Development of E-Learning Teaching Materials Graphic Media Development Course for Students' Educational Curriculum and Technology

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Abstract. This study aims to identify the feasibility and efficacy of e-learning material for graphic media development subjects by using the e-learning material provided by Universitas Negeri Surabaya. The study takes place in The Department of Technology of Education, Universitas Negeri Surabaya. The subject involves students who have participated in media graphics courses. The samples are selected through simple random sampling with the amount of samples in the experiment and the control class is 30 students each. This development research is carried out using the development model of the Four-D Model with the stages of Defining, Designing, Developing, and disseminating. The validation test on each unit of the test proved that all of them are considered valid at Sig. 5%, while the reliability coefficient of the test is = 0.83. Feasibility test on the material and media each gains 88.5% and 87.7%, which means very feasible to apply. The effectiveness test on the e-learning material is conducted using a quasi-experimental group analysis technique. Based on the Independent sample t-test, it was gained that ($p < 0.05$). N-Gain from the experiment class is 0.6 which is categorized as fairly effective, while the N-Gain of the control class is 0.45 and perceived as less effective. The findings presented that e-learning material is deemed feasible and fairly effective to be used during the teaching and learning activity and could improve the students' learning outcomes.

Keywords: Development; Learning Material; E-Learning.

INTRODUCTION

One of the implementations of the Tri Dharma of Higher Education is to conduct education and teaching. In this case, the lecturer is obliged to prepare lecture materials as well as give lectures to students. Thus the role of lecturers has a very important influence in order to improve quality resources. For this reason, lecturers must have competence in conducting education and teaching. In delivering learning materials to students, lecturers must have teaching materials in the form of handbooks.

One of the reasons for the low quality of learning is the lack of optimal utilization of learning resources, including teaching materials. Teaching materials are reference material that is used as a source in delivering material.

Teaching materials used by lecturers in teaching basically contain learning materials,

learning methods, methods, limitations, and ways of evaluating which are packaged systematically in accordance with the applicable curriculum with the aim of achieving the expected competencies or sub-competencies. The learning materials or materials are basically the contents of the curriculum, namely in the form of subjects or fields of study with topics/subtopics and details. Good teaching materials allow students to study independently. (Magdalena & et al, 2020). Sanjaya (2008) in Rieke states that teaching materials are everything that is part of the curriculum content that must be mastered by students in accordance with basic competencies in order to achieve competency standards for each subject in certain educational units (Indriati & Rohayati, 2006). Teaching materials or materials are a set of learning materials (teaching materials) that are arranged systematically, showing a complete figure of competencies that will be mastered by students in learning activities. Suryaman in Lilis (Lillis, 2019). Teaching materials are all materials (both information, tools and texts) that are arranged systematically (Andi, 2011). Teaching materials are content that is given to students during the learning and teaching process. Through these teaching materials, students are delivered to teaching goals (Sudjana, 2019).

One indication of the decline in student learning achievement is that many students do not understand the lecture material, this is due to several factors, among others, the teaching materials delivered by lecturers are not interesting, thereby reducing student motivation (Susianto, 2015). Furthermore, Widodo and Jasmadi in (Lilis 2019) stated several things that must be considered in making teaching materials in order to be able to motivate students to study independently and obtain mastery in the learning process as follows: 1). provide interesting examples in order to support the presentation of learning materials, 2). provide feedback or measure their mastery of the material provided by providing practice questions, assignments and the like, 3). contextual, namely the material presented is related to the atmosphere or context of the task and student environment, 4). the materials used are quite simple because students only deal with teaching materials when studying independently (Lillis, 2019). Thus, in the development of teaching materials, the following criteria must be met: 1). teaching materials must be relevant to the learning objectives, 2). teaching materials must be in accordance with the level of

student development, 3). teaching materials must be useful for the development of knowledge for future assignments in the field, 4). teaching materials must be interesting and stimulate student activity, 5). teaching materials must be arranged systematically, gradually and in stages, 6). The material presented to students must be thorough, complete and intact.

While Majid in Rizal (2015) states that teaching materials are essentially the content of subjects or fields of study given to students in accordance with the curriculum they use. A teaching material should at least include, among others: a) study instructions (student or lecturer instructions), b). competencies to be achieved, c) supporting information, d). exercises, e) work instructions, f) evaluation (Rizal Zaenal Muqodas & et al, 2015).

