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DEVELOPMENT OF LEARNING DIFFUSION OF INNOVATION TEACHING MATERIALS AT THE JAKARTA STATE UNIVERSITY

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ABSTRACT

The purpose of this research is to develop division teaching materials and learning innovations in the Postgraduate Educational Technology Study Program, Jakarta State University. The target of this research is students who are taking diffusion and innovation courses in Education at the Postgraduate Education Technology Doctoral Program, Jakarta State University. This research was conducted in the Postgraduate Education Technology Doctoral Study Program, Jakarta State University. The population in this study were students of the Educational Technology Doctoral Program for the 2019/2020 academic year. While the respondents in this study were 20 students who were taking the Division and Innovation Education courses at the Postgraduate Education Technology Doctoral Study Program, Jakarta State University. Considering that this research is in the form of development of diffusion teaching materials and learning innovation, the research method used is the Research and Development research method. This research uses Derek Rowntree's model which consists of three stages, namely the planning stage, the writing preparation stage, and the writing and editing stages. The product testing phase begins with material experts and media experts. Then the product was tested on a number of students, namely 3 students for individual evaluation and 20 students for field evaluation. The results of interviews with students got very good results. The results of this study state that diffusion and innovation teaching materials developed in terms of readability, material, and media are considered easy and suitable for use in learning. Overall it can be concluded that diffusion and educational innovation teaching materials are in the very good category, where this teaching material is feasible and effectively used in the learning process.

INTRODUCTION

Education is a conscious effort made by humans to maintain the values of life and culture, to pass on knowledge from one generation to another, thus human life will be more cultured and civilized. Today, as we know, science and technology are passed on through educational institutions. In educational institutions, students are given in-depth knowledge about various things. In this case, the development of students really becomes a priority, because the purpose of establishing an educational institution is to create quality human resources, both in terms of knowledge, as well as in terms of morals or personality.

Educational institutions, as a place for education to be held, are an issue that deserves a deeper study. Education in Indonesia, which in this case has been regulated in Law no. 20 of 2003 article 3 states that "National education functions to develop capabilities and shape the character and civilization of a nation with dignity in the framework of educating the nation's life, aiming at developing the potential of students to become human beings who believe and fear God Almighty, have noble character, are healthy. , knowledgeable, competent, creative, independent, and become democratic and responsible citizens.

The process that occurs in education leads to the learning process.*"Learning is an enduring change in a behavior, or in the capacity to behave in a given fashion, which results from practice or other forms of experience*" (Schunk, 2012: 3). Learning is a lasting change in behavior, or in the capacity to behave in a certain way, the result of practice or other forms of experience. Referring to Anurrahman (2010), learning is a process carried out by individuals to obtain a whole new change in behavior, as a result of the experience itself in interactions with their environment (Anurrahman, 2010: 35).

Advances in science and technology have an impact on the world of education. Therefore, the educational and learning paradigm also undergoes a shift and transformation (Spector, 2009: 1-2). These shifts are (1) focusing on developing individual potential *holistically*, (2) learning not only occurs in the classroom but the environment is also an effective learning resource, (3) the communication model for educators and students is more interactive and democratic, (4)) learning assessment is not only result-oriented but also process-oriented, (5) and the diversity of characteristics of students in learning requires educator sensitivity. This paradigm shift has implications for the nature of the learning process, learning resources, the role of educators, students, and the learning evaluation system.

Utilization of learning resources maximally can improve learning achievement of learners (students). This is in line with research comparing the learning achievement of students who use learning resources and students who do not. The study found that there was a significant difference between students who had a high intensity of utilization of learning resources and students who had a low intensity of use of learning resources regarding learning achievement (Taiwo, 2009: 8).

The development of information and communication technology moves so fast, penetrating all sectors of life. In fact, the development is estimated to be faster than originally estimated. We still remember, three to four years ago information and communication technology, such as web-based computers and cell phones, was still considered expensive and only owned by certain people, but today this technology is no longer owned by certain people. it belongs to all nations, to all people from the lowest to the top. In fact, many people cannot be separated from this technology in their daily lives, from morning to evening and until morning again. Information and communication technology has rapidly and revolutionarily changed the mind set and human civilization (Prawiladilaga, et al. (2013).

