in teaching about navigation aids. The research subjects are D3 Air Navigation Engineering 13th Alpha and Bravo cohorts. Data collection was obtained from learning outcomes through Evaluation and Interactive Learning Media on Flight Navigation Aids. This research is a quasi-experimental quantitative study using pretest-posttest design. The conclusion drawn from the review and data analysis, to assess the validity using SPSS, is that the calculated r-value (r) is greater than the critical r-value (r 0.30), indicating that the questionnaire items are valid. Meanwhile, for the reliability test results, a Guttman SplitHalf coefficient correlation value of 0.929 was obtained, which is ≥ 0.80 . The Cronbach's Alpha value was 0.861. It can be concluded that all items of the ability variable (x) are valid. The pre-test and post-test scores in the control group were 40 and 75, respectively. Whereas in the experimental group, the class provided with interactive learning media obtained pre-test and post-test scores of 45 and 85, respectively. Therefore, this learning media can lead to increased student engagement and a significant improvement in their academic success.

Keywords: Learning Outcomes, Learning Media, Macro Media Flash

INTRODUCTION

The communication between teachers and students should be planned as effectively as possible during the learning process. Through a planned and systematic teaching process, students can master the learning material effectively and efficiently. One thing that needs to be planned is the use of teaching media. The use of teaching media can facilitate and accelerate students' understanding of the learning material. Additionally, these media can enhance students' learning motivation and broaden their access to information and knowledge[1].

Interactive learning media is a type of instructional media that delivers information not only in the form of text and graphics but also includes audio and video components. Interactive learning materials can consist of text, audio, images, animations, and videos that are transmitted through a computer and can be presented interactively to students.[2]

The Doppler VHF Omnidirectional Range (DVOR) navigation aid is a navigation device used in aircraft to determine their relative position to a ground station. This

system transmits high-frequency electromagnetic signals through antennas on the ground, which are then received by the aircraft. By utilizing the phase differences between the signals received from various antennas, the aircraft can determine its direction relative to the ground station in the form of radial lines[3].

Learning outcomes refer to the achievements attained by an individual in sharpening, comprehending, and mastering the learning material after going through the learning process[4]. According to Oemar Hamalik, learning outcomes occur when an individual undergoes a change in behavior and gains competence or skills as a result of their learning[5]. The evaluation of learning outcomes is reflected in the obtained grades. Learning evaluation is a mandatory activity in every learning process, aimed at reflecting on and determining the success or failure of the implemented learning activities[6]. The success of the learning process is influenced by two factors, namely internal factors that exist within the individual and external factors that originate from outside the individual. Internal factors involve the characteristics of the students, their attitude towards learning, level of motivation, focus and

concentration while studying, ability to manage learning materials, skills in acquiring new knowledge, level of self-confidence, and study routines. On the other hand, external factors consist of the influence of teachers, the social environment around them, as well as the availability of learning facilities and infrastructure[7].

METHODS

The research was conducted at Poltekbang Surabaya. This study employed a quantitative research method with a pretest-posttest group design.[8], by taking samples using the cluster random sampling method. The independent variables in the study encompass pretest and posttest data from both the experimental group and the control group. The data is then tested to ensure that the obtained values have a normal and homogenous distribution after normality and homogeneity testing. The selected sample includes Class TNU 13 Alpha as the experimental group, where their learning involves the use of learning media, while Class TNU 13 Bravo is used as the control group without any intervention.

Before being used on all research participants, an assessment of the research instrument is conducted. Testing for validity and reliability, which are indicators of how reliable or trustworthy the questionnaire is, is also carried out. There are several stages of testing[9]. Sugiyono (2014) argues that besides the instrument itself, the validity and reliability of a measuring tool (instrument) are also influenced by the users of the measuring tool who conduct the measurements and the subjects being measured[10]. The testing of Validity and Reliability is done using SPSS. SPSS is an application program with high analytical statistical capabilities and a graphic data management system. It uses descriptive menus and simple dialog boxes, making it easy to understand how to operate it. SPSS is widely used in marketing studies, quality control and improvement, as well as scientific research[11].

1. Validity Test

Validity testing serves to determine whether a measuring instrument is valid or not. The measuring instrument referred to here consists of the questions within the questionnaire. Validity testing is used to evaluate the extent to which the questions used in the pretest and posttest are effective.

