Jurnal Edutech Undiksha
Volume 11, Number 1, Tahun 2023, pp. 73-87
P-ISSN: 2614-8609 E-ISSN: 2615-2908
Open Access: https://doi.org/10.23887/jeu.v11i1.58318

Graphic Media E-Learning Teaching Materials to Improve Learning Outcomes

Hari Sugiharto Setyaedhi[1*], Andi Mariono[2], Alim Sumarno[3]

[1,2,3] Kurikulum dan Teknologi Pendidikan, Universitas Negeri Surabaya, Surabaya, Indonesia

ARTICLE INFO

Article history:
Received February 06, 2022
Accepted June 9, 2023
Available online June 25, 2023

Kata Kunci:
Bahan Ajar, E-Learning, Media Grafis

Keywords:
Teaching Material, E-Learning, Graphic Media

This is an open access article under the CC BY-SA license.

Copyright © 2023 by Author. Published by Universitas Pendidikan Ganesha.

ABSTRAK

Dosen kurang memanfaatkan bahan ajar e-learning media grafis yang diakses melalui Virtual Learning Unesa (Vinesa). Hal ini menyebabkan mahasiswa menjadi kurang tertarik untuk belajar sehingga menyebabkan penurunan hasil belajar mahasiswa. Penelitian ini bertujuan untuk menciptakan bahan ajar e-learning media grafis. Jenis penelitian ini merupakan penelitian pengembangan dengan pendekatan kuantitatif. subjek penelitian pengembangan untuk validasi yaitu 1 orang ahli materi, 1 orang ahli media, serta 1 orang ahli desain pembelajaran. Uji coba produk perorangan diperlukan 3 mahasiswa dan 6 mahasiswa Metode pengumpulan data menggunakan tes, observasi, wawancara, dan kuesioner. Instrument yang digunakan yaitu kuesioner. Analisis yang digunakan dalam penelitian ini adalah deskriptif kuantitatif dan uji t. Hasil penelitian yaitu hasil kelayakan pengembangan bahan ajar e-learning media grafis dinyatakan valid dengan: validasi materi sangat layak (96%), media pembelajaran sangat layak (94%), desain pembelajaran sangat layak (94%), uji coba perorangan sangat layak (94%), uji coba kelompok kecil sangat layak (94%). Hasil efektivitas menunjukkan ada perbedaan hasil n-gain antara kelompok kontrol dengan kelompok eksperimen. Disimpulkan pengembangan bahan ajar e-learning media grafis sangat layak dan cukup efektif digunakan untuk meningkatkan hasil belajar siswa. Bahan ajar e-learning media grafis memudahkan siswa dalam belajar.

ABSTRAK

Lecturers do not use graphic media e-learning teaching materials accessed through Unesa Virtual Learning (Vinesa). It causes students to become less interested in learning, causing a decrease in student learning outcomes. This study assesses the feasibility and effectiveness of developing graphic media e-learning teaching materials. This type of research is development research with a quantitative approach. Methods of data collection using tests, observations, interviews, and questionnaires. The instrument used is a questionnaire. The analysis used in this research is descriptive quantitative and t-test. The results of the study are the results of the feasibility of developing e-learning teaching materials for visual media, which are declared valid with very feasible material validation (96%), very feasible learning media (94%), very feasible learning designs (94%), very feasible individual trials (94%), very feasible small group trial (94%). The effectiveness results show that there is a difference in n-gain results between the control group and the experimental group. Developing e-learning teaching materials using visual media is feasible and effective enough to improve student learning outcomes. Graphic media e-learning teaching materials make it easier for students to learn.

1. INTRODUCTION

One of the obligations of lecturers is education and teaching, which is part of the Tri Dharma of higher education. Education and teaching in higher education institutions are related to the other Dharmas (Ariani, 2019; Fathurrahman & Muhtarom, 2019; Fitriana et al., 2021). Lecturers must prepare lecture materials to increase quality resources (Nuryasana & Desiningrum, 2020). In the learning process, lecturers and students must need each other and understand the importance of education (S. Hidayat, 2002; Shee, 2020). Lecturers have a function to provide knowledge, and students, as recipients of knowledge, will receive new information (Leal Filho et al., 2018; Matsuoka, 2019). Lecturers conveying

*Corresponding author.
E-mail addresses: harisetyaedhi@unesa.ac.id (Hari Sugiharto Setyaedhi)

learning material to students must have a device or a set of learning materials. Thus the teaching material is a device or a set of materials.

Teaching resources can be used as guidelines for teaching assignments on campus (Aisyah et al., 2020; I Magdalena, Sundari, et al., 2020). Teaching materials are presented coherently, which can be in the form of written or unwritten materials, to motivate students to learn (Ina Magdalena, Prabandani et al., 2020; Taufikurrahman, 2018). Teaching materials or teaching materials are said to be good if they are prepared by good procedures so that students can easily learn without the help of lecturers so that students can study the material on their own or independently (Lilis, 2019; I Magdalena, Sundari, et al., 2020). Learning materials or teaching materials (teaching materials) are prepared by good procedures and mastery of knowledge that must be mastered by students (Lilis, 2019; Mudiartana et al., 2021). Teaching materials at least cover learning processes that can determine the success and failure of learning. Teaching materials have a basic reference for the material being taught. Teaching materials will standardize the courses developed by each lecturer (Kesuma et al., 2020). Teaching materials used by lecturers in teaching contain guidelines for implementing learning, competencies that students must achieve, supporting information, practice questions, student worksheets, and Evaluation (Kharisma & Asman, 2018; Nuryasana & Desiningrum, 2020).

Lecturers, as educators, must have competence in developing teaching materials, but there are still many educators who have not mastered how to develop teaching materials. Hence, lecturers delivering materials are still teacher-centered, meaning that learning is centered on the lecturer. It makes students passive and only listen, less active, and less varied learning (I Magdalena, Sundari, et al., 2020; Mujahida & Rus'an, 2019). In practice, many lecturers still have a limited understanding of developing teaching materials for each lecture, so their number still needs to grow (Nuryasana & Desiningrum, 2020; Taufikurrahman, 2018). Lecturers must be a facilitator and a motivator for students by facilitating various learning resources to support the learning process (Ana, 2018; Setiyani, 2020). The development of teaching materials has several reasons, such as students can learn easily, practical learning material, and students can repeat or learn new lessons. Textbooks must be tested first on students, evaluated, and revised to get quality textbooks (Sanjaya & Inawati, 2019; Suniasih, 2019). Based on observations in the Department of Educational Technology S1, many educators still need to develop proper e-learning teaching materials so that teaching is still conventional (Muazzomi & Sofyan, 2021; Sitinjak & Siahaan, 2021). Based on the explanation above, there has been a gap between the expectations to be achieved and the facts happening now. The hope is to create appropriate and effective graphic media e-learning teaching materials that can improve learning outcomes. The fact is that what is happening now, and in almost all tertiary institutions, will certainly affect the effectiveness of lectures in these subjects (Arsanti, 2018).

