Development of Interactive Multimedia-Based Teaching Materials for Distance Learning during the Covid-19 Pandemic

by Siti Sri Wulandari

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ABSTRACT

The development of information technology in the world of education makes it more possible to conduct distance education in two directions through the use of technology-based learning media that are appropriate and precisely targeted in designing teaching materials to achieve learning objectives. The purpose of the research is to find out the process of developing interactive multimedia-based teaching materials and students' correct agreement for interactive multimedia-based teaching materials in the introductory courses of management administration. Research & Development the 4-D Development model consists of four stages of development, namely Define, Design, Develop, and Disseminate. As a result, this interactive multimedia-based teaching material is worth using in the distance learning process and gets a good response from students, in addition to being able to motivate learning can apply the ability to analyze, evaluate and create materials through self-learning.

Keywords: *Teaching Materials; Interactive Multimedia; Distance Learning; COVID 19*

INTRODUCTION

The learning process in educational units is held interactively, fun in order to motivate students to actively participate and be creative (Suratman, Sri, Nugraha, & Shandy, 2020). So in the learning activities there are two main actors, namely lecturers as learners and students as learners. Learning will run effectively if the process of implementation is not centered on only one perpetrator, namely the teacher center, but more than that activeness must also be owned by students because they are the output of the overall learning process covering cognitive, affective and psychomotor abilities. In the process of teaching and learning activities, teachers or lecturers as learners are not the only learning resources in the classroom and lecturers cannot transfer knowledge to students, but more than that the learning process will be more meaningful if learners or students are able to build their own knowledge gained from the process of teaching and learning activities received either in the classroom or outside the classroom so that the process learning give meaning through his experience. Universitas Negeri Surabaya

prepares the S-1 level of education to be graduates who have qualifications as undergraduate education, then students are ready to be trained further in to a teacher and professional education personnel in their field in accordance with the profile of the study program. Introduction to Management Administration Science is one of the behavioral courses working in the Office Administration Education study program.

Education must be able to improve the quality of human beings who have critical, creative, futuristic and character power in order to have adaptive abilities to be able to live life and live in global competition(Nuryani, Abidin, & Herlambang, 2019). To achieve educational goals, it is necessary to innovate the learning model to be applied (Suriyanto & Wulandari, 2021). Learning independence plays a role in determining the learning success of students. One of the factors that affect this independence of learning is the availability of teaching materials used during the teaching and learning process. The teaching materials should be in accordance with the needs and learning conditions of the learners(Linda & Putra, 2021). Educators act as a source in the formation of motivation, When conducting direct interaction with students in the teaching process equipped with learning resources as support in teaching.(Anggraini & Wulandari, 2021). In addition, educators are required to be able to use technological devices as development (Fauziah & Wulandari, 2022). Therefore, teachers must be able to create learning methods that can use technology such as computers as a medium in the learning process (Purnamasari, Herman, & Indonesia, 2016).

E-learning has changed the paradigm of teacher-centered learning to learner-centric (Mutia, 2013). Therefore, efforts can be made to increase the motivation and stimulation of this learning activity by developing interactive teaching materials (Astutik et al., 2013). Interactive teaching materials can be interpreted as active teaching materials, meaning they are designed to be able to perform counter-commands to users to carry out an activity (Mulyadi, 2018). Teaching materials contain the standard of competency that has been determined in the form of knowledge, skills, and attitudes that must be learned by students. Currently, interactive teaching materials have begun to be widely used, because in addition to being interesting, it also makes it easier for users to learn them (Malalina, 2016).

The policy from the government that regulates this is the Circular Letter of the Ministry of Education and Culture (Kemendikbud) of the Directorate of Higher Education No. 1 of 2020 concerning the prevention of the spread of covid 19 in the world of education. In the circular, the Ministry of Education and Culture instructed to organize distance learning and advised students to learn from their respective homes(Handarini & Wulandari, 2020). Choosing the right learning media is also an important thing to do before applying or utilizing the selected media for learning activities (Marta dkk, 2018). The advantage of digital teaching materials is that learning does not have to be conducted face-to-face in the classroom but can be done remotely, so as to expand the scope of learning and teaching through distance learning. Within the scope of

higher education and learning levels over the past decade, the software of distance learning models is felt to be the most relevant and widely used (Leontyeva, 2018).