If you look for a moment, how the learning process takes place in each individual, it is found that the learning process occurs because of the interaction between people who learn and messages that are packaged in a variety of specific mediums. It can be in the form of a medium that is only used (*by utilization*), it can also be deliberately designed (*by design*) to achieve certain goals. Therefore, learning can take place anytime, anywhere, with what only. In the history of the United States, innovation diffusion theory has been around since the 1950s. in the context of the history in question, the United States government to do research to find out how and why some farmers there adopt new techniques in agriculture and others are not. Everett M. Rogers is one of this exploration team, starting from that history However, although initially diffusion theory was aimed at understanding the diffusion of agricultural techniques, in later developments this diffusion theory was used in other fields more universally. The diffusion theory of innovation from Everret M. Rogers was then formulated in a book in 1962 entitled "Diffusion of Innovations", where this book in its later development became the basis for understanding innovation, the characteristics of innovation, why people adopt innovation, what social factors support it. the adoption of innovation, and how it proceeds in society. In general, innovation is defined as an idea, practice or object that is considered as something new by an individual or another unit of adoption. Thompson and Eveland (1967) define innovation as technology, which is a design used for instrumental action in order to reduce the irregularity of a causal relationship in achieving a certain goal. So, innovation can be viewed as an effort to achieve certain goals.

Fullan (1996) states that the 1960s was an era where many contemporary educational innovations were adopted, such as new mathematics, chemistry and physics, teaching machines, open education, individual learning, team teaching and included in this case is the self-learning system.

Meanwhile, Rogers stated that innovation is "an idea, practice, or object perceived as new by the individual." (an idea, practice, or thing that is considered / felt new by the individual). With this definition, the word perceived becomes an important word because perhaps an idea, practice or object will be considered an innovation for some people but for others it is not, depending on what individuals feel about these ideas, practices or objects.

Diffusion is defined as a process by which an innovation is communicated through certain channels over a period of time to members of a social system. Diffusion can also be said to be a special type of communication where the message is a new idea. In addition, diffusion can also be considered a type of social change, namely a process of change that occurs in the structure and function of social systems. It is clear here that the term diffusion cannot be separated from the word innovation. Because the main goal of the diffusion process is the adoption of an innovation by members of a particular social system. Members of the social system can be individuals, informal groups, organizations and / or sub-systems.

Nowadays the learning process can take place without having to study in the classroom because the development of learning resources, especially information and communication technology, is very fast. The learning process no longer depends on the teacher as a learning resource but can take place anytime and anywhere. The learning process is no longer in the form of verbal communication between learners and teachers. Thus students can learn anything according to their interests and learning styles. However, in reality, the various learning resources are generally not fully utilized (Percival, 1993).

Therefore, the use of learning resources is an effort to solve learning problems. In the context of educational technology, learning resources are components of a learning system that need to be considered if they are designed beforehand or use existing ones, and are combined in a complete learning system to make the learning process purposeful and controlled. These learning resources are identified as messages, people, materials, tools, techniques, and backgrounds (Seels & Richey, 1994: 12). Learning technology also develops by taking four main characteristics, namely; (1) applying a systems approach, (2) using the widest possible learning resources, (3) aiming at improving the quality of human learning, and (4) oriented towards individual learning activities (Mukminan, 2003: 12). Abdalraheem and Al-Rabane (2006) also found that the use of textbooks in the classroom is still very dominant (Abdelraheem & Al-Rabane, 2006: 2).

Lilawati's research results (2017) show that the use of learning resources in the learning process at SDIT Hamas Stabat in the form of messages is categorized as quite good with a percentage of 70%, human learning resources are categorized quite good with a percentage of 74%, learning resources are included in the quite good with a percentage of 66%, learning resources with the right method was in the poor category with a percentage of 49%, learning resources for tools was categorized as quite good with a percentage of 74%, learning resources for the environment was categorized as quite good with a percentage of 69%. Of the overall learning resources the most dominant used are human learning resources and methods. Efforts to use learning resources in the learning process at SDIT Hamas Stabat are categorized as quite good with a percentage of 71% (Lilawati, 2017: 106).

