Survey on How to Select and Develop Learning Media Conducted by Teacher Professional Education Participants

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Abstract. This paper discusses the selection and development of instructional media of participants of Teacher Professional Education held in the Department of Electronic Engineering Education, Faculty of Engineering, Universitas Negeri Yogyakarta in the 2018. Teacher Professional Education Participants were middle school and elementary school teachers from Java and Sumatra, Indonesia. The total respondents were 82 teachers. Based on the results of the survey, it was found that most of the teachers had carried out the task of selecting and developing the media even though it was not based on Anderson’s theory in selecting and developing media. Most teachers (53.66\%) always used learning media when carrying out the learning process. Most of the teachers made their own learning media (78.05\%) using computers (84.15\%) in the form of Microsoft Power Point presentations (100\%). Finally, most teachers did not understand Anderson’s theory about the selection and development of learning media (72.20\%).

1. Introduction

Teaching and learning activities in principle are the process of communication between teachers and students, namely the delivery of messages (in this case of learning material) from teachers to students. One component of the communication process in general is a communication medium which functions as a channel in conveying messages. Communication media in the learning process are often referred as learning media. The main function of learning media is as a means to achieve learning goals. The more effective learning media used, the more effective the learning process will be. Thus, choosing the right media will greatly affect the success of the learning process.

The main task of a teacher in carrying out the learning process consists of 3 (three) main components, namely: (1) the planning and preparation process; (2) the implementation process; and (3) evaluation process. The planning and preparation process usually takes a long time. This preparation activity will produce learning tools that will be used in carrying out the learning process. The implementation process is a real process carried out by the teacher in carrying out learning, namely when there is communication in the classroom or other activities needed to achieve the learning objectives. While the evaluation process is a process to monitor success in achieving learning goals. Have all planned learning objectives been achieved? Are all learning materials delivered by the teacher understood by all students? Has the method used been appropriate in achieving the learning objectives? Have the selected media helped students understand the learning material? How is the level of success of the learning process seen from
the value of the learning outcomes of all students? Some of these questions are commonly used to evaluate the learning process and the learning tools used.

The task of the teacher in carrying out the planning and learning preparation process includes: (1) determining the learning objectives; (2) preparing materials or teaching materials; (3) choosing the appropriate teaching method; (4) determining the media to be used; and (5) choosing and preparing learning evaluation techniques.

In regard to the task of the teacher in determining the type of learning media, teacher must be able to choose the right type of media so that the learning objectives can be achieved well. Some things that must be considered in determining the type of learning media include: learning objectives, learning material to be delivered, student characteristics, types of media suitable for use, environments in which students take lessons, and as well as available resources.

The development of computer technology today is very supportive for the development of multimedia for learning media needs. Many application software can be used to create learning media such as Microsoft Power Point, Authorware, Lectora, Macromedia Flash / Adobe Flash, Virtual, Adobe Captivate, and others. In addition, the development of Internet services also provides many types of learning media that are ready to be downloaded and ready to use such as tutorial videos from Youtube and someone's blog. However, often the learning media that is ready to be downloaded and used does not match the purpose and material of learning that has been determined by the teacher. Therefore, the teacher must continue to provide media that is truly in line with the objectives and planned learning material. An important step in making learning media is certainly to begin with the right media selection process based on the theory of learning media selection, for example Anderson's theory in choosing learning media.

This paper discussed the task of the teacher in carrying out the preparation process especially in terms of determining or choosing the type of learning media to be used. The survey was conducted on the participants of Teacher Professional Education in Computer and Informatics Engineering for group I in 2018. Participants are teachers who currently have taught in secondary schools or elementary schools. The purpose of this study is to answer several questions related to the selection and development of learning media, namely: Do teachers use learning media when implementing the learning process? Does the teacher develop learning media for the purposes of the learning process? What application software is used most often? Do teachers choose the media using media selection theory? How do teachers develop learning media? Some of these questions will be answered through this survey research.