One of the causes of the low quality of learning is not maximal use of learning materials. Poor reference to teaching materials results in low student learning outcomes (Rahayu & Harjono, 2019). The results of observations and interviews with Educational Technology undergraduate students obtained several facts. The graphic media course is very enjoyable for students because students can translate their ideas or creativity into designs that can later be assessed in terms of concepts and designs. Students state that graphic media courses have adequate and ample printed teaching materials. However, there are still few teaching materials in the form of e-learning, so students who are not yet proficient or not used 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, besides students can study without having to go to campus, meaning students can study independently. It makes students bored and results in decreased student learning outcomes. Educators less innovative in supporting the learning process will decrease student learning outcomes (Dwiqi et al., 2020; Izzah et al., 2022). Learning outcomes are defined as mastery of the material provided and changes in behavior after they follow the lesson (Alexandro et al., 2022; Nurrita, 2018). Teaching materials are used by lecturers in carrying out teaching to improve the quality of learning (Dwi et al., 2021; Wijayanti et al., 2021).

The solution or the right way to solve the learning problem is by using interesting and challenging media to liven up the learning atmosphere (Herawati & Muhtadi, 2018). Students in learning are expected to be able to solve a problem (Ariyani & Kristin, 2021). Current learning provides students with opportunities to study independently. Learning is not centered on the lecturer but on students. Interesting, interactive, affordable, efficient, effective, easily accessible, flexible, and meaningful, it is possible to do e-learning or online (Ambiyar, Verawardina, et al., 2021; Herawati & Muhtadi, 2018). The rapid development of information technology, such as computers, has become a "solution" for student learning services, e-learning-based learning that is delivered electronically. E-learning or electronic learning is a learning process that relies on electronic facilities, especially the Internet, in the learning process (Elyas, 2018; Kumar Basak et al., 2018; Putri et al., 2021). E-learning uses electronic media for

various learning needs that can replace conventional or lecture methods by switching to online methods with supporting facilities such as cell phones, laptops, smartphones, tablets, and others (Pratiwi & Listiadi, 2021). E-learning has a level of practicality (Faradayanti, 2020; Nedeva et al., 2010) improve the quality of teaching and learning activities as an innovative tool, ease of use of services in e-learning, innovative e-learning advantages are positively related to student assessment in obtaining e-learning content (Bae & Shin, 2020; Gon & Rawekar, 2017; Stecuła & Wolniak, 2022).

Previous research stated that e-learning teaching materials can improve student achievement (Schack & Ørngreen, 2015). Teaching materials can improve learning outcomes (Ritonga, 2022; Sukarman et al., 2021). The e-learning model facilitates independent learning for students and can also enhance interactive skills (Shetu et al., 2021). The development of e-learning platforms can increase student engagement in learning and use immersive learning technologies, such as Virtual Reality and Augmented Reality, to enhance student learning experiences (Brika et al., 2022). The successful implementation of e-learning is a positive step towards evolution and change. Besides that, it can increase the educational value of the experience of college staff (Zalat et al., 2021). The effectiveness of developing electronic modules (Hastari et al., 2019). Effectiveness of interactive e-module development (Aryawan et al., 2018). E-book teaching materials correlate with student academic achievement (Chen et al., 2021). E-learning is a learning model that utilizes information and communication technology to deliver learning materials to students (Mastan et al., 2022; Srika Ningsih Pasi; Yusrizal, 2018). Teaching materials or e-learning-based learning media during the Covid-19 pandemic (Ichsan et al., 2021).

However, each lecturer and college certainly has its characteristics related to the learning methods and strategies they use to improve learning outcomes. Both from the learning process, who is involved, the stages passed in the learning process, the obstacles, and the authority of each party involved. In addition, the focus of the problem studied related to the renewal of this research is that there needs to be research on graphic media e-learning teaching materials. In addition, graphic media e-learning teaching materials have yet to be optimally developed by most Unesa lecturers for students to use in accessing teaching materials through Vinesa (Unesa Virtual Learning). In this study, only a few Unesa lecturers have researched the effectiveness and feasibility of using teaching materials through Unesa virtual learning. This research aims to create graphic media e-learning teaching materials to improve learning outcomes. There are appropriate and effective graphic media e-learning teaching material products that can be utilized more broadly, especially for Educational Technology students.

2. METHOD

This type of research is development research with a quantitative approach aimed at producing effective products suitable for use (Rahman et al., 2021). For the feasibility test of e-learning teaching materials, a development research subject is required for validation: one material expert, one media expert, and one learning design expert. Individual product trials required three students and six students for small group trials. Students are selected heterogeneously with high, medium, and low abilities. This research method uses a quasi-experimental design with a nonequivalent control group design to test the effectiveness of e-learning teaching materials with a sample size of 60 Unesa Educational Technology undergraduate students. The experimental group research was given treatment using e-learning teaching materials, while the control group used conventional methods. The subjects of this study used simple random sampling (Sugiyono, 2017). Data were analyzed by descriptive quantitative. Quantitative analysis techniques are used to calculate the feasibility and effectiveness of e-learning teaching materials. Experts (expert judgment) first validate E-learning teaching materials regarding media, materials, and learning design. The hypothesis is tested using the t-test, which meets the prerequisites for normality and homogeneity (Wingga Pratami et al., 2019). Test the validity of the items with biserial points. Reliability test with KR-20. The model uses ADDIE (Analysis, Design, Development, Implementation, Evaluation) (Dwiqi et al., 2020; Pramana et al., 2020; Rahman et al., 2021). The ADDIE development model has advantages, one of which is that at each stage, it goes through an evaluation stage to minimize errors from the start (Artha & Putra, 2021; Pramana et al., 2020). In the ADDIE model, evaluation is carried out at each stage of the activity (F. Hidayat & Nizar, 2021; Rahman et al., 2021). The stages of the research are presented in Figure 1.

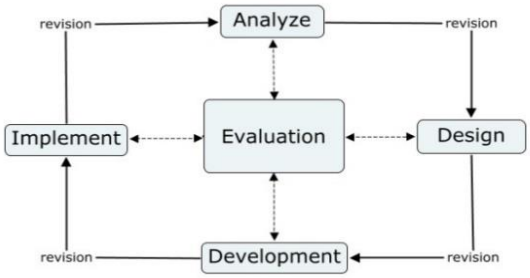

Figure 1. ADDIE Development Model
(F. Hidayat & Nizar, 2021; Krut, 2018)

Data collection methods are observation, interviews, and questionnaires. The method of observation or observation is the collection of data by direct observation and is designed systematically for the research object to take a close look at the activities carried out (Muchta, 2019; Pramana et al., 2020). The observation method is arranged sequentially and is structured and systematic (Khoridah et al., 2019). The data obtained through observation is more accurate because researchers observe directly according to reality or real (Dwiqi et al., 2020). Observations were made at the Department of Educational Technology, with the object of research being undergraduate students who were taking a graphic media course. The interview method is data collected through questions and answers systematically, and the results are documented. The interview method lists questions for students who will be studied (Dwiqi et al., 2020; Khoridah et al., 2019; Pramana et al., 2020). Interviews were conducted with undergraduate students taking graphic media courses and their supervisors. The questionnaire method is a data collection technique in which the researcher makes a list of questions given to media experts, material experts, and learning design experts to measure the feasibility of graphic media e-learning teaching material products (Dwiqi et al., 2020; Pramana et al., 2020). The questionnaire method was carried out to obtain accurate data from the questions contained in the questionnaire (Khoridah et al., 2019). Several instruments were used in this study to collect data: observation sheets, interview sheets, and questionnaire sheets. Observation sheets are used to discover everything related to learning on campus, such as; learning facilities, learning process, and student characteristics. The research instrument grids are presented in Table 1, Table 2, Table 3, Table 4, Table 5, and Table 6.