There are four aspects that need to be considered in writing a book according to the Center for Curriculum and Books (Ministry of Education and Culture, 2008). These aspects are as follows: 1). components of the feasibility of the content of the material such as the suitability of the description of the material with the SK and KD, the accuracy of the material, the up-to-date of the material, encouraging curiosity (curiosity), and broadening of horizons with other relevant material items; 2). presentation feasibility components such as presentation techniques, presentation support, presentation of learning and coherence and a sequence of lines of thought; 3). components of language eligibility such as conformity to the level of student development and communicativeness: 4). Graphical feasibility components such as book size, book cover design, content section design, and paper quality.

Based on the criteria for these teaching materials, the development of e-learning teaching materials for the graphic media development course is developed in accordance with the course description, course learning achievements, final competencies achieved by students, the latest reference sources according to material needs and advances in information technology, learning needs and according to student characteristics so that they can provide a stimulus in the learning process, all of which will be adapted to the format of e-learning teaching materials that have been facilitated by UNESA.

Along with the development of computers and increasingly advanced communication and information technology, offering various "solutions" to fulfill student learning services, namely text-based learning delivered

electronically. The form of learning that is delivered electronically is known as e-learning. E-learning stands for Electronic Learning is a teaching and learning process using electronic media, especially the internet as a learning system. (Wang & Hwang, 2004)

E-learning is defined in various ways by experts such as: e-learning is "learning supported by digital electronic tools and media" (Basak & Wotto, 2018). E-learning is the use of electronic media for a variety of diverse learning purposes that can replace conventional classes or face-to-face meetings with online. (Sangr, Vlachopoulos, & Cabrera, n.d.). E-learning is also defined as a learning process with interactions and materials delivered digitally, with network-based services. In computer-assisted learning settings, this is a shift from traditional education to innovative learning (Jethro, Grace, & Thomas, 2012).

Some of the benefits of learning with e-learning include: (1) Flexibility, meaning that students do not have to come to campus to receive learning materials but can be done at home or anywhere. (2) Independent learning means that students can learn interesting materials first, they can also determine when to start and when to finish the material that they consider mastering. (3) Costs, cost savings can be reduced because students do not need transportation to campus (Elyas, 2018).

In connection with this, (Riza et al., 2018) state that conventional learning methods are felt to be less effective because they collide with space and time problems. For this reason, lecturers are required to make learning more innovative which encourages students to learn optimally both in independent learning and in classroom learning. Educational Technology Study Program, Faculty of Education, State University of Surabaya is an educational institution that aims to produce competent human resources (HR) in the field of Educational Technology. The graphic media development course is a theoretical and practical learning course that requires learning resources that can make students more active and independent. Learning that takes place in the Educational Technology Study Program (TP) is directed to facilitate the development of potential abilities possessed by students into real abilities that can be used especially to solve educational problems and the learning process.

The results of interviews with students that the graphic media development course is a very fun course for students because students can express their ideas or creativity into design forms which can later be assessed in terms of concept and design. In the lecture process, teaching materials act as reference material for lecturers and students. Students need references that can be used as a guide in understanding broader concepts and not just paying attention to the material explained by the lecturer in lectures so that they can improve students' abilities in understanding lecture material. Teaching materials can motivate students to practice individually or in groups in learning. According to students, the graphic media development course already has proper teaching materials, but there are no teaching materials in the form of e-learning so that students who are not proficient or not accustomed to using design applications will find it difficult but with the existence of e-learning teaching materials, it is hoped that there will be no difficulties. because e-learning teaching materials allow loading material that is simulative in nature. This means that e-learning teaching materials can present moving media in the form of animation or video, besides students can learn without having to go to campus, meaning students can learn independently. Based on interviews conducted by researchers to lecturers in charge of graphic media development courses, it is said that graphic media development courses already have printed teaching materials but have not used Unesa's e-learning lecture facilities. At this time, lecture activities are still conventional face-to-face using various kinds of references and other relevant sources according to the competencies to be achieved. Thus, e-learning is considered mandatory.