Interactive multimedia is able to provide two-way communication interactively as well as added value for users in exploring the material contained in it, because it is supported by interactive functions. (Mayer. 2009) States that in presenting a message, against two main format options, namely words and images. Hardware as the main controller is a computer or laptop with various types of hardware and software to perform its main functions. Computer or laptop, camera, LCD projector, speakers, compact disc is a type of hardware combined. Microsoft Power Point, Macromedia Flash, Camtasia Recorder, Adobe Audition, Encarta and other application programs are software to support the creation of interactive learning media by combining text, sound, images, graphics, video and animation. Then the quality of the learning process will be better and improved if educators select the learning media appropriately. The use of learning media must be able to adjust the material to be provided by the teacher with the situation of students during a pandemic like today. This is intended to make it easier for students to receive and understand the material provided, so that later it is hoped that learning activities can run effectively (Mauliddiyah & Wulandari, 2022).

In today's millennial era, the rapid development of technology, communication and information makes distance learning in the network or online, especially in the pandemic covid-19 era easier to implement by using various platforms and applications, such as learning management systems or video conferences. Learning management system is often used, namely, google classroom and E-learning portals owned by schools or universities. The most commonly used forms of video conferencing learning during distance learning are zoom, google meet, Microsoft team and WhatsApp Group applications. However, sometimes the learning process is constrained by the support of technology and human resources' ability to operationalize the technology as well as the limitations of distance learning support facilities such as internet networks.

So, a teacher must have creativity, innovation and prepare a good teaching strategy in implementing and packaging virtual interactions with learners. Not only that, they must also have the ability and skills in using technology and other supporting media in distance learning. Therefore, stakeholders' participation from internal and external aspects should be improved. On the internal aspects of the leadership, educator staff, education staff, students, school committees, and class groups. On external aspects with the government, the business world and industry, as well as the development of technology. All stake holders also strive to improve the standardization of teachers and learners in applying information and communication technology while actively involved in distance learning.

Meanwhile (Huang, Liu, Tlili, Yang, & Wang. 2020) mentioned that the learning process during the Covid-19 pandemic, implemented with the "Flexible Learning" system. This system has several characteristics, namely; 1) The learning process that can be done anywhere and anytime, 2) learners can learn

independently as desired, 3) The selection of learning resources varies greatly from direct teachers or various digital sources in media such as web, you tube and other applications, 4) teachers can choose the desired learning model in distance learning such as tutoring , self-study, seminars, debates, and discussions online, and 5) the implementation of learning evaluation and reporting of student learning outcomes is very flexible during the Covid-19 pandemic.

Based on the results of interviews with students who attended the lecture Introduction to Management Administration Science during this time the distance lecture process has used various applications such as google meet, zoom, and Microsoft team but during the lecture lecturers only provide material through Microsoft Power Point presentations, students feel unable to understand the material given because the slide show changes too fast that causes a sense of lazy to take notes and only ask for soft files from lecturers. Students want teaching materials that are easy to understand, interesting with examples of many questions and discussions, so that they can be studied independently and do not get bored quickly by taking from various references to daily life.

Therefore, the teaching materials that will be used must be innovative, creative and can meet the cognitive needs of students. Along with the development of information technology in the world of education that is increasingly advanced, then as a lecturer must be able to explore new ideas or innovate and increase his creativity in designing a teaching material based on interactive multimedia in the learning process so that the ability to improve the understanding of materials, insights and potentials that exist in students. The development of teaching materials based on information technology becomes very important by lecturers so that the delivery of materials in accordance with the needs and background of students, the development of teaching materials based on information and communication technology should be prepared from various learning sources that refer to digital literacy and contain tasks performed by students in the form of self-learning activities that form structured and systematic learning procedures.

Research Results (Irham. Wiyani 2013) suggest that the learning process carried out with a happy and exciting learning atmosphere makes it easier for students to receive and record new information submitted by educators. One solution to overcome problems in learning is to provide an interactive media-based teaching material that suits the characteristic and learning style of students today. Thus, giving rise to the motivation and passion of learning students (Devi.Iskandar. Suhari, 2020). This interactive teaching material has a concept of material that is easy to understand, interesting and fun accompanied by interactive learning media that aims to facilitate behavior so that students can more easily remember the information they arrive at, for example audio, video, text, or graphics (Prastowo, 2015).