Table 1. Observations

No.	Question
1.	Can the lecturer operate the computer?
2.	In the learning process, what media or learning resources do lecturers use?
3.	How many students are active in participating in the learning process?
4.	How many students feel bored quickly when attending lectures in class?
5.	What materials are difficult for lecturers to explain because too many abstracts and media need to be made to support the learning process?
6.	Students whose lecturers teach are more interested in learning with e-learning teaching materials or textbooks?
7.	What obstacles do lecturers face in the learning process?

(Pramana et al., 2020)

Table 2. Interview

No.	Question
1.	Do lecturers use e-learning teaching materials in teaching graphic design courses?
2.	Can the media that the lecturer uses to support the learning process?
3.	Do lecturers need help teaching graphic design courses?
4.	Do lecturers use vines in the learning process?
5.	Are e-learning teaching materials needed to support learning?
6.	Can lecturers/students operate computers?
7.	Is the internet connection at Unesa good?
8.	What are the minimum completeness criteria required in graphic media lessons?
9.	What is the lecturer's strategy in dealing with problems when teaching graphic media?

No.	Question
10.	What method is used during the graphic media learning process
11.	Can students study independently in graphic media courses?
12.	What is the attitude of Educational Technology students?

(Pramana et al., 2020)

Table 3. Learning Material Experts

No.	Aspect		Indicator
1	Curriculum	a	The suitability of the material with basic competence
		b	Material suitability with indicators
		c	The suitability of the material with the learning objectives
2	Material	a	The material is easy to understand
		b	Material depth
		c	The right media support the material.
3	Grammar	a	Use language that is easy to understand
		b	Use language according to EYD rules.
4	Evaluation	a	Suitability of material difficulty level questions with competence
		b	Conformity evaluation with the material

(Dwiqi et al., 2020)

Table 4. Learning Media Experts

No.	Aspect		Indicator
1	Text Aspect	a	text clarity
		b	Text type
2	Image Aspect	a	Image layout
		b	Image quality
		c	Image attractiveness
3	Animation Aspect	a	Animation quality
		c	Suitability of animation with the material
4	Audio Aspect	a	Clarity of sound music and narrator
5	Accessibility Aspect	a	Interactive link learning
		b	Smooth interactive links
6	Design Aspect	a	E-Learning Banners
		b	Use of background colors
		c	Font size
		d	Font color
		e	Font type

(Dwiqi et al., 2020)

Table 5. Learning Design Experts

No.	Aspect		Indicator
1	Learning Design Aspects	a	The clarity of the formulation of learning objectives
		b	Selection of teaching materials
		c	Organizing teaching materials
		d	Steps of learning activities
2	Strategy	a	Submission of systematic material
		b	Can motivate students
		c	Provide opportunities for students to learn independently
		d	Provide opportunities for students to access material via the Internet
3	Evaluation	a	Questions according to indicators
		b	The suitability of the level of difficulty of the questions

(Artha & Putra, 2021)

Table 6. Individual and Small-Group Trials

No.	Aspect		Indicator
1	Ease of navigation	a	Easy-to-operate navigation

No.	Aspect		Indicator
		b	Navigation menu compatibility
2	Cognition	a	Facilitate student learning
		b	The content of the material
		c	Clarity of material description
3	Appearance	a	Appropriate content placement
		b	Correct color composition
		c	Text is readable
		d	sound clarity

(Artha & Putra, 2021)

This study's data analysis used qualitative and quantitative data analysis methods. The qualitative data analysis method is a method in the form of words or sentences to obtain facts or information (Sutisna, 2020). This method is used to process data in the form of input, criticism, and suggestions in revising teaching material development products from the validation results of learning material experts, instructional media experts, learning design materials, and individual and small group trial subjects. At the same time, the quantitative data analysis method is a collection of numbers that are then analyzed using statistical formulas to obtain conclusions (Sutisna, 2020). The references used to make decisions are presented in Table 7.

Table 7. Criteria for Eligibility of Teaching Materials with a Scale of 5

Score	Eligibility Category
<21%	Very not feasible
21%-40%	Not Feasible
40%-60%	Enough Feasible
60%-80%	Feasible
80%-100%	Very Feasible

(Ernawati, 2017)

N-Gain calculations were obtained for each experimental group (the group that used graphic media e-learning teaching materials) and the control group (the group that did not use graphic media e-learning teaching materials). The N-Gain assessment criteria can be seen in Table 9.

Table 9. Classification of N Gain Scores

Gain normality (g)	Criteria
(N-gain) ≥ 0,7	Very Good
0,7 < (N-gain) ≥) 0.3	Good
(N-gain) < 0.3	Less

(Hardiyantari, 2017; Herawati & Muhtadi, 2018)

After determining the N-Gain, the researcher conducted a normality test, then an independent t-test (Oktavia & Prasasty, 2019; Ramdhani et al., 2020). The normality and t-test were carried out using the SPSS 20 statistical test. It was done to find results from descriptive statistics. The hypothesis was tested to find the temporary differences in the mean post-test between the control and experimental groups. This development research uses validity and reliability tests. The validity of the items is used to determine whether the items used are valid (Utomo, 2019). The Kuder Richardson reliability test (KR -20) in this study is used to measure the level of trust or reliability of the results of a test (Nurul Rezki Amalia et al., 2021; Sutriyono, 2016).

3. RESULT AND DISCUSSION

Results

The research analyzes three things: the feasibility of developing graphic media e-learning teaching materials and the effectiveness of developing graphic media e-learning teaching materials. The analysis phase is divided into needs and front-end analysis (Sofia, 2017). Based on the interviews and observations, data was obtained that there were gaps, including that students needed help understanding graphic media material, so learning was not optimal. Some students have yet to reach the standard score. Even though this material is mandatory in the curriculum and educational technology department, it also

becomes their provision in conducting the Introduction to Prakerin Schooling (Industrial Work Practice). Lecturers use printed teaching materials in delivering material so that students feel bored with the use of printed teaching materials so that the absorption of knowledge is less than optimal and also impacts student activity in learning, causing learning outcomes to decrease. Students need a variety of learning variations according to their learning styles. Students do not use their smartphones as an educational tool.

Educational Technology students are heterogeneous with different learning styles from students, so e-learning teaching materials are needed that can accommodate the learning styles of these diverse students. Students in Educational Technology use Technology Analysis, e-learning teaching materials because they can be accessed through Vinesa to be used anytime, anywhere, and independently. Situation Analysis: The availability of good wifi facilities at the faculty and access via Vinesa will make it easier for students to use e-learning teaching materials in their learning environment. Task Analysis in which researchers, media experts, material experts, and learning design experts develop e-learning teaching material products that are suitable for use in learning activities. Issue Analysis: limited time allocation, lack of student activity in class, lack of independent learning, and dependence of students on campus learning in exploring learning material. Critical analysis, this analysis will relate to the effectiveness or ineffectiveness of product implementation. By analyzing important events, it can be determined which material is developed and which is not. Objective Analysis The learning objective of this course is that students can make graphic media. Media Analysis Based on this, e-learning was chosen as a medium for developing teaching materials for graphic media courses. Based on the analysis from student analysis to the media, the decision was to develop e-learning teaching materials for graphic design courses. Cost Analysis is a relatively low cost in developing e-learning teaching materials developed in faculties because, with these e-learning teaching materials, students can access them anywhere, anytime, and independently. At this stage, a problem is raised that forms the basis of graphic media learning, student characteristics that aim to determine the various abilities of students, identification of material so that it is relevant to the development of teaching materials in learning, and determines the abilities that students must have. At this stage, several points need to be obtained, the learning objectives that have been determined and the achievement of learning objectives (Cahyadi, 2019).