2. Learning Media

2.1. Definition of Learning Media

Smaldino states that medium (plural, media) is a means of communication used by the sender to convey information to the recipient. The word media comes from Latin which means "between", this term refers to anything that carries information between the source and the recipient[1]. Examples of media include video, television, diagrams, print materials, computer programs, and instructors. Therefore, learning media is a means to convey information from the sender (teacher) to the recipient (student) during the learning activities take place. Thus, various media as mentioned previously will be a medium of learning when they provide messages with instructional goals. The purpose of the media is to facilitate communication and learning.

Branch said that effective media facilitates the construction and retention of knowledge and skills. Instructional media is intended to enrich the learning experience by using a variety of tangible objects
to facilitate performance goals. The media must be chosen to support instructional events in order to achieve the learning objectives, so do not choose instructional programs to support the media [2].

Munadi stated that learning media can be understood as "everything that can deliver and channel messages from sources in a planned manner so as to create a conducive learning environment from which the recipient can do the learning process efficiently and effectively" [3].

Based on these definitions, learning media in principle is a device used to convey learning material and provide convenience for students in achieving learning objectives. The learning process is regarded as successful if there is a change in student behavior. Thus, the learning media must provide facilities to move students from not knowing to knowing, from not understanding to understanding, from the easiest things to difficult things, from simple things to complex things, and from real things to abstract things. The more effective learning media, the more effective the learning process will be.

2.2. Types of Learning Media

In general, learning media is divided into 6 (six) types, namely: (1) Text; (2) Audio; (3) Visual; (4) Motion; (5) Real objects and models; and (6) People [1]. The most commonly used learning media is text-shaped media. This type of text media is used to convey learning material in the form of books, posters, whiteboards, computer screens and others. Other types of media that are often used as learning media are audio, including anything that can be heard, for example, human voice conversations, music sounds, mechanical engine sounds, and others. Visual type learning media are such as diagrams in a poster, images posted on walls (eg wall charts), pictures on a blackboard using chalk or markers, graphics in a learning book, photographs of objects, and others. Motion is a learning media in the form of motion such as videotape, film, and animation. Real objects or models are learning media in the form of three dimensions that can be touched and held by students. An example of a model-shaped learning media commonly used in vocational learning is "trainer" [4]. The last type of media is humans, namely teachers, students, or experts in their fields. Students can learn through teachers, fellow students, or to an expert in their fields.

This type of learning media actually also refers to Edgar Dale's (1969) theory known as the Dale’s Cone of Experience [1]. This cone describes student learning experiences based on learning media used in the learning process. This cone describes the type of learning media that are real to the type of learning media that are abstract in terms of the learning experience gained from the learning media. The lowest learning media, namely the cone base, is a learning medium that is real, giving the greatest learning experience. While at the end of the cone is a learning medium that provides the most abstract learning experience. Dale’s Cone of Experience is shown in Figure 1.

The development of computer technology today has supported the development of learning media with a type of media known as multimedia, which is a media that can present a combination of text, audio, visual, and motion. The development of multimedia learning has been carried out to help students understand learning material [5]. Even with the development of computer networks known as the Internet, it has been able to provide services that are very valuable in the learning process, namely online learning services or e-learning as a continuation of the term of multimedia [6]. The development of e-learning in the learning process has been carried out and proven its positive impact on the achievement of learning objectives. E-learning can help students take online learning while doing field practice activities in an industry whose position is very far from the teacher or school where the student originated [7].
2.3. Choosing Learning Media

In fact, the learning process does not only use one type of media. The combination of several types of learning media and also variations in the types of learning media will provide learning conditions and situations that are more interesting, not boring, and students can get more learning experiences. The task of the teacher in preparing the learning process is to choose and make learning media in accordance with pre-determined goals.

The decision to choose a systematic and careful learning media is very important for solving problems of successful and cost-effective learning [6]. The statement shows how important the selection and development stage of learning media is so that the learning process can work well.

There are several important things that need to be considered in choosing and developing learning media. The process of selecting existing media or developing new media is based on context, expectations, conditions of performance, available resources, culture, and practicality [2]. The choice of learning media types is done for several reasons: 1. Learning media is chosen to improve the quality of learning; 2. Learning media is chosen to present and strengthen the most essential knowledge and skills. Media is usually used to present content. The media also functions as a tool to strengthen important points so that learning outcomes can improve; 3. Variations in the use of different types of learning media will strengthen information and offer additional opportunities to strengthen learning without making students repeat the learning material; 4. Learning media is chosen to accommodate differences in student characteristics, especially due to the various learning styles possessed by students. Learning style refers to a group of psychological characteristics that determine how a person feels, interacts in a learning environment.