According to V. Wiratna Sujarweni, decisions regarding the validity and reliability of an instrument are made based on theoretical grounds. If the r value > critical product moment value, then the item is considered valid; conversely, if the r value < the critical product moment value, then the item is considered invalid.[12]. The approach used to test construct validity is through the correlation between the results of each question and the overall results.

Table 1. Test result Validity Using SPSS

Indicator	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
X.1	38.08	22.601	.838	.889
X.2	38.17	22.493	.736	.893
X.3	38.67	22.493	.695	.895
X.4	38.75	21.500	.784	.889
X.5	38.46	22.520	.580	.903
X.6	38.17	22.493	.736	.893
X.7	38.75	23.848	.474	.908
X.8	38.42	23.210	.652	.898
X.9	38.38	21.984	.766	.891
X.10	38.54	22.085	.533	.910

Based on the output table above, it can be concluded that the overall value of corrected item-total correlation or r value for variables x_1 through $x_{10} \geq 0.30$. According to Jonathan Suwarno's validity testing decision theory, if the calculated r -value $\geq r$ -value of 0.30, then the questionnaire items are considered valid.

2. Reliability Test

Reliability testing aims to measure the level of confidence or reliability of the measurement. If the measurement provides reliable and predictable results, it is said to have a high level of reliability.

To test reliability, a single measurement is used, followed by a comparison with other questions or measurements regarding the correlation between responses to those questions. Cronbach's Alpha is one of the tools used to assess reliability[13]. According to Jonathan Sarwono, the item is considered reliable if the Guttman split-half coefficient correlation value is ≥ 0.80 . In this case, the instrument is declared reliable[14].

Table 2. Test result Reliability Using SPSS

Cronbach's Alpha	Part 1	Value	.861
		N of Items	5 ^a
	Part 2	Value	.774
		N of Items	5 ^b
Total N of Items			10
Correlation Between Forms			.870
			.930
			.930

Spearman-Brown Coefficient	Equal Length	.929
	Unequal Length	
Guttman Split-Half Coefficient		.929

- a. The items are: X.1, X.2, X.3, X.4, X.5.
- b. The items are: X.6, X.7, X.8, X.9, X.10.

Based on the output table of Reliability Statistics above, it is known that the Guttman Split-Half Coefficient correlation value is 0.929, which is ≥ 0.80 . Therefore, it can be concluded that the evaluation items for variable x as a whole are considered reliable. Additionally, an item can be considered reliable if the Cronbach's Alpha If Item Deleted value for all item scores is ≥ 0.80 . In the table, the Cronbach's Alpha value is 0.861. Thus, it can be concluded that all items for competency variable (x) are valid.

RESULT AND DISCUSSION

The development of learning media using Macromedia Flash application can serve as a reference to inspire the students' enthusiasm in studying materials and simulations related to the Flight Navigation Aids course.



Figure 1 The first display of the learning media

In the Macromedia Flash application, various transitions can be applied to make the transition between slides appear engaging. The initial display in the learning media consists of a title and visually appealing graphic animations designed similar to the image shown above.

In Figure 2 below is the design display of the menu features in the flight navigation aid learning media. The menu features include profile, instructions, competencies, materials, and evaluation.

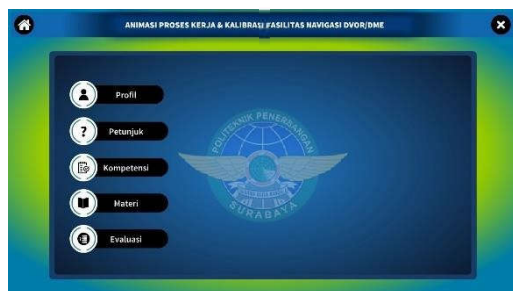


Figure 2 The display of the learning media menu features.



Figure 3 The display of instructions for using the learning media.

The figure above is the display of instructions for using the learning media. This display contains information about each button feature. These features range from the home button, play button, to exit button from the learning media application.

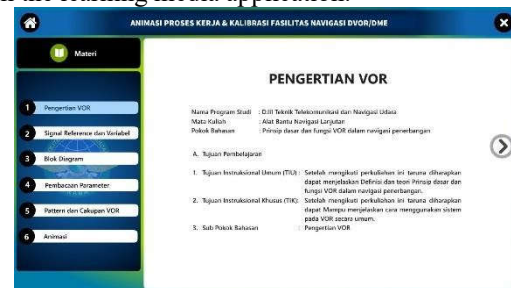


Figure 4 The display of the learning media content

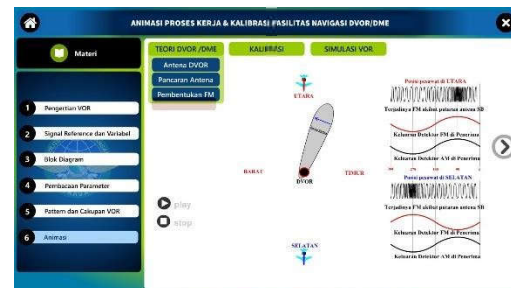


Figure 5 The display of the animated learning media content.