The development of e-learning teaching materials for the development of graphic media courses because it has several advantages that other teaching materials do not have. The advantages are: 1). e-learning teaching materials can combine text with moving media such as animation and video. So that students become easier to understand because mobile media is able to describe the real environment. 2). e-learning teaching materials can be used flexibly, 3). The use of e-learning teaching materials for learning can improve the quality of learning. 4). e-learning teaching materials can work automatically because they can be integrated with the Learning Management System (LMS) (Utomo, Sumarmi, & Singgih, 2015).

The success of students in taking each course is a provision to realize their expertise. Understanding of conceptual competence in the

Graphic Media Development course is something that needs to be considered in order to achieve the success of learning objectives that are not only on learning outcomes. In the course description, Graphic Media Development examines various visual message symbols and designs various visual symbols so that effective communication occurs in the learning process. The learning achievement to be achieved is that students can produce graphic media in accordance with visual rules and learning media ranging from design to media products. Based on course descriptions and learning outcomes, it is expected that students will be able to learn independently so that they can have skills after learning. Therefore, students need to be facilitated with e-learning teaching materials that can facilitate independent learning in accordance with the learning outcomes of the subject. In other words, e-learning teaching materials are expected to make the learning of the message graphic media development course feasible and effective.

In order for the learning process to run effectively, a media that is in accordance with the characteristics of students, the courses delivered and the supporting infrastructure is needed. The selection and use of good learning tools will lead students to be able to improve competence well. Media is indispensable in learning as a means of delivering information to students. The readiness of learning tools, both adaptive and productive learning, must be carried out by lecturers so that students will be motivated in participating in learning activities and create an independent learning attitude. e-learning.

Therefore, in the Graphic media development course, a learning design is needed that is in accordance with the course description, learning outcomes, student characteristics, developments in technology and information, as well as the latest reference sources relevant to learning outcomes. Based on this explanation, this research aims to produce e-learning teaching materials for graphic media development courses.

This development research is teaching materials which are meant for teaching materials for Graphic Media Development courses which are arranged based on the learning outcomes of the courses which consist of several competencies.

The graphic media development course is a Special Skills Course (SSC) which is a group of theoretical courses in accordance with the special competencies of the Educational Technology and Curriculum department. Courses with a weight of 4 credits, these courses are carried out in odd semesters. The learning achievement of the graphic media development course is that students can develop graphic media in accordance with the rules of learning media and graphic principles.

Graphic media is a visual media that presents facts, ideas, or ideas through the presentation of words, sentences, numbers, and symbols as well as pictures. Another opinion was expressed by Sudjana and Rifai in Manshur (Manshur & Rodhi, 2020) that graphic media is the art or science of drawing, mainly defined for mechanical drawing, also interpreted as a vivid explanation, a strong explanation or an effective presentation. The existence of this graphic aims to attract the attention of the target, clarify ideas or ideas and make it easy for the audience to remember with the help of Saifudin's images in Febrianti (Febrianti, 2019). In learning, graphic media is the most frequently used media. This applies to all levels, from elementary school to university. One example of graphic media used by educators is power point slides, illustrations, diagrams. Graphic media is widely used in learning because it has a function that supports the learning process so that students can receive the material well. By using graphic media, students get a clearer picture of the material presented so that it does not cause different perceptions between one student and another (Febrianti, 2019).

The functions of graphic media in the field of learning are: 1). can develop visual abilities, 2). develop students' imagination power, 3). help develop and improve students' mastery of abstract things, or events that are impossible to present in class, 4). develop student creativity.

Sadiman in Aprilia (Aprillia, Daningsih, Studi, & Biology, n.d.) states that graphic media consists of several kinds, namely: graphs, diagrams, posters, comics, pictures, as for the explanation as follows: Graphics are simple images that describe quantitative data that accurate in an attractive and easy to understand form. Graphs are made to change data in the form of numbers to be clearer. Diagrams are visual media that present information about the cross-section of parts of an object by using lines or drawings of certain geometric shapes. The function of the diagram is to clarify an object, knowing the important parts in a work process. Posters are large images and emphasize one or two main ideas, so that the idea can be easily