There are several previous research results to support the implementation of this development research that was put forward by (Khamidah & Mustikasari, 2019) explained that the The use of interactive digital teaching materials with the

discovery learning model can be used by teachers to accommodate students' cognitive abilities so that student learning achievement can increase. In accordance with the opinion, according (Gufron & Winarso, 2018) explained that interactive multimedia-based teaching materials consist of several integrated media, namely images, sounds, animations, and text. Process of designing and developing interactive multimedia-based teaching materials is useful to facilitate students in understanding the material in accordance with the learning objectives that have been learned on campus, because multimedia has animations and videos that can increase the spirit of student learning. Similar to (Djamas & Padang, 2018) explained that the that interactive multimedia learning materials can enhance students' critical thinking skills. Therefore, the purpose of this development research is to know 1) the process of developing teaching materials based on interactive multi-media and 2) Practicality and 3) Learning motivation to interactive multimedia-based teaching materials in the Introductory Management Administration course in the Office Administration Education Study Program of Universitas Negeri Surabaya, Indonesia.

RESEARCH METHOD

The type of research used is development research or Reseacrh and Development (R&D). The 4-D development models are the step that is used. The stages contained in the Four-D model are define, design, develop, and disseminate. However, this research was not carried out on a wide scale only carried out in the development stage, namely the development test which was tested on 57 students of office administration education program of the 2020/2021, Faculty of Economics and Business.

Interactive Teaching Materials developed in introduction to administration and management Subjects using books that are already on the market by identifying the content of materials that correspond to the material of Interactive Teaching Materials. It is agreed that research and development method or Research & Development is a research method used to produce a particular product or learning facility, and test the effectiveness and feasibility of the product (Sugiyono, 2016).

This type of data consists of qualitative data obtained from student response questionnaires, validation sheets of material experts, linguists and graphing experts on this interactive multimedia-based teaching material. Meanwhile, quantitative data from the scoring of questionnaires that get results with predetermined criteria to see the feasibility of interactive multimedia-based teaching materials. The research instrument is divided into 2, namely; 1) Expert Validari Sheet consists of a) Material Expert Validation with content feasibility component and presentation b) Language Validation Sheet with linguistic component and c) Graphing Validation Sheet with Interactive Teaching Material Cover Design component and Interactive teaching material content design. The third component validates the assessment criteria using the Likert scale. 2) Student response questionnaire sheet, the results of the student response questionnaire grid are calculated descriptively quantitatively using Guttman scale. Data analysis techniques are performed using

descriptive quantitative analysis with the likert scale to see the feasibility of interactive teaching materials. Formulas in analyzing the validation of material experts, linguists and graphists, as follows:

$$Percentage = \frac{number\ of\ scores\ earned}{maximum\ score\ amount} x100\%$$

Source: (Riduwan, 2015)

Table 1. Expert Validation Interpretation of Materials, Language, Graphing

Assessment	Interpretation Criteria
0%-20%	Very Unworthy
21%-40%	Not Worth It
41%-60%	Decent Enough
61%-80%	Worth
81%-100%	Very Decent

Source: (Riduwan, 2015)

Student response questionnaire analysis Formula to calculate the analysis of student response questionnaires using the table below:

$$Response = \frac{amount\ response\ score}{maximum\ score\ amount} x100\%$$

Source: (Riduwan, 2015)

Table 2. Interpretation of Student Response Questionnaire Sheet

Assessment	Interpretation Criteria
0%-20%	Very Unworthy
21%-40%	Not Worth It
41%-60%	Decent Enough
61%-80%	Worth
81%-100%	Very Decent

Source: (Riduwan, 2015)
Whether the use of interactive teaching materials can be seen or said well if the assessment on the interpretation criteria is more than 61 %.