The design phase involves selecting software to overcome student learning gaps and designing a learning media framework that will be developed. In addition, it is necessary to prepare the materials needed for expert validation and student trials. Making workflows or flowcharts to describe the product includes making schedules in media development, creating project teams, designing media specifications and material structures to be developed, controlling the development work process, and making storyboards, which serve as a guide for researchers in inputting material, developing media elements by the design framework, reviewing and improving the developed media so that it is declared feasible for the implementation of learning.

The development stage is the collection of e-learning teaching materials such as materials, syllabus, text, images, video, audio, and animation. Development of e-learning teaching materials, such as inputting material and developing text, images, video, audio, and animation designs. Display of graphic media e-learning teaching materials. E-learning teaching materials consist of intros, profiles, instructions, Basic Competencies, materials, and evaluations. The following displays graphic media e-learning teaching materials in Figure 2, Figure 3, and Figure 4.

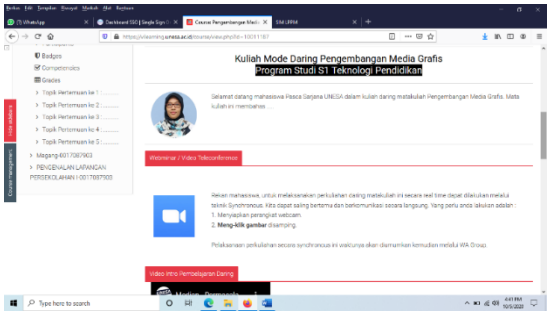

Figure 2. Development of E-Learning Teaching Materials

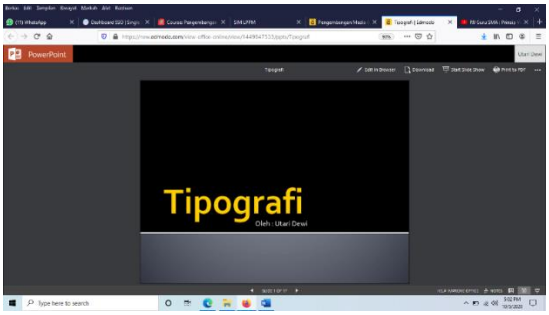

Figure 3. Development of E-Learning Teaching Materials

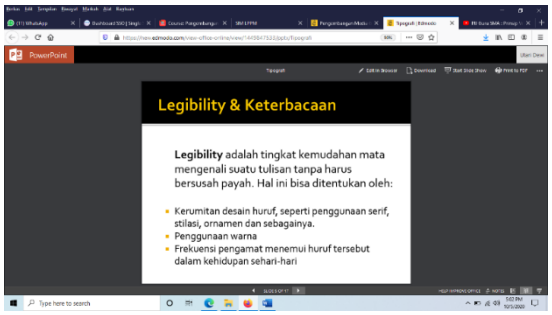

Figure 4. Development of E-Learning Teaching Materials in the form of Media for Online Learning that Students at Unesa E-Learning can Access

Implementation The activities that will be carried out in this phase are testing the product through several scientific stages. It is done so that the product's validity, reliability, and effectiveness can be measured and tested by involving experts. These experts include material experts, media experts, and learning design experts. At this stage, the media expert will assess the product's feasibility regarding each program's appearance and functioning in the e-learning teaching materials and accompanying materials from the developed e-learning teaching materials. The material experts will assess the material presented in this e-learning teaching material. After assessing its feasibility, the researcher received input, suggestions, and constructive responses from media and material experts. After that, the researcher made revisions according to the notes provided by related parties so that the media produced met the standards and according to student needs. Product trials included individual group trials with three students and small group trials with a heterogeneous number of 6 students with high, medium, and low abilities. After the trial, six students were asked to provide feedback or opinions about the e-learning teaching materials, which were developed as a form of evaluation to minimize deficiencies. Assessments carried out by experts and product trials are intended to determine the effectiveness and feasibility of e-learning teaching materials that have been developed. The instrument and product validity results are presented in Tables 10 and 11.

Table 10. Instrument Validity Results

Trial Subjects	Result	Description
The validity of learning materials	1	Very high
The validity of learning media	1	Very high
Learning design validity	1	Very high
Product trial validity	1	Very high

Table 11. Product Validation Assessment Results

Trial Subjects	Validity Results	Description
Test learning materials	96%	Very Feasible
Test learning media	96%	Very Feasible
Test the learning design	94%	Very Feasible
Individual trials	94%	Very Feasible
Small group trial	94%	Very Feasible

Feasibility test using All Aspects Calculation (PSA) with data collection techniques using a questionnaire with a scale of 5. Expert assessment of the content of learning materials gets 96% categorized as very feasible, expert assessment of learning media gets 96% of results categorized as very feasible, Expert assessment of learning design gets 94% of results categorized as very feasible, individual trial results get 94% results categorized as very feasible, small group trial results get 94% results categorized as very feasible.

Evaluation stage (evaluation), the activities carried out in the evaluation stage are evaluations of graphic media e-learning teaching material products. The evaluation carried out in this development research was based on a feasibility test and an effectiveness test. The media feasibility test was evaluated based on expert validation and product trial results. The effectiveness test of the developed graphic media e-learning teaching materials is seen from the calculation of data analysis from the trial results. The results of the evaluation are revised according to the results of the evaluation. Evaluation of the

development of e-learning teaching materials aims at student attitudes toward learning activities as a whole, increasing student abilities and institutional benefits as a result of increasing student competence (Cahyadi, 2019). Analysis of the effectiveness test for developing graphic media e-learning teaching materials. The results of the validity test of the items after being compared with the Table of Product Moment correlation coefficient scores can be said that all items are valid at the significance level of 5% and 1%. At the same time, the reliability test results using the KR-20 are said to be reliable, with a test reliability coefficient = 0.82. The test criteria are if the reliability score of the calculation results is > 0.7, then the instrument is said to be reliable. The mean N-Gain score for the experimental group is 0.60, effectively increasing student learning achievement. Whereas for the control group, it was 0.45, meaning that learning without using e-learning teaching materials was less effective in improving student learning outcomes. The results of the analysis are presented in Table. 12.

Table 12. Analysis Results

	Class	N	Mean	Std. Dev	Std. Error Mean
N-Gain	Experiment	30	0.6056	0.09531	0.01740
	Control	30	0.4532	0.09186	0.01677

Based on Table 12, it can be seen that the N-Gain pre-test and post-test results in the experimental group yielded a score of 0.60, while the N-Gain in the control group yielded a score of 0.45. Thus, there is a significant difference between the experimental and control groups in developing online learning materials. The graph is presented in Figure 5.