Ronald H. Anderson (1987) presented logical steps that must be taken in the process of selecting and creating learning media. These steps are presented with questions that must be answered so that eventually they will lead to a group of types of learning media. The questions in each step of selecting learning media are questions that connect the content and objectives of learning with some characteristics of types of learning media. The steps of media selection are presented in the form of flow charts so that the process of selecting media can be carried out systematically [8][9].
3. Research Method

The research method used in this research is survey method. This method is chosen according to the purpose of the study, which is to explore information related to the teacher's task in carrying out planning and learning preparation, especially in terms of the selection and development of learning media. The research instrument is a questionnaire developed based on research questions, namely: Does the teacher use learning media when carrying out the learning process? Does the teacher develop learning media for the purposes of the learning process? What application software is used most often? Do teachers choose media using media selection theory? How do teachers develop learning media? The questionnaire used in this study is shown in Table 1 below.

| Question                                                                 | Answer options                                                                 |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Do you always use learning media every time you teach in class?           | □ Always<br>□ Sometimes<br>□ Never                                           |
| Which type of learning media do you use most often?                       | □ Text<br>□ Picture or Photo<br>□ Audio<br>□ Audio-Video<br>□ Presentation with a Computer. |
| What application software do you most often use to create learning media? | □ Microsoft Powerpoint<br>□ Authorware<br>□ Macromedia/Adobe Flash<br>□ Other types, specify: ........................................ |
| For the purposes of the availability of learning media, the most frequent things you do are: | □ Make your own summary of the material using application software with a computer.<br>□ Download from the Internet.<br>□ Ask someone else to make it.<br>□ Using learning media provided by the school. |
| What basis do you use in choosing learning media?                         | □ Based on the availability of learning media in schools.<br>□ Based on habits (using Microsoft Power Point).<br>□ Based on the material to be taught.<br>□ Based on Anderson's theory in choosing media. |
| Do you know the media selection theory proposed by Anderson?               | □ Yes<br>□ No                                                               |
If No. 6 answered Yes, give a brief description of the media selection theory proposed by Anderson.

The study was conducted in the Department of Electronic Engineering Education, Faculty of Engineering, Yogyakarta State University in August and September 2018. The subjects were the participants of Teacher Professional Education in the field of Computer and Information Technology, followed by secondary and elementary school teachers from Java and Sumatra Island. The study sample was 3 classes of Teacher Professional Education participants, while the population was 4 classes of Teacher Professional Education participants.

Data analysis uses descriptive statistics by presenting diagrams and graphs to facilitate data interpretation and conclusions.

4. Result and Discussion

After all questionnaires given to all respondents (research subjects) were collected, the next process was the analysis of research data. The total respondents were 82 teachers both elementary school teachers and secondary school teachers. Data analysis was done by recapitulating all data and calculating the percentage value for conclusions. Answers to open type questions were used to confirm the answer to a closed type question. Based on the results of the analysis that had been carried out, the recap of research data is presented in the following diagrams and graphs.

Figure 2 shows the answers of all respondents related to the question whether the teacher uses learning media in carrying out the learning process presented in the form of pie charts. Based on these diagrams it appears that in carrying out the learning process there are 53.66% of respondents stated that "always" using learning media, while 46.34% said "sometimes" using learning media, and 0% who claimed not to use learning media. Based on these results it can be interpreted that not all Teacher Professional Education participants use learning media for each time they carry out the learning process. Most teachers only sometimes use learning media.