The Jakarta State University educational technology study program is one of the study programs that have not fully implemented information and communication technology in learning. The availability of facilities and

infrastructure as well as adequate internet facilities is not really used by lecturers and students to improve the quality of learning. This is because the learning used is still using face-to-face learning systems. Based on the results of the preliminary analysis, several problems were found that should be investigated. One of them is the learning system used. The learning system used generally still uses face-to-face learning, lecturers as the main learning resource in learning. In the classroom, students are only passive listeners, listening and taking notes on what the lecturer says. This makes the learning atmosphere in the classroom feel stiff, very boring and there is no active communication between lecturers and students. Students are faced with the same learning system every day, without any other learning system that can motivate students to take lessons with enthusiasm. Of course this is a serious problem because it affects the achievement of learning competencies.

RESEARCH METHODS

This study aims to produce a product in the form of diffusion and innovation teaching materials. Packaged in printed form that can be used for independent study. Judging from the purpose of developing a product, this research can be said as a research*and development*.

The approach taken in this study is a product-oriented learning development approach and uses the Rowntree development model. This approach is carried out because this research begins by examining the problem by analyzing the learning needs in schools to determine whether or not a package of teaching materials can help in the learning process. In general, the Rowntree Model (1994) consists of 3 stages, namely 1) planning; 2) writing preparation; 3) Writing and editing.

This research was conducted at the Postgraduate Education Technology Doctoral Study Program, State University of Jakarta. The population in this study were students of the Educational Technology Doctoral Program for the 2019/2020 academic year. While the respondents in this study were 20 students who took the Division and Innovation Education courses in the Postgraduate Education Technology Doctoral Study Program, Jakarta State University.

The research methodology in this study uses a research approach through Derek Rowntree's research and development procedures. Research and development methods are methods used to produce certain products and test the effectiveness of these products. Development research aims to find, develop and validate a product.

The product developed is tested in three stages, an expert trial stage, a face to face trial, and a field trial. The product trial stage begins with trials with material and media experts. Then the product was tested on a number of students, namely 3 people for the face to face try out stage and 20 people for the field trial evaluation stage.

RESEARCH RESULTS AND DISCUSSION

From the results of the questionnaires distributed to students, information was obtained that the books used in the learning process of diffusion and information

subjects had not been able to meet the needs of students. Out of 12 doctoral students who filled out the questionnaire, 41.7% answered that the manual did not meet their expectations. Then the questionnaire was given to a larger group of students, and out of the 73 respondents who filled out the questionnaire, 64.4% of the manuals did not meet their expectations.

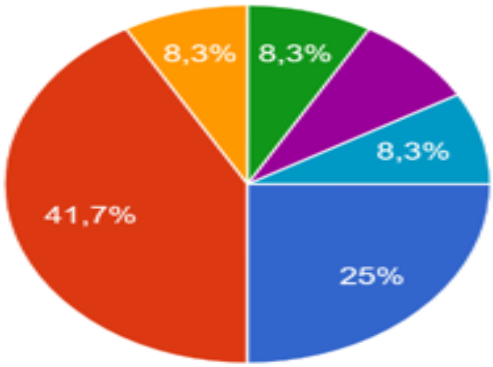

Figure 1 small group student responses

The picture above shows that the books used in the learning process are currently 41.7% of students said they did not meet their needs, 25% answered yes, 8.3% of students answered they did not know.

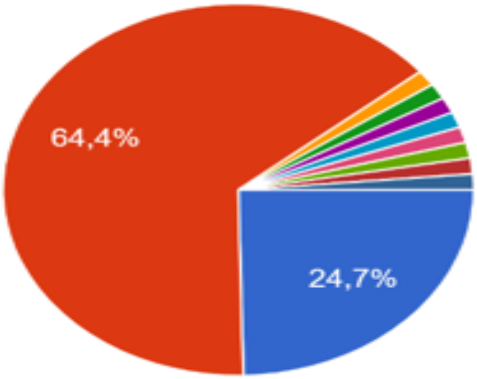

Figure 2: large group student responses

The picture above shows that the books used in the learning process are currently as many as 64.4% of students stated that they did not meet their needs, 24.7% answered yes, 8.3% of students answered they did not know.