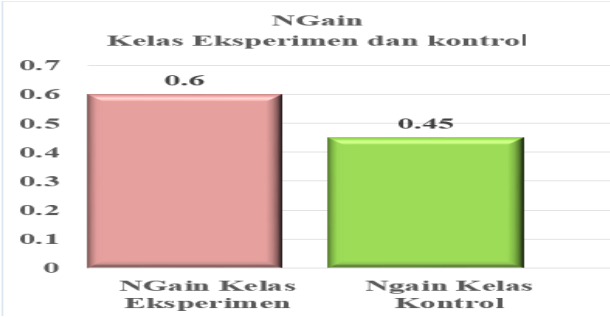

Figure 5. N-Gain Graphs of the Experimental and Control Groups
(Source: Data Processing Results)

Based on Table. 13, for the experimental group, it was 0.285 > 0.05; for the control group, it was 0.193 > 0.05, meaning that the data was normally distributed. Each group of less than 50 people uses the Shapiro-Wilk technique.

Table 13. Table of Normality

N-Gain	Group	Shapiro-Wilk		
		Statistics	df	Sig.
	Experiment	0.959	30	0.285
	Control	0.952	30	0.193

(Source: Data Processing Results)

In Table. 14 to determine the difference between the experimental and control groups using the t-test. The results of the t-test give a score of Sig. 2 tailed 0.00 <0.05 means that there is a significant difference between the results of the pre-test and post-test in the experimental group and the control group or, in other words, the post-test that uses e-learning teaching materials will increase learning outcomes compared to the pre-test that does not use e-learning materials teach e-learning.

Table. 14. T-Test

t-test	Result	Decision	Conclusion
t-test	Sig. 2-tailed = .000	Sig. 2-tailed, .05 So that H0 is rejected, Ha is accepted	There is a difference between pre-test and post-test

(Source: Data Processing Results)

Before using e-learning teaching materials, testing the validity of the items and reliability are first carried out. The validity of using biserial points was obtained when all 24 items were declared valid, and the reliability using KR 20 obtained r11 = 0.82, classified as very high.

Discussion

Graphic media e-learning teaching materials to improve learning outcomes are feasible and valid for use in learning. It is seen from several aspects, so using the material aspects of the learning objectives is feasible. E-learning material is writing books containing pictures published in digital form, which can be read by computers or other digital devices (Jojon et al., 2022; Riwu et al., 2018). Electronic learning materials can facilitate the inclusion of audio elements and dynamic images such as videos (Jojon et al., 2022; Muga et al., 2017). E-books can increase motivation (Tiara et al., 2021). It is due to the rapid development of technology and communication so that students can easily access information (Seso et al., 2019). This electronic learning resource can guide students to improve the quality of learning independently (Muga et al., 2017). The advantages of the results of this study are the level of assessment which has very good qualification results. It is evidenced by the ease of using e-learning teaching materials, the attractiveness of the screen in terms of text, images, video, audio, animation, clarity of presentation of material, and examples, which can motivate students to learn (Dwiqi et al., 2020). The ease of accessing the media causes students to be interested in accessing again the material they have studied outside of class hours. It is supported by research (Setiyaningsih et al., 2019). Teaching materials in E-learning as electronic-based learning are very appropriate to change the culture of face-to-face learning (Ambiyar, Verawardina, et al., 2021).

Graphic media e-learning teaching materials to improve learning outcomes are feasible and valid for design learning. Design teaching materials using graphic media. This graphic media aims to clarify ideas or ideas and make it easy for the audience to remember with the help of pictures (Febrianti, 2019; Siburian, 2016). In learning, graphic media is widely used at all levels of education. One example of graphic media educators use is PowerPoint slides, illustrations, and diagrams. Graphic media is widely used in learning because it has a function that supports the course of learning to be easier so that students can receive the material well. Graphic media is expected to provide a clear picture, so all students get the same picture or perception (Febrianti, 2019; Nurrita, 2018). E-learning is expected to be easy, whereas previously, teaching materials were considered difficult and time-consuming because it was still traditional (Wijayanti et al., 2021). E-learning uses digital or electronic media to accommodate learning (Daniel Hermawan, 2021; Ina Magdalena, Andriyanto et al., 2020).

This finding is reinforced by the findings of previous research, which states that students who use online teaching materials are feasible and effective compared to students who do not use online teaching materials (Arisa et al., 2020; Wardani & Susilowibowo, 2021). Learning through e-learning has better feasibility and effectiveness than face-to-face learning (Hardiyantari, 2017; Herawati & Muhtadi, 2018). There is a positive influence of e-learning on learning outcomes (Khusniyah, 2020; Suprayogie & Hakim, 2021). The e-learning learning method provides empirical evidence of the effect of benefits, convenience, and experience on learning outcomes (Ngabiyanto et al., 2021). The effectiveness of using e-learning has also been proven by the PTM JPTK FKIP UNS study program (Basori, 2017). E-learning teaching materials can improve student learning outcomes (Harahap & Abidin, 2021; Rahmawati & Vahlia, 2017; Rusman, 2016; Suprayogie & Hakim, 2021). Multimedia teaching materials can increase learning outcomes (Setiawan et al., 2016; Wiguna & Indrayani, 2022). Using digital book-based teaching materials can improve learning outcomes (Farhana et al., 2021; Zaini et al., 2019). Integrating teaching materials with e-learning can improve learning outcomes (Rusman, 2016; Wiguna & Indrayani, 2022; Zahidah & Bambang Sujatmiko, 2016). The limitations of this study are the mean N-Gain for the experimental group, which is only 0.60 in the category of only quite effective and not very effective in increasing student learning achievement. However, it is still feasible and effective because it has received very good qualifications from experts and students. The implication of this research is the development of e-learning teaching materials facilitated by Unesa (Vinesa), which can improve the learning process more easily and effectively and is appropriate for use in utilizing the developed teaching materials so that the implications of this development product can be monitored for its level of effectiveness and feasibility in improving student learning outcomes.

4. CONCLUSION

The development of graphic media e-learning teaching materials through Vinesa with the ADDIE development model has obtained qualifications from experts and students so that it can be concluded that

graphic media e-learning teaching materials have proven feasible and effective in improving student learning outcomes. E-learning teaching materials foster an independent learning culture so that the development of e-learning teaching materials is feasible and effective to be used as a recommendation for learning resources that can be accessed anytime and anywhere.

5. REFERENCES

Aisyah, S., Noviyanti, E., & Triyanto, T. (2020). Bahan Ajar Sebagai Bagian Dalam Kajian Problematika Pembelajaran Bahasa Indonesia. *Jurnal Salaka : Jurnal Bahasa, Sastra, Dan Budaya Indonesia*, *2*(1), 62–65. https://doi.org/10.33751/jsalaka.v2i1.1838.

Alexandro, R., Hariatama, F., & Wulandari, M. (2022). Meningkatkan Mutu Belajar Mahasiswa Pendidikan Ekonomi melalui Pembelajaran Elektronik (E-Learning). *Jurnal Imiah Pendidikan Dan Pembelajaran*, *6*(1), 99. https://doi.org/10.23887/jipp.v6i1.43695.