In Figure number 4 and 5, it contains various materials regarding flight navigation aids. This includes explanations, signal shape animations, block diagrams, and readings of the device parameters.

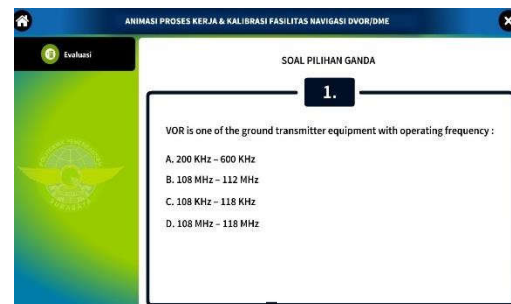


Figure 6 The display of the evaluation questions menu

The figure above includes multiple-choice questions about the material on flight navigation aids. These questions can enhance knowledge and serve as an evaluation for the user before and after using the application..

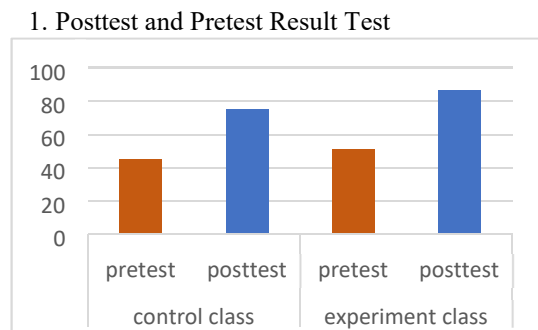


Figure 7 The Posttest and Pretest score graph.

Based on the above graph, the learning outcome scores show that students in the control group had a pretest score of 40 and a posttest score of 75. Meanwhile, for the experimental group, the pretest score was 45 and the posttest score was 85. The average scores obtained by the experimental group and the control group are different but not too far apart. It can be concluded that the utilization of technology for learning media that aligns with the interests and needs of the students provides its own appeal for them to access the content provided in the application. This results in an increase in the level of student engagement in learning. Higher levels of learning engagement have the potential to have a positive impact on student learning outcomes and allow for a significant improvement in their academic achievements.

The impact of using this learning media has been proven to assist in the teaching and learning process. This is also supported by several researchers. According to Nurul Audie, the use of learning media has a significant impact on enhancing student motivation, as well as aiding educators in delivering lesson materials interactively and efficiently. This has a profound effect on the teaching process[15]. The research conducted by Abdurrahman, Jampel, and Sudatha, titled "Development of Interactive Learning Multimedia to Improve Social Studies Learning Outcomes," also concluded that the use of interactive learning multimedia in integrated social studies subjects has been proven to enhance student learning achievement. This is based on the effectiveness test between pretest and posttest results[16]. According to Ayu Lestari's research, conducted with the aim of understanding and enhancing students' learning outcomes after using learning media, it was found that the use of Computer-Based Learning Model with a Tutorial approach significantly outperforms conventional learning methods in improving students' learning achievement in the subject of Information and Communication

Technology (ICT). This was determined through a comparison of the Gain scores between the experimental and control groups[17].

CONCLUSION

The following conclusions were drawn from the examination and analysis of the research data in the study titled "The Influence of Macro Media Flash-Based Learning Media on Student Learning Outcomes" shows the results of validity testing using SPSS, where the calculated r-value is greater than or equal to the critical r-value of 0.30, indicating that the questionnaire items are valid. As for the reliability test results, the Guttman Split-Half Coefficient correlation value is 0.929, which is ≥ 0.80 . The Cronbach's Alpha value is 0.861. Thus, it can be concluded that all items for competency variable (x) are valid. The Pretest and Posttest scores in the control group are 40 and 75, respectively. In the experimental group, where the class received treatment using the learning media, the Pretest and Posttest scores are 45 and 85, respectively. Therefore, this can result in an increase in the level of student engagement in learning and allow for a significant improvement in their academic achievements.

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