From the results of the questionnaire, the researchers developed diffusion teaching materials and educational innovations in the form of printed materials. The teaching materials developed consist of 7 chapters which are equipped with material descriptions, summaries, exercises, glossaries and references. Through this developed teaching material, lecturers and students can learn independently. The following covers the developed division and innovation teaching materials:

Figure 3 Cover of teaching materials

The results showed that the average score at the expert trial stage was as follows: The average score of material experts was 3.77 which means the product was considered very good and the media expert was 3.78 which means that the product was very good. Then in the experimental stage to students the average score for the face to face try out stage was 3.63, which means the product was considered very good and at the field trial evaluation stage was 3.98, which means the product was considered very good. The results of interviews with lecturers who teach the education division and innovation subjects obtained very good results. In conclusion, the division teaching materials and educational innovations that have been developed can be said to be good, but there still need to be improvements in accordance with expert advice, students as users, and lecturers.

Based on the results of trials from experts obtained an average score of 3.77. These results indicate that the teaching materials produced in terms of content feasibility, presentation feasibility, and language feasibility are good.

Table 1. Recapitulation of material experts

Component	**Average Assessment**
Feasibility Content	3,76
1. Material Conformity with SK and KD	4.0
2. Accuracy of Material	3,8
3. Encouraging Independent Learning	3.5
Presentation Feasibility	3.57
1. Systematicism and guidance	3,5

2. Presentation Support / Important elements	3,8
3. Presentation of learning	3,5
4. Coherence and lineage of thought	3.5
Language feasibility	4.0
1. straightforward	4.0
2. communicative, dialogic / interactive, critical / reflective	4.0
3. Polite, not gender biased and touch affection	4.0
4. suitability with the level of development of students	4.0
5. conformance with the rules of the Indonesian language	4.0
6. use of terms, symbols and / or icons	4.0
Average	**3.77 (very good)**

Based on the test results from material experts obtained an average score of 3.78. These results indicate that the distribution of teaching materials and educational innovations produced in terms of media include components of teaching materials, sizes of teaching materials, and the principles of verbal message design are very good. Following are the results of the trial recapitulation of media experts.

Table 2. Recapitulation of media experts

Component	**Average Rating**
Size of teaching materials	
1. Teaching material design	4.0
Cover Design	
1. The layout of the cover of teaching materials	3.5
2. Letters that are attractive and easy to read	3,6
3. Cover illustration of teaching materials	3,5
4. Layout consistency	4.0
5. harmonic layout elements	3,6
6. complete layout elements	4.0
7. Layout accelerates understanding	3,5
8. Topography of simple book contents	4.0
9. Topography easy to read	4.0
10 Typography of module content facilitates understanding	4.0
11 Illustration of contents	3,7
Average	**3,78 (very good)**

Furthermore, the researchers measured the readability level of the module using a *fog index*. Researchers use the themselves *fog index* to measure the level of readability of discourse or reading material contained in diffusion teaching materials and educational innovations.

Table 3. Readability Test

Subject	**Readability Level**
Definition and elements of diffusion and innovation	5.93
History of diffusion research	5.73
Decision process and the concept of innovation adoption	7.33
Innovation attribute, adoption rate and change agent	6.38
Average	6.34

The results of the legibility calculation of the four subjects obtained an overall average score of 6.34. These results suggest that diffusion and innovation teaching materials developed in terms of readability are considered easy. Diffusion and innovation teaching materials are suitable for use in learning.

DISCUSSION

The needs analysis stage is carried out by giving a questionnaire via google form and sending it to students. From the results of the questionnaire it was found that diffusion and educational innovation subjects were less desirable for various reasons, including lecturers only using the lecture method in delivering material, the unavailability of textbooks, the way of delivering the material was less attractive and the delivery took too long.

Based on the problems that were found during the needs analysis stage, to overcome them, it is necessary to develop a pre-existing model in order to improve the quality of achieving the objectives to be achieved, both process objectives and outcome objectives, which can be used as guidelines for designing learning.