Ambiyar, Verawardina, U., Lubis, A. L., Ramadhani, D., & Asnur, L. (2021). Application of Adaptive Media and Engaging E-learning for Students in E-learning Courses. *Jurnal Pendidikan Indonesia*, *10*(2), 288–296. https://doi.org/10.23887/jpi-undiksha.v10i2.24376.

Ana, R. F. R. (2018). Penggunaan Model Four D Dalam Pengembangan Bahan Ajar Mata Kuliah Perencanaan Pembelajaran Pada Mahasiswa STKIP PGRI Tulungagung. *Pedagogy : Jurnal Ilmiah Ilmu Pendidikan*, *5*(2), 64–74. https://ejournal.upm.ac.id/index.php/pedagogy/article/view/14.

Ariani, S. S. (2019). Persepsi Mahasiswa dalam Pengimplementasian Tri Daharma Perguruan Tinggi. *Jurnal At-Tadbir STAI Darul Kamal NW Kembang Kerang*, *3*(1), 59–77. https://doi.org/10.3454/at-tadbir.v3i1.3414.

Arisa, N., Johansyah, & Ali Hanif, M. K. (2020). Keefektifan Model Pembelajaran Novick terhadap Pemahaman Konsep Fisika Siswa SMK Negeri 17 Samarinda Materi Elastisitas dan Hukum Hooke. *Jurnal Literasi Pendidikan Fisika*, *1*(01), 45–55. https://doi.org/10.30872/jlpf.v1i01.77.

Ariyani, B., & Kristin, F. (2021). Model Pembelajaran Problem Based Learning untuk Meningkatkan Hasil Belajar IPS Siswa SD. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *5*(3), 353. https://doi.org/10.23887/jipp.v5i3.36230.

Arsanti, M. (2018). Pengembangan Bahan Ajar Mata Kuliah Penulisan Kreatif Bermuatan Nilai-Nilai Pendidikan Karakter Religius Bagi Mahasiswa Prodi Pbsi, Fkip, Unissula. *KREDO : Jurnal Ilmiah Bahasa Dan Sastra*, *1*(2), 71–90. https://doi.org/10.24176/kredo.v1i2.2107.

Artha, I. M. A. W., & Putra, D. B. ketut N. S. (2021). Pengembangan Media Audio Visual Dengan Model Analysis Design Development Imlementation Evaluation Pada Muatan IPA Kelas IV SD Negeri 2 Pejeng Tahun Ajaran 2020/2021. *Jurnal Edutech Undiksha*, *9*(1), 149–157. https://doi.org/10.23887/jeu.v9i1.32974.

Aryawan, R., Sudatha, I. G. W., & Sukmana, A. I. W. I. Y. (2018). Pengembangan E-Modul Interaktif Mata Pelajaran IPS di SMP Negeri 1 Singaraja. *Jurnal Edutech Universitas Pedidikan Ganesha*, *6*(2), 180–191. https://doi.org/10.23887/jeu.v6i2.20290.

Bae, J., & Shin, H. (2020). A Study on the e-Learning Revitalization Plan to Improve the Quality University Education: Focused on the YouTube Learning Contents. *Journal of The Korean Chemical Society*, *11*(7), 309.

Basori, M. (2017). Efektivitas Komunikasi Pembelajaran Online Dengan Menggunakan Media E-Learning Pada Perkuliahan Body Otomotif. *Jurnal Imiah Pendidikan Teknik Kejuruan*, *7*(July). https://doi.org/10.20961/jiptek.v7i2.12722.

Brika, S. K. M., Chergui, K., Algamdi, A., Musa, A. A., & Zouaghi, R. (2022). E-Learning Research Trends in Higher Education in Light of COVID-19: A Bibliometric Analysis. *Frontiers in Psychology*, *12*(March), 1–10. https://doi.org/10.3389/fpsyg.2021.762819.

Cahyadi, R. A. H. (2019). Pengembangan Bahan Ajar Berbasis Addie Model. *Halaqa: Islamic Education Journal*, *3*(1), 35–42. https://doi.org/10.21070/halaqa.v3i1.2124.

Chen, C. H., Yang, S. J. H., Weng, J. X., Ogata, H., & Su, C. Y. (2021). Predicting at-risk university students based on their e-book reading behaviors by using machine learning classifiers. *Australasian Journal of Educational Technology*, *37*(4), 130–144. https://doi.org/10.14742/ajet.6116.

Daniel Hermawan. (2021). The Rise of E-Learning in COVID-19 Pandemic in Private University: Challenges and Opportunities. *IJORER : International Journal of Recent Educational Research*, *2*(1), 86–95. https://doi.org/10.46245/ijorer.v2i1.77.

Dwi, I. K., Ardana, C., Agung, A., Agung, G., & Simamora, H. (2021). Meningkatkan Semangat Belajar Siswa Melalui Multimedia Interaktif Pada Mata Pelajaran IPA. *Jurnal Edutech Undiksha*, *8*(1), 104–112. https://doi.org/10.23887/jeu.v9i1.32523.

Dwiqi, G. C. S., Sudatha, I. G. W., & Sukmana, A. I. W. I. Y. (2020). Pengembangan Multimedia Pembelajaran

Interaktif Mata Pelajaran IPA Untuk Siswa SD Kelas V. *Jurnal Edutech Undiksha*, *8*(2), 33. https://doi.org/10.23887/jeu.v8i2.28934.

Elyas, A. H. (2018). Penggunaan Model Pembelajaran E-Learning Dalam Meningkatkan Kualitas Pembelajaran. *Warta Edisi: 56*.

Ernawati, I. (2017). Uji Kelayakan Media Pembelajaran Interaktif Pada Mata Pelajaran Administrasi Server. *Elinvo (Electronics, Informatics, and Vocational Education)*, *2*(2), 204–210. https://doi.org/10.21831/elinvo.v2i2.17315.

Faradayanti, K. A. (2020). Kepraktisan Media Pembelajaran Berbasis WEB untuk Menunjang E-Learning pada Mata Pelajaran Intalasi Motor Listrik DI SMK. *Jurnal Pendidikan Teknik Elektro*, *09*(3), 675–683.

Farhana, F., Suryadi, A., & Wicaksono, D. (2021). Pengembangan Bahan Ajar Berbasis Digital pada Mata Pelajaran Bahasa Inggris di SMK Atlantis Plus Depok. *Instruksional*, *3*(1), 1. https://doi.org/10.24853/instruksional.3.1.1-17.

Fathurrahman & Muhtarom, A. (2019). Pengaruh Pembinaan Tri Dharma Perguruan Tinggi terhadap Perilaku Dosen Sebagai Sumber Daya Manusia Pendidikan. *Jurnal Kajian Teori Dan Praktik Kependidikan*, *4*(1), 45–48. http://journal2.um.ac.id/index.php/jktpk/article/view/10782.

Febrianti, F. (2019). Efektivitas Penggunaaan Media Grafis dalam Meningkatkan Motivasi Belajar. *Prosiding Seminar Nasional Pendidikan FKIP*, *2*(1), 667–677.

Fitriana, A. D., Mutmainnah, I., & Halifah, S. (2021). Penyelenggaraan Tridharma Perguruan Tinggi sesuai Bidang Keilmuan sebagai Upaya Personal Branding Dosen. *KOMUNIDA: Media Komunikasi Dan Dakwah*, *11*, 195–217. https://doi.org/10.35905/komunida.v7i2.http

Gon, S., & Rawekar, A. (2017). Effectivity of E-Learning through Whatsapp as a Teaching Learning Tool. *MVP Journal of Medical Sciences*, *4*(1), 19. https://doi.org/10.18311/mvpjms/0/v0/i0/8454.