understood even at a glance. Posters have the power to persuade the target to follow the content of the poster. The elements contained in the poster are the principle of balance, reading flow, emphasis, unity, impression, typography, color and center of attention (Sinaga and Fuad, in Aprillia (Aprillia et al., n.d.). Research conducted by (Purwani, Fridani) , & Fahrurrozi, 2019) mentioned that posters are easy to install and store in the classroom. In addition, teachers are also not difficult to learn before the media is used for students. Comics are reading that is of interest to various ages. In a comic, it contains elements, namely: characters, backgrounds, reading balloons, panels (boxes that separate one scene from another) narration, and color effects that make the story more alive.Through research conducted (Cholisoh, 2021) got the results that comics can increase interest and student learning outcomes, Pictures are visual media that are widely used and easy to obtain. The advantage of images is that people can capture the most popular ideas contained in them more clearly than just written or spoken information. Pictures are effective media used in learning. The types of images are stick figures, sketches, shape drawings, illustrations, photos, flashcards, and cartoons.

(Jennah, 2009) states that graphic media has several advantages such as; 1). the cost/price is relatively cheap, 2). easy to obtain and use, 3). more realistic, 4). attract students' attention, 5). clarify the presentation of messages and information, 6). help overcome the limitations of observation, 7). overcome the limitations of the senses of space and time (objects that are too big/small, natural events, and rare events). While the lack of graphic media such as; 1). The size of the media is often not appropriate for large-group learning, 2). requires the availability of resources, skills, and expertise of teachers to use the graphic media.

METHOD

Educational development research is defined as: "Educational Research and development is a process used to develop and validate educational products". Educational research and development is the process used to develop and validate educational products. Based on the above opinion, it is clear that in this development research, an educational product that has been validated and will be used in the learning process in the classroom will be developed (Gall, M. D., Gall, J. P., & Borg, 2003).

The development model used in developing teaching materials is the model developed by Thiagarajan, Dorothy S. Semmel, and Melvyn Semmel which is known as the Four D or 4-D development model. The 4-D development model according to (Thiagarajan, Semmel, & Semmel, 1974) has four stages of development steps as follows: (1) Definition Stage. The purpose of the definition stage is "The purpose of this stage is to stipulate and define instructional requirements. The initial phase os Mainly analytical. Through analysis, we prescibe objectives and constraints for the instructional material. As for what is studied in this stage are: a). early-late analysis/needs analysis, b). student analysis, c). concept analysis, d). task analysis, and e). specification of learning objectives; (2) Design Phase. The design stage is "The purposes of this stage is to design prototype instructional material.". as for What is studied in this stage are: a). preparation of formative tests of teaching materials Development of graphic media, b). media selection stage, c). format selection, and d). initial planning; (3). Development Stage. The development stage is as follows: "The purpose of stage III is to modify the prototype instructional material". Although much has been produced since the define stage, the result must be considered an initial version of the instructional material which mus be modified before it can become an effective final version. In the Development stage, feedback is received through formative evaluation, and the material from suitably revised". What is done in this stage is validation from experts and product development trials; (4) Dissemination Stage. The dissemination stage is divided into three activities, namely: "validation testing, packaging, diffusion and adoption. At the validation testing stage". Products that have passed the revision stage in development can then be implemented for students. The last activity of the development stage is to carry out packaging, diffusion and adoption. This stage is done so that the product can be used by others. The packaging of the learning model can be done by printing a guidebook for the implementation of the learning model. After the teaching materials are printed, they can be disseminated so that they can be absorbed or understood by others and used (adopted).

This research is a qualitative and quantitative descriptive study, aimed at testing

the feasibility and effectiveness of e-learning teaching materials for undergraduate students of the Education Technology Program in the fourth semester. The research location is in the educational technology study program, State University of Surabaya. In this study, the researcher used two classes, namely the experimental class (A) and the control class (B). The experimental class was given treatment using e-learning teaching materials, while the control class did not use e-learning teaching materials. The subject of this study used simple random sampling, which means that the sampling of members of the population was carried out randomly. This is done because researchers consider population members to be homogeneous (Sugiyono, 2017).

The research sample for the experimental and control classes was 30 students each. Data collection techniques in this study were obtained by interviewing, observing (observing), filling out, and testing. Interviews were conducted by the researchers to the experimental and control class students.