The initial design of the teaching materials was then tested by experts. After all the data collected are processed using simple statistics. For the assessment using the average of the sum of its values. The average value is used as the basis for providing an assessment level of the teaching materials being developed.

The explanation and process of developing the learning steps in the Rowntree learning model development research begins with the following stages:

Preparation phase (Needs Analysis Stage).

The development of teaching materials is a very important need at this time, after researchers observe and analyze that the current situation is still far from perfect because teachers do not have teaching materials. This gap is an important stage of needs analysis for researchers to develop teaching materials that are tailored to the model characteristics of students and the curriculum.

Planning stage.

Based on analysis factual and findings, the planning stage determines the steps for preparing instructional media that are tailored to the characteristics of students, namely: (a) formulating general learning objectives and specific learning objectives, (b) formulating the form of implementing the developed learning, (c) formulating evaluation form to be developed for students, (d) designing an appropriate drawing.

Editing Stage (Stage Development).

The material learning that will be developed and implemented in product this development is then evaluated by a learning expert (expert material) as an expert who weighs in to find out the validity of the data, the feasibility and validity of the instrument items and then each item (item) of the instrument is re-evaluated for approval. and the validity of the data. This is in accordance with the results of research conducted by Jhoni Lagun Siang et al (2020), the results of the study show that the products developed can increase student creativity. The younger generation prefers to use electronic-based learning materials rather than print-based learning materials and in the future the ability and usefulness of electronic-based learning materials will increase with the costs incurred (Annan, 2008).

Trial and Revision Phase.

The Trial and Revision stage is carried out in research and development after the design of the learning development model is completed. The trial of teaching materials was carried out to measure the appropriateness of this learning media and to see the extent to which the designed product was able to achieve the aims and objectives of the development model. In this research and development, there are three stages of testing developed, namely:

Expert Judgment.

Expert trials are carried out by content experts who provide input on additional meanings, objectives and input on the formative and summative tests conducted. Then input from instructional design experts who build learning media that is better and more effective and efficient for teachers. The next expert trial is the test media expert which provides input that the icon in the learning material must be added.

One-on-one trials.

This trial was carried out after the results of the data from the language and media experts were revised and then tested on 3 students to find out whether the teaching materials, effectiveness and efficiency in the learning process. In each trial conducted aims to draw conclusions from the results of the test data analysis in explaining the product or learning media developed that was tested as a basis for making decisions whether the media produced needs to be revised or not, the decision is to revise the model, it is necessary to have a dissertation with support. learning that after being revised this model will be better, more effective, efficient and have an appeal to teachers. This trial involving students

aims to determine whether the media design learning developed can be implemented properly by students. Results and limited trials were revised again so that the instructional media design was ready for small group trials.

Field Trial.

This trial aims to determine whether the teaching materials developed have been implemented correctly and effectively. The trial was conducted on 20 students. The main emphasis of testing at this stage still focuses on the effectiveness, efficiency and attractiveness of the design of teaching materials using the results of the improved design.

CONCLUSION

Diffusion teaching materials and educational innovations that have been developed are already very good and need to be maintained, but there are still components of teaching materials that need to be improved and developed in terms of the four feasibility tests. This teaching material is feasible and effectively used in the learning process.

According to the material expert (expert matter), division teaching materials and educational innovation fall into the very good category. In terms of content feasibility, feasibility of presentation and language feasibility according to material experts is very good.

Meanwhile, according to media experts, the teaching materials developed are in the good category. According to media experts, all module components are complete, the module size is appropriate and the visual message design principle is very good.

According to students, this teaching material falls into the very good category. Based on interviews where students said that the printed module for Christian religious education that was developed was very useful and helped students in the learning process. According to students in terms of methods, evaluation, size of teaching materials, language, sentence structure, layout, typography, illustrations and colours in teaching materials are very good.

According to the lecturer, this educational innovation and distribution teaching material falls into the very good category.

Judging from the readability test conducted by the researcher using the fog index, division teaching materials and educational innovations developed, the material falls into the easy category. This means that students easily understand the content of teaching materials.

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