Harahap, A. N., & Abidin, J. (2021). Pengembangan Bahan Ajar Interaktif Berbasis E-Learning Untuk Meningkatkan Hasil Belajar Mahasiswa. *JURNAL MathEdu (Mathematic Education Journal)*, *4*(2), 231–235. https://doi.org/10.37081/mathedu.v4i2.2733.

Hardiyantari, O. (2017). Pengembangan Multimedia Pembelajaran Interaktif Menggunakan Teknik Dinamis pada Mata Pelajaran Produktif Teknik Komputer dan Jaringan untuk Siswa SMK Kelas X. *Jurnal Inovasi Teknologi Pendidikan*, *4*(1), 77. https://doi.org/10.21831/jitp.v4i1.13372.

Hastari, G. A. W., Gede Agung, A. A., Sudarma, I. K., & Teknologi Pendidikan, P. (2019). Pengembangan Modul Elektronik Berpendekatan Kontekstual Pada Mata Pelajaran Ilmu Pengetahuan Sosial Kelas Viii Sekolah Menengah Pertama. *Jurnal EDUTECH*, *7*(1), 33–43. https://doi.org/10.23887/jeu.v7i1.20008.

Herawati, N. S., & Muhtadi, A. (2018). Pengembangan Modul Elektronik (E-Modul) Interaktif Pada Mata Pelajaran Kimia kelas XI SMA. *Jurnal Inovasi Teknologi Pendidikan*, *5*(2), 180–191. https://doi.org/10.21831/jitp.v5i2.15424.

Hidayat, F., & Nizar, M. (2021). Model ADDIE (Analysis, Design, Development, Implementation and Evaluation) dalam Pembelajaran Pendidikan Agama Islam. *Jurnal Inovasi Pendidikan Agama Islam (JIPAI)*, *1*(1), 28–38. https://doi.org/10.15575/jipai.v1i1.11042.

Hidayat, S. (2002). Sistem Pembelajaran di Perguruan Tinggi. *Alqalam*, *19*(93), 109. https://doi.org/10.32678/alqalam.v19i93.457.

Ichsan, I. Z., Purwanto, A., & Rahmayanti, H. (2021). E-learning in new normal covid-19 era: Measure hots and pro-environmental behavior about environmental pollution. *International Journal of Evaluation and Research in Education*, *10*(3), 790–797. https://doi.org/10.11591/ijere.v10i3.21382.

Izzah, F. N., Khofshoh, Y. A., Sholihah, Z., Nurningtias, Y., & Wakhidah, N. (2022). Analisis Faktor-faktor Pemicu Turunnya Keaktifan Siswa dalam Proses Pembelajaran Mata Pelajaran IPA di Masa Pandemi. *Pensa E-Jurnal: Pendidikan Sains*, *10*(1), 150–154. https://ejournal.unesa.ac.id/index.php/pensa/article/view/43965.

Jojon, D. A., Awe, E. Y., & Wau, M. P. (2022). Pengembangan Bahan Ajar Elektronik Bermuatan Multimedia pada Benda di Sekitarku untuk Siswa Kelas II di SD 1 Malanuza. *Jurnal Citra Pendidikan*, *2*(2), 305–319. https://doi.org/10.38048/jcp.v2i2.625.

Kesuma, T. A. R. P., Handayana, S., & Ciciria, D. (2020). Pengembangan bahan ajar kewarganegaraan di Perguruan Tinggi Keagamaan Islam. *Jurnal Civics: Media Kajian Kewarganegaraan*, *17*(1), 104–116. https://doi.org/10.21831/jc.v17i1.30470.

Kharisma, J. Y., & Asman, A. (2018). Pengembangan Bahan Ajar Matematika Berbasis Masalah Berorientasi pada Kemampuan Pemecahan Masalah Matematis dan Prestasi Belajar Matematika. *Indonesian Journal of Mathematics Education*, *1*(1), 34. https://doi.org/10.31002/ijome.v1i1.926.

Khoridah, F., Prasetiyawati, D., & Baedowi, S. (2019). Analisis Penerapan Metode Sas (Struktural Analitik

Sintetik) Dalam Kemampuan Menulis Permulaan. *Journal for Lesson and Learning Studies*, *2*(3), 396–403. https://doi.org/10.23887/jlls.v2i3.19899.

Khusniyah, T. W. (2020). Efektivitas E-Learning Terhadap Hasil Belajar Mahasiswa Pada Mata Kuliah Konsep Dasar IPS. *SAP (Susunan Artikel Pendidikan)*, *4*(3), 207–214. https://doi.org/10.30998/sap.v4i3.6283.

Krut, S. (2018). *ADDIE Model: Instructional Design*.

Kumar Basak, S., Wotto, M., & Bélanger, P. (2018). E-learning, M-learning, and D-learning: Conceptual definition and comparative analysis. *E-Learning and Digital Media*, *15*(4), 191–216. https://doi.org/10.1177/2042753018785180.

Leal Filho, W., Raath, S., Lazzarini, B., Vargas, V. R., de Souza, L., Anholon, R., Quelhas, O. L. G., Haddad, R., Klavins, M., & Orlovic, V. L. (2018). The role of transformation in learning and education for sustainability. *Journal of Cleaner Production*, *199*, 286–295. https://doi.org/10.1016/j.jclepro.2018.07.017.

Lilis. (2019). Pengembangan Bahan Ajar Digital pada Mata Pelajaran Dasar Listrik dan Elektronika Kelas X. In *Jurnal Teknologi Pendidikan dan Pembelajaran* (Vol. 6, Issue 2). https://jurnal.untirta.ac.id/index.php/JTPPm/article/viewFile/7423/5155.

Magdalena, I, Sundari, T., Nurkamilah, S., Nasrullah, & Amalia, D. A. (2020). Analysis Bahan Ajar. *Jurnal Pendidikan Dan Ilmu Sosial*, *2*(2), 311–326. https://ejournal.stitpn.ac.id/index.php/nusantara/article/download/828/570.

Magdalena, Ina, Andriyanto, A., & Refaldi, R. R. (2020). Pemanfaatan Media Pembelajaran E-Learning Menggunakan Whatsapp sebagai Solusi di Tengah Penyebaran Covid-19 di SDN Gembong 1. *As-Sabiqun*, *2*(2), 1–16. https://doi.org/10.36088/assabiqun.v2i2.998.

Magdalena, Ina, Prabandani, R. O., Rini, E. S., Fitriani, M. A., & Putri, A. A. (2020). Analisis Pengembangan Bahan Ajar. *Jurnal Pendidikan Dan Ilmu Sosial*, *2*(2), 170–187. https://ejournal.stitpn.ac.id/index.php/nusantara.

Mastan, I. A., Sensuse, D. I., Suryono, R. R., & Kautsarina, K. (2022). Evaluation of Distance Learning System (E-Learning): a Systematic Literature Review. *Jurnal Teknoinfo*, *16*(1), 132. https://doi.org/10.33365/jti.v16i1.1736.