Observations or observations were made by researchers to compare the conditions of class A which used e-learning teaching materials and class B which did not use e-learning teaching materials. The use of questionnaires is given to students to provide input on e-learning teaching materials. To determine the effectiveness of e-leaning teaching materials, researchers used pretest and posttest.

The pretest was given to students before the e-learning graphic media teaching materials were taught with the aim of knowing the students' prior knowledge. posttest is given to students after the e-learning teaching materials for graphic media courses are taught. The purpose of giving pretest and posttest is to; 1). knowing the comparison of the scores of class A and class B. 2). Knowing the comparison of pretest and posttest scores.

The data analysis technique in this research is the quantitative descriptive analysis technique. Quantitative analysis techniques are used to calculate the feasibility and effectiveness of e-learning teaching materials. Prior to the trial, the e-learning teaching materials were validated by experts (experts' judgment), namely material validation by lecturers in graphic media courses and media validation by learning media expert lecturers.

The trial was conducted to determine the validity and reliability of the items. The trial was conducted on 30 Education Technology students with 10 questions, in the form of multiple choice, with 4 options. A measurement is said to have high validity if it produces data that accurately provides an overview of the variables being measured as desired by the purpose of the measurement. Test the validity of the items using biserial point correlation.

Meanwhile, the measurement will be reliable if several times the measurement of the same group of subjects obtains relatively the same results, as long as the aspects measured in the subject have not changed. The reliability test in this study used the KR-20 (Azwar, 2013).

According to (Sudijono, 2016) the KR-20 reliability coefficient ranges between 0 and 1. The Spearman-Brown coefficient can be said to have good reliability if the test reliability coefficient is greater than 0.70.

To determine the feasibility of media and e-learning teaching materials for graphic media development courses, it is necessary to have a feasibility test obtained from data collection from the results of material and media expert validation using instruments that have been made by researchers. In the instrument, columns 1 = less, 2 = enough, 3 = good, and 4 = very good. Material and media experts only gave a checklish after reading the indicators if they felt it was appropriate. After the experts validated the materials and media, the researchers calculated the level of feasibility by using the All Aspects Calculation.

The results of the calculation of the assessment of each aspect for the material and media, then the results are compared with the table. 1.

Table. 1. Research Results and Criteria (Arikunto, 1993)

Value	Criteria
81 – 100	Very good
61 – 80	Well
41 – 60	Not good
21 – 40	Not good
0 – 20	Very Not Good

Meanwhile, to determine the effectiveness of e-learning teaching materials, a quasi-experimental group analysis technique was used. In the form of an experimental class (A) and a control class (B) which were developed using a

pre-test and post-test control group design. The effectiveness test was carried out by using a t test (difference test) to test the differences in the test results, namely; student pretest and posttest. The t test is used to test the difference between two sample means taken from the same population, there is no significant difference (Sudijono, 2014). The level of effectiveness of e-learning teaching materials was tested by comparing the normalized G score (<g>) on the results of the pretest and posttest in the experimental class and the control class. Gain score calculation results criteria are presented in the table. 2.

Table 2. Criteria for calculating the gain score

Range	Criteria
< 40	Ineffective
40 – 55	Less effective
56 – 75	Effective enough
>76	Very effective
< 40	Ineffective

(Hake, 1998)

Analysis of the data in this study, researchers used statistical calculations, using the software program Statistical Product and Service Solution (SPSS) version 20. This was done to find the results of descriptive statistics. Descriptive statistics are pictures or presentations of large numbers of data consisting of central tendencies, standard deviations, and others (Dwi Agus Kurniawan, 2019).

Before e-learning teaching materials are made, researchers must know the main problems of the graphic media development course, 2) a pre-survey is carried out to determine the implementation of graphic media development learning. Information is obtained through observation, documentation, and interviews, 3) model design is needed to create prototypes of e-learning teaching materials that will be used for graphic media development courses (4) validation of e-learning prototypes before being tested is validated by experts (expert judgment).). Validation test using PSA. The validators include a) media validation by learning media experts, at least S2 education, b) material validation by graphic media development

lecturers, at least Masters education (5) This limited trial is used as a means of obtaining empirical data about the level of goodness of e-learning teaching materials. Limited trial involving 3 students (6) revision or improvement of prototypes of e-learning teaching materials based on information from limited trial results, 7) expanded trial of graphic media development, involving more students (8) product improvements or revisions carried out after the e-learning media received an assessment from the expanded trial by students, so that the final product was obtained, this was done to produce e-learning teaching materials in good graphic media courses.