Table 3. Student learning motivation criteria score

Assessment	Interpretation Criteria
0%-20%	Very Unworthy
21%-40%	Not Worth It
41%-60%	Decent Enough
61%-80%	Worth
81%-100%	Very Decent

Source: (Riduwan, 2015)

Table 3. Student learning motivation criteria score

Score	Criteria
>3.25-4.00	Very Good
>2.50-3.25	Good
>1.75-2.50	Enough
1.00-1.75	Deficient

Source: (Sardiman, 2012)

RESULTS AND DISCUSSION

I. Interactive Teaching Material Development Process

The following process of developing teaching materials based on interactive multimedia course Introduction to Administrative and Management Sciences using a 4-D development model consists of a series of processes:

1) Definition Stage.

The definition stage conducts activities with the identification of learning requirements in accordance with the subject matter of the introduction of administrative and management sciences, namely the nature of the concepts of Administration, History and Administrative Thought, Position of Administrative Sciences, Relationship of Administrative Sciences and Other Sciences, Dimensions of Administrative Sciences, Organization, Management, Management Functions, Leadership, Decision Making, Communication.

In this stage there is also a process that must be passed, namely The definition stage conducts activities with the identification of learning requirements in accordance with the subject matter of the introduction of administrative and management sciences, namely the nature of the concepts of Administration, History and Administrative Thought, Position of Administrative Sciences, Relationship of Administrative Sciences and other sciences, Dimensions of Administrative sciences, Organization, Management, Management Functions, Leadership, Decision Making, Communication. In this stage there is also a process that must be passed, namely.

a. Curriculum analysis.

Introductory Administration and Management Courses are basic courses of office administration education programs, especially in the Merdeka Belajar curriculum given in odd semesters for new students of the class of 2020. As a basic course, the basic competencies are as follows the nature of the Concepts of Administration, History and Administrative Thought, Position of Administrative Sciences, Relationship of Administrative Sciences and Other Sciences, Dimensions of Administrative Sciences, Organization, Management, Management Functions, Leadership, Decision Making, Communication.

b. Initial capability analysisi.

Observation and information seeking activities through interviews are used as lecturers' guidelines in developing interactive multimedia-based teaching materials, then in analysis to see the characteristics of diverse students especially in distance learning today. The subjects in the trial numbered 57 students of the class of 2020. Here's a description of characteristic students force 2020 who are approximately 18-19 years old; 1) Students prefer interactive teaching materials because they use images and animations that are collaborated with appropriate colors and materials that are not.

c.   Task analysis.

The task is analyzed by looking at the basic competencies that have been determined and the indicators that must be achieved by students in understanding basic competencies, namely the nature of the concept of Administration, History and Administrative Thinking, The Position of Administrative Sciences, Relationship of Administrative Sciences and other sciences, Dimensions of Administrative sciences, Organization, Management, Management Functions, Leadership, Decision Making, Communication. Students are given multiple choice questions based on Higher Order Thinking Skills and case study questions that students must complete and the results are used for guidance in knowing the level of students' ability to understand the material studied.

d.   Concept analysis.

In analyzing the concept to analyze materials related to basic competencies, the concept adapts to the learning objectives divided into three areas, namely Cognitive, Affective, and Psychomotor. It is expected that students can do a high level of reasoning so that they are not fixated on just one pattern of answers resulting from the memorization process, without knowing the concept of science. Higher Order Thinking Skills is one of the demands of skills in 21st century learning, namely critical thinking, creative, collaborative, and communicative

e.   Formulation of learning objectives.

In accordance with the purpose of learning in the Semester Program Plan that students are expected 1) Analyzing the position of administrative science; 2) Analyzing the relationship of science administration with other sciences; 3) Analyzing the dimensions of administrative science; 4) Analyze administrative behavior in the organization; 5) Analyzing management concepts; 6) Analyze the development of management thinking; 7) Analyzing planning functions; 8) Analyzing organizing functions; 9) Analyze the driving function; 10) Analyzing surveillance functions.

2)   Design Stage.

The result of the design stage is called draft-a. There are two parts in this stage, namely: 1) Designing materials in interactive teaching materials to prepare interactive teaching materials in accordance with the Semester program plan by using macromedia flash software 8 pro. 2) Initial design of teaching materials. The initial part, the initial part of the arrangement consists of:

2.1 Cover/front page contains the title of the interactive teaching material.

Figure 1. Cover of Teaching Materials

2.2 Content section. The content of this interactive teaching materials section contains learning instructions, material schemes, materials in each learning session and training individual problems in the form of multiple choice, the final result can be known to students after completing the whole problem of multiple choice, then there is a group task in the form of case studies done with his team.