![Figure 2. Use of Media Learning in Learning Process](image)

Figure 3 is a bar graph that shows respondents' answers related to the type of media that is most often used in the learning process. Based on the graph, it appears that 84.15% of respondents use learning media in the form of presentations using a computer, 48.78% of respondents use audio type media, 46.34% of respondents use learning media in the form of pictures or photos, and 35.37% of respondents use text as a learning medium. Based on these results it can be interpreted that the majority of Teacher Professional Education participants use learning media in the form of presentations using computers.
Figure 4 is a bar graph that shows respondents' answers regarding the type of software used in making learning media. Based on the graph it appears that 100% of respondents use Microsoft Power Point as learning media. Besides using Microsoft Power Point, there are 15.85% of respondents using Macromedia Flash / Adobe Flash application software to create learning media, 7.32% of respondents use video learning media, 2.44% use iSpiring application software to create learning media, 1.22% of respondents use Adobe Captivate software, and 1.22% of respondents use the Corel Draw application program to create learning media. The results of the respondents' answers are in accordance with the previous respondents' answers that most Teacher Professional Education participants use computers to make learning media and based on respondents' answers regarding the type of application program used is to use Microsoft Power Point. Thus, it can be interpreted that most Teacher Professional Education participants use Microsoft Power Point as a mainstay application program in creating learning media.

**Figure 3.** Types of Learning Media That Are Often Used

**Figure 4.** Application Software Used by Teacher in Developing Media Learning

Figure 5 is a bar graph that shows respondents' answers related to the question of how the teacher method in providing learning media for the learning process. Based on the graph, it appears that 78.05% of respondents made their own learning media, 64.63% of respondents downloaded from the Internet, 10.98% of respondents used learning media provided by the school, and 0% of respondents asked for help from others in providing or making learning media. Based on these results it can be interpreted that all Teacher Professional Education participants had carried out their functions as teachers in preparing learning, especially in terms of choosing and making learning media. Most Teacher Professional Education participant teachers provided learning media by making their own learning media.
Figure 6 is a bar graph that shows the respondent's answers related to the question whether the basis used in choosing the type of learning media that will be used in the learning process. Based on the graph, it appears that 78.05% of respondents used learning material as a basis for choosing and creating learning media. As many as 30.49% of respondents stated that the use of Microsoft Power Point to create learning media due to customary factors, 29.27% of respondents stated using the available learning media at school, and only 4.88% of respondents stated the selection and creation of learning media using Anderson's theory. Based on this data, it can be interpreted that only a small percentage of Teacher Professional Education participant teachers used Anderson's theory to choose and create learning media. Thus, the teacher chooses and makes media without regard to the media selection theory developed by Anderson. The choice of learning media was only based on the habit of using Microsoft Power Point regardless of whether the type of media used really matched the material that would be delivered in the learning process.

Figure 6. Basic Selection of Media Types

Figure 7 is a pie chart that shows respondents' answers related to the teacher's understanding of the selection theory of the type of learning media developed by Anderson. Based on the diagram, it appears that 72.20% of respondents stated that they did not understand Anderson's theory, and only 27.80% of respondents stated their understanding of Anderson's theory for media selection. Furthermore, while confirmed with an open question, out of 27.80% of respondents who stated that they understood the Anderson theory, not all of them could explain in detail how the process of selecting learning media was
based on the theory. Thus, based on data recapitulation related to Anderson's understanding of learning media selection, it can be interpreted that most of the Teacher Professional Education participants did not understand the theory of media selection developed by Anderson, and only some Teacher Professional Education participants knew the theory.

![Percentage of Teachers Who Know Media Selection Theory](image)

**Figure 7.** Percentage of Teacher Who Know Media Selection Theory by Anderson

5. Conclusion

Based on the results of the research and discussion described earlier, the conclusions of this study are: 1. Most of the teachers participating in Teacher Professional Education in 2018 always use learning media in carrying out learning activities; 2. Most of the teachers participating in 2018 Teacher Professional Education have carried out the task of preparing learning, especially in choosing and developing learning media; 3. Most of the teachers participating in the 2018 Teacher Professional Education use learning media in the form of presentations using computers; 4. Most Teacher Professional Education participants in 2018 use Microsoft Power Point to create learning media; 5. Most of the teachers who participated in Teacher Professional Education in 2018 do not understand the theory of selection and development of learning media delivered by Anderson.

Acknowledgments

We express our gratitude to Teacher Professional Education participants in 2018 and other parties who have helped conduct the research from beginning to end so that we can present this paper. We expect input, criticism, and suggestions for improving this paper.

6. References

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