RESULTS AND DISCUSSION

Result

The results of the research from the development stages that have been carried out are as follows: Define: a). analysis of facts/there is a gap between real conditions and ideal conditions in lectures on graphic media development, b). student analysis, c). material analysis, d). task analysis, and e). analysis of learning objectives. Design: a). e-learning teaching material format design, b). integration of various media formats into e-learning materials, c). display/face design, and d). the elaboration of each study material for the graphic media development course. Development: a). validation of material experts and media experts obtained data of 88.5% and 87.7%, respectively, so that graphic media online teaching materials are feasible to use, b). user trials, in this case, to get input from users in this case are Education Technology students as a basis for measuring the feasibility of developing products. Dessimination: This product will later be implemented for Unesa Education Technology students who are taking a graphic media development course which consists of two parallel classes, namely class A and class B with a total of about 80 people.

The following shows the interface and design of e-learning teaching materials, the graphic media development course, figure 1 and 2.
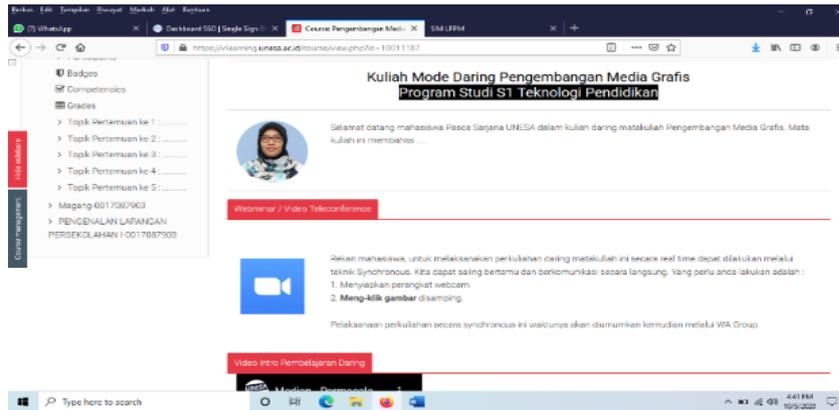
Figure. 3. Unesa's e-learning display on the online course Graphic Media Development
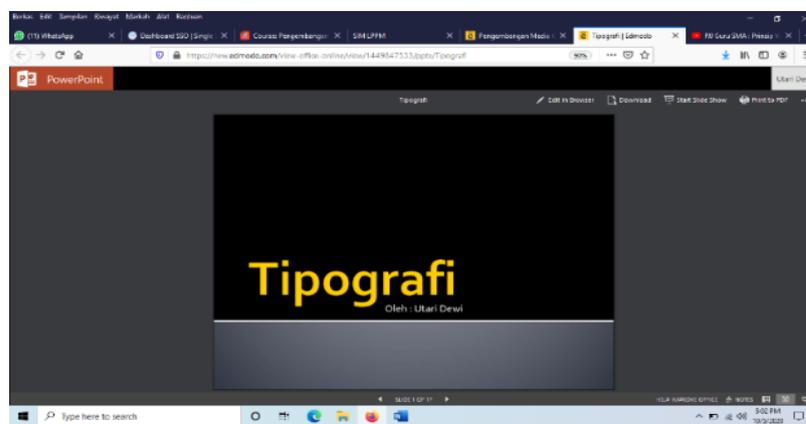

Figure. 4. Unesa e-learning display

Based on the observations of the lecture process in Educational Technology, it was found that the lecturers had used e-learning teaching materials for graphic media courses in the experimental class while in the control class the lecturers did not use teaching materials in the form of e-learning but used the lecture method and handbooks. Meanwhile, the results of interviews with 30 students in the experimental class showed that almost 98% of students were satisfied with the e-learning teaching materials. Meanwhile, interviews with some 40% control class students did not focus on the graphic media courses that were given face-to-face.