Figure 2. Teaching Material Scheme
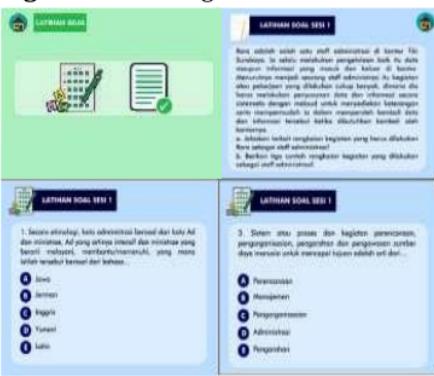
Figure 3. Multiple Choice Practice View and Case Study

3) Development Stage.

The development phase aims to provide validation on interactive multimedia-based teaching materials. There are 3 validators, namely material experts from lecturers of office administration education Faculty of Economics, Linguists from lecturers of Indonesian Language and Literature Education Faculty of discussion and art and media experts from lecturers of educational technology Faculty of education.

Table 3. Result of Recapitulation Validator

No	Expert Validators	Results (%)	Interpretation
1	Material	81	Very decent
2	Language	75	Worth
3	Media	78	Worth

Source: Processed Primary Data (2021)

4) Disseminationt Stage.

At this stage of dissemination is only done packaging interactive teaching materials course Introduction to Management Administration Science and disseminated only for students in office administration education program aims to help the learning process in semester 1 in students' class 2020. Application of multimedia-based teaching materials interactive course Introduction to Management Administration Sciences in student's office administration study program is useful as a learning medium to see the extent of understanding of student materials in analyzing, evaluating and creating materials during distance learning during the pandemic covid-19.

2) Practicality to interactive multimedia-based teaching materials in the Introductory Management Administration course

The response of students from the office administration education program numbered 57 people in the class of 2020. Based on the results response of students conducted as follows:

Table 4. Result of Recapitulation Student Responses

No	Response	Results (%)	Interpretation
1	Content of the material	90	Very decent
2	Serving	89	Very Decent
3	Linguistics	87	Very Decent
4	Graphics	90	Very decent
	Average	89	Very Decent

Source: Processed Primary Data (2021)

3). **Learning motivation to interactive multimedia-based teaching materials in the Introductory Management Administration course**

During the learning process using interactive teaching materials, students are asked to fill out a questionnaire consisting of eight indicators to see student learning motivation during the learning process. The following is a picture of the results of student learning motivation.
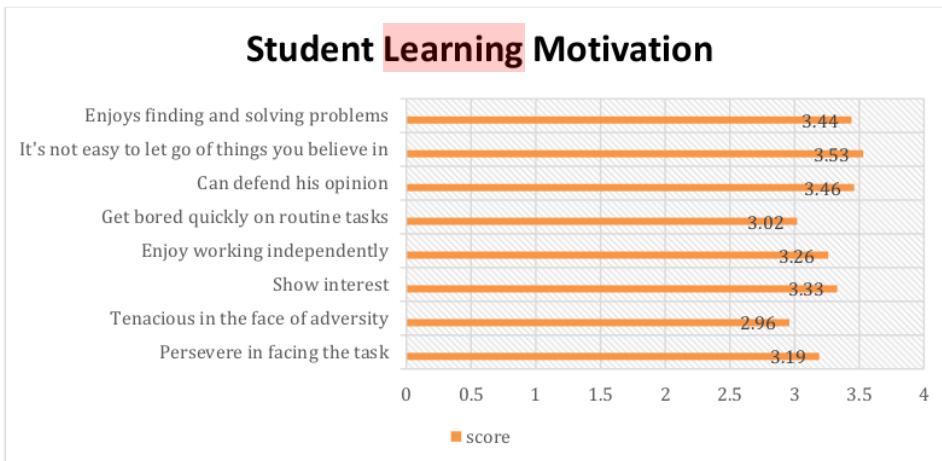