The results of the item validity test after being compared with the Product Moment correlation coefficient value table can be said that all items are said to be valid at the 5% and 1% significance levels. While the results of the reliability test using the KR-20 are said to be reliable with the test reliability coefficient = 0.83. The test criteria if the reliability value of the calculation results > 0.7 then the instrument is said to be reliable. (Siregar, 2017).

The feasibility test using the results of the Calculation of All Aspects (PSA) for the feasibility test of the material obtained 89% which means it is very feasible. While the media feasibility test resulted in a value of 90.4% which means it is very feasible to use.

The effectiveness of e-learning teaching materials. Based on the table. 4 above, it is known that the average value (mean) of N-Gain for the experimental class is 0.63. based on the category table the effectiveness interpretation is moderate or sufficient, so it can be concluded that the use of e-learning teaching materials (in the experimental class) is quite effective in increasing student achievement. While for the control class is 0.45. Based on the category table the effectiveness interpretation is low or lacking, so it can be concluded that the use of teaching materials without e-learning is less effective for improving student achievement. the results of the analysis can be seen in the table. 3

Table. 3. Analysis Results

	Class	N	Mean	Std. Dev	Std. Error Mean
N Gain	Experiment	30	.6056	.09531	.01740
	Control	30	.4532	.09186	.01677

The results of the analysis of the average value (mean) of the experimental class and the control class are graphed so that the comparison between the two classes can be seen, as shown in the figure. 3.
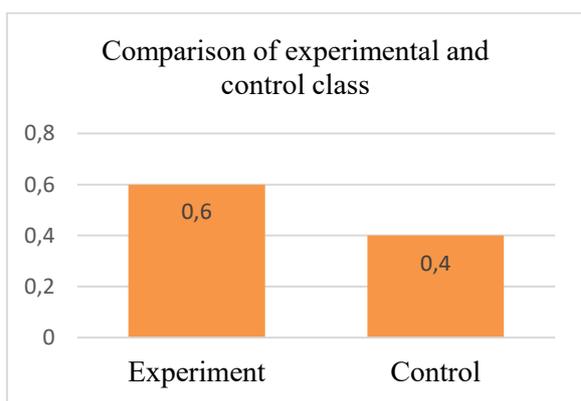

Figure. 3. Comparison Graph of N-Gain

Based on figure 3, It can be seen that the N-Gain of the pretest and posttest results in the experimental class is 0.63 while the N-Gain in the control class is 0.45. Thus there is a significant difference between the experimental class and the control class in the use of e-learning teaching materials in the graphic media development course for undergraduate students of Education Technology, Unesa.

Based on the table. 4. The output of the Test of Normality above, it is known that the value of Sig. in the Shapiro-Wilk test for the experimental class is 0.285 and the control class is 0.193 for both classes the value of Sig. above 0.05 which means that this study is normally distributed and as a requirement for the use of an independent sample t-test for the N-Gain score has been fulfilled.

Table. 4. Normality Table

	Class	Shapiro-Wilk		
		Statistic	df	Sig.
NGain	Experiment	.959	30	.285
	Control	.952	30	.193

Table 5. t-test

t-test	Result	Decision	conclusion
	Sig. 2-tailed = .000	Sig. 2-tailed < .05 Therefore, Ho is rejected, Ha is accepted	There is a difference between pretest and posttest

On the table. 5 can be seen the effectiveness of e-learning teaching materials after the t-test is carried out. The results of the independent sample t-test showed a correlation index of 0.923 <0.05 and Sig. 2 tailed 0.00 it was concluded that there was a significant (significant) difference between the results of the pretest and posttest in the experimental class and the control class or in other words the posttest that used e-learning teaching materials could improve learning achievement than the pretest that did not use e-learning teaching materials.

Discussion

The research aims to develop e-learning teaching materials in graphic media development courses that meet the eligibility of an expert level equipped with semester learning plans, for students majoring in curriculum and educational technology in odd semesters. With e-learning facilities that have been facilitated by Unesa, it is hoped that e-learning teaching materials can be used by students to make the learning process easier and more effective.

The results of the feasibility test for the material obtained 89% which means it is very feasible, while the media feasibility test is 90.4%

which means it is very feasible to use. The test of the effectiveness of e-learning teaching materials with an average value (mean) of N-Gain for the experimental class of 0.63 is quite effective, while for the control class of 0.45 it is considered less effective. The two classes, namely the experimental class and the control class, differed significantly. This is evidenced by the t test which shows that Sig. 2-tailed < 0.05 so Ho is rejected, and Ha is accepted. This means that the learning outcomes of students who use e-learning teaching materials are quite effective than students who do not use e-learning teaching materials, which means that student achievement in the experimental class is better than students in the control class.

The use of teaching materials is quite effective, this is because: 1). Graphic media development course material can be understood by Education Technology students, 2). written material, images, and sounds, can be accepted by students, and quite understandable by students, 3). the material in graphic media is enough to attract students' attention, 4). e-learning model leads students to learn independently, 5). Learning through e-learning encourages students to complete assignments on time.

Several relevant research results using e-learning teaching materials prove that e-learning has better effectiveness than face-to-face learning. Research on the development of e-learning media at STKIP Modern Ngawi has proven to be effective in increasing student understanding of the basic concepts of social studies with an N Gain of 0.712 (Khusniyah, 2020). Another study stated that the use of e-learning learning methods based on browser-based training proved to be effective on student achievement in class XI SMKN 2 Kendal. (Bisri, Samsudi, & Supraptono, n.d.). The effectiveness of using e-learning is also proven in the delivery of automotive body module material to students of the PTM JPTK FKIP UNS study program. (Basori, 2017).

From some of these studies, it can be concluded that the implementation of online learning or e-learning is considered quite effective. This is evidenced by the readiness of the teachers or lecturers, the ability to use the application, the responses and the benefits obtained. (Simatupang et al., 2020). Effective learning requires learning activities that are able to provide a meaningful and enjoyable learning experience. Through e-learning media, students can create their own knowledge, explore a lot of material, and learn independently (Khusniyah, 2020).

In line with that, Ade Kusuma stated that learning through e-learning requires students to learn independently, such as: students can try themselves to understand the content of the material that has been given by the lecturer. Students can be given the opportunity to digest teaching materials with a little help from the lecturer. The independent learning process makes lecturers as facilitators, thus lecturers as partners of students, and others (Kusmana, 2111).

This is supported by Punaji's research which states that e-leaning learning brings the following advantages: 1). by learning online learning provides a great opportunity for students (learners) to access the materials or learning materials presented by the lecturers or facilitators themselves. 2). Learning can increase when students are actively involved in the learning process. Thus, it is considered very important to develop a design that involves students actively in the learning process, besides that the learning process itself must be organized clearly and systematically. 3). Learning through this network has potential, including meaningful learning, ease of access, and improvement of learning outcomes. (Setyosari, 1996).

CONCLUSIONS AND SUGGESTIONS

The conclusion of this research is the development of graphic media e-learning teaching materials for undergraduate students of Educational Technology developed with 4D namely defining, designing, development), and dissemination. The four stages of the 4D model have been systematically carried out but at the dissemination stage, it has not been carried out. The development stage begins with needs analysis, product design, and product development.

The development of e-learning teaching materials in the graphic media development course is very feasible and quite effective in improving the learning achievement of S1 Educational Technology students. The feasibility test obtained from the validation results of material experts and media experts obtained data of 89% and 90.4%, respectively. Thus, it can be concluded that the results of the development of e-learning teaching materials for graphic media courses are said to be suitable for use in learning.

The test of the effectiveness of e-learning teaching materials is known and the average

value (mean) of N-Gain for the experimental class is 0.6. categorized as moderate or effective enough to improve student achievement. While the control class is 0.45. categorized as low or less to improve student achievement. Analysis of Independent Sample t test, known value of Sig. (2-tailed) of .000 < .05, it can be concluded that there is a significant (significant) difference between the results of the pretest and posttest in the experimental class and the control class.

Suggestions for other researchers, that the results of this study can be used and developed for wider research, for example, the object of research is not only undergraduate students of Curriculum and Education Technology, but can also be extended to postgraduate students with different study programs and subjects. Other research could be directed at the feasibility and effectiveness of online learning during the current pandemic for all subjects.

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