Figure 4. Student Learning Motivation Diagram

DISCUSSION

After going through four stages of development, namely definition, design, development, dissemination and response of students, the interactive teaching materials deserve to be used in the learning process and get a positive response from students. In accordance with the results of the study (Febriana. Sajidan. Prayitno, 2015). which states that the interactive multimedia learning media developed has met the criteria very well based on the assessment of media experts to support the learning process. Students who use this interactive teaching material have different levels of activity and understanding. Therefore, innovation and creative ways are needed to help students understand the materials in learning activities. In addition, the evaluation process for students is implemented very flexible as well as in reporting student learning activities can be reported through learning management systems such as google classroom most used in schools, google drive, email, even YouTube video links to report project assignments.

This is in accordance with the opinion of (Rusno. 2012) which states that the activeness that students do during the learning process has a different influence on the student's memory. The use of interactive multimedia-based teaching materials makes it easier for educators to achieve learning objectives. Interactive multimedia-based teaching materials in addition to containing materials from some basic competencies

of the introductory course of management administration science there are also practice questions in the form of multiple choice and case studies that can stimulate students in critical thinking to solve daily problems and make students able to make choices so that students have high learning motivation. Changes in behavior related to knowledge, skills, values and attitudes because of the learning process experienced by humans throughout their lives.

So, the benefits that students can feel in using interactive multimedia-based teaching materials in addition to the fun learning atmosphere can also facilitate students in mastering learning objectives. Students can construct their experience and knowledge through the competence to analyze, evaluate and create materials so that it is clearer in their meaning. In line with the above opinion, according to (Hamalik., Oemar. 2009) "Learning is a process of changing an individual's behavior through interaction with the environment". Educators' strategy in creating interesting distance learning in the midst of the COVID-19 pandemic is to strengthen the interaction of lecturers and students. Lecturers can optimize communication techniques by ensuring high-quality sound, lighting and video. In addition, ask for the student's camera to be positioned parallel to the eyes so that the lecturer can see the students, not to the laptop or notes. Lecturers can also stand during the class to express themselves through body and hand language.

Interactive multimedia-based teaching materials are new media, students have a high interest in media (Pradana, Lingga. 2020). (Keyri. Gencoglu. 2012) demonstrates that the use of computer-based learning media can improve student learning outcomes. (Gunawan. Nisrina, Suranti & Herayanti. 2018) also found that interactive simulations can improve students' conceptual understanding. This is related to the reaction of students when a teacher uses a learning model and gives a positive reaction to ongoing learning. Thus, interaction with the intended environment is the teacher as the facilitator in learning, where the existing learning resources can be used by students with direction from a teacher (Wulandari, Trisnawati, Suratman, & Narmaditya. 2020). So interactive multimedia-based teaching materials accompanied by assessment become a new model in learning strategies that are very suitable to be applied in distance education, because there are competencies of knowledge and skills that can be simulated through interactive multimedia-based teaching materials integrated continuously. Students' activation, skills, and learning achievements are increasing as educators are increasingly motivated to use various learning models and methods in carrying out the functions and tasks of everyday teachers (Suratman, Sri, Nugraha, & Shandy. 2020).

Therefore, distance learning at all levels of education in an effort to suppress the widespread spread of the virus. Meanwhile (Huang, Liu, Tlili, Yang, & Wang. 2020) mentioned that during the Covid-19 pandemic, the learning process was carried out with a "Flexible Learning" system. This study recommends further research for the development of higher order thinking skills-based learning evaluation tools instruments in accordance with the free curriculum of learning in other productive courses, designed and made using interactive applications into an interactive teaching medium both for regular classes and for international classes

so as to minimize existing shortcomings. In addition, it is recommended for lecturers to participate in online workshops to improve pedagogical competence.

CONCLUSION

The results of the process development of interactive multimedia-based teaching materials in the introductory courses of administrative and management sciences using research and research development containing basic competencies, materials, practice questions in the form of multiple choice and case studies for students so as to help self-learning during distance learning during the pandemic covid-19, especially in the Office Administration Education Study Program. This interactive multimedia-based teaching material is worth using and has met the perfect criteria based on the assessment of media experts in supporting the distance learning process can improve the understanding of the material in students.

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