Matsuoka, R. (2019). Concerted cultivation developed in a standardized education system. *Social Science Research*, *77*(July 2017), 161–178. https://doi.org/10.1016/j.ssresearch.2018.08.011.

Muazzomi, N., & Sofyan, H. (2021). Pengembangan Bahan Ajar Pengembangan APE Berbasis Kewirausahaan S1 PG- PAUD FKIP Universitas Jambi. *Jurnal Sains Sosio Humaniora*, *5*(2), 742–749. https://doi.org/10.22437/jssh.v5i2.15780.

Muchta, A. (2019). *Teknik Pengumpulan Data Observasi : Pengertian, Metode dan Contohnya*.

Mudiartana, I. M., Margunayasa, I. G., & Divayana, D. G. H. (2021). How is The Development of Valid and Practical Android-Based Local Wisdom Teaching Materials? *Jurnal Ilmiah Sekolah Dasar*, *5*(3), 403. https://doi.org/10.23887/jisd.v5i3.38176.

Muga, W., Suryono, B., & Januarisca, E. L. (2017). Pengembangan Bahan Ajar Elektronik Berbasis Model Problem Based Learning dengan Menggunakan Model Dick and Carey. *Journal of Education Technology*, *1*(4), 260–264. https://doi.org/10.23887/jet.v1i4.12863.

Mujahida, M., & Rus'an, R. (2019). Analisis Perbandingan Teacher Centered Dan Learner Centered. *Scolae: Journal of Pedagogy*, *2*(2), 323–331. https://doi.org/10.56488/scolae.v2i2.74.

Nedeva, V., Nedeva, V., & Dimova, E. (2010). Some Advantages Of E-Learning In English Language Training e-learning View project Application of virtual laboratories in universities View project Some Advantages Of E-Learning In English Language Training. *Trakia Journal of Sciences*, *8*(8), 21–28.

Ngabiyanto, Njurkhin, A., Mukhibat, H., & Harsono. (2021). E-Learning Evaluation Using General Extended Technology Acceptance Model Approach at Schools in COVID-19 Pandemic. *European Journal of Educational Research*, *10*(3), 1063–1074. https://eric.ed.gov/?id=EJ1307678.

Nurrita, T. (2018). Pengembangan media pembelajaran untuk meningkatkan hasil belajar siswa. *MISYKAT: Jurnal Ilmu-Ilmu Al-Quran, Hadist, Syari'ah Dan Tarbiyah*, *3*(1), 171. https://doi.org/10.33511/misykat.v3n1.171.

Nurul Rezki Amalia, Abdul Halik, & Nurul Mukhlisa. (2021). Analisis Butir Soal Matematika Pada Siswa Sekolah Dasar. *Pinisi Journal of Education*, *1*(1).

Nuryasana, E., & Desiningrum, N. (2020). Pengembangan Bahan Ajar Strategi Belajar Mengajar Untuk Meningkatkan Motivasi Belajar Mahasiswa. *Jurnal Inovasi Penelitian*, *1*(5), 967–974. https://doi.org/10.47492/jip.v1i5.177.

Oktavia, M., & Prasasty, A. T. (2019). Uji Normalitas Gain untuk Pemantapan dan Modul dengan One Group Pre and Post Test. *Simposium Nasional Ilmiah*, *November*, 596–601. https://doi.org/10.30998/simponi.v0i0.439.

Pramana, M. W. A., Jampel, I. N., & Pudjawan, K. (2020). Meningkatkan Hasil Belajar Biologi Melalui E-Modul Berbasis Problem Based Learning. *Jurnal Edutech Undiksha*, *8*(2), 17. https://doi.org/10.23887/jeu.v8i2.28921.

Pratiwi, N. A., & Listiadi, A. (2021). Pengembangan Bahan Ajar Elektronik Mata Pelajaran Praktikum Akuntansi Lembaga/ Instansi Pemerintah Kelas XI SMK Berbasis Kontekstual. *Jurnal Pendidikan Akuntansi (JPAK)*, *9*(2), 220–231. https://doi.org/10.26740/jpak.v9n2.p220-231.

Putri, W. U., Alexandro, R., & Wulandari, M. (2021). Pengaruh Pembelajaran Elektronik (E-Learning) Terhadap Mutu Belajar Mahasiswa Program Studi Pendidikan Ekonomi. *Edunomics Journal*, *2*(2), 73–80. https://doi.org/10.37304/ej.v2i2.3010.

Rahayu, S., & Harjono, A. (2019). Pengembangan Bahan Ajar Untuk Meningkatkan Hasil Belajar Mahasiswa Pada Mata Kuliah Strategi Pembelajaran. *Jurnal Penelitian Dan Pembelajaran Fisika Indonesia*, *1*(1), 26–30. https://doi.org/10.29303/jppfi.v1i1.16.

Rahman, D., Suyasa, P. W. A., & Wahyuni, D. S. (2021). Pengembangan Media Pembelajaran E-Learning dengan Model Pembelajaran Flipped Classroom Berbasis Edmodo pada Mata Pelajaran Informatika. *Kumpulan Artikel Mahasiswa Pendidikan Teknik Informatika (KARMAPATI)*, *10*(1), 13. https://doi.org/10.23887/karmapati.v10i1.31092.

Rahmawati, Y., & Vahlia, I. (2017). Pengembangan Bahan Ajar Berbasis E Learning pada Matakuliah Evaluasi Pembelajaran untuk Meningkatkan Hasil Belajar Mahasiswa. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *6*(2), 169. https://doi.org/10.24127/ajpm.v6i2.1038.

Ramdhani, E. P., Khoirunnisa, F., & Siregar, N. A. N. (2020). Efektifitas Modul Elektronik Terintegrasi Multiple Representation pada Materi Ikatan Kimia. *Journal of Research and Technology*, *6*(1), 162–167. https://journal.unusida.ac.id/index.php/jrt/article/view/152.

Ritonga, A. K. (2022). Effectiveness of English for Tourism E-Learning during the Covid-19 Pandemic. *Journal of Education Technology*, *6*(1), 102. https://doi.org/10.23887/jet.v6i1.42312.

Riwu, I. U., Laksana, D. N. L., & Dhiu, K. D. (2018). Pengembangan Bahan Ajar Elektronik Bermuatan Multimedia Pada Tema Peduli Terhadap Makhluk Hidup Untuk Siswa Sekolah Dasar Kelas Iv Di Kabupaten Ngada. *Journal of Education Technology*, *2*(2), 56. https://doi.org/10.23887/jet.v2i2.16182.

Rusman, N. (2016). Pengembangan Model E-Learning Untuk Meningkatkan Hasil Belajar Mahasiswa. *Jurnal Kwangsan*, *4*(1), 1. https://doi.org/10.31800/jurnalkwangsan.v4i1.31.

Sanjaya, M. D., & Inawati. (2019). Pengembangan Bahan Ajar Mata Kuliah Pengembangan Keterampilan Berbicara. *Jurnal Bindo Sastra*, *3*(2), 104–118. http://jurnal.um-palembang.ac.id/index.php/bisastra/index.

Schack, S., & Ørngreen, R. (2015). The Effectiveness of E-Learning : An Explorative and Integrative Review of the Definitions , Methodologies and Factors that Promote e-Learning Effectiveness ResearchLAB : IT and Learning Design , Dep . of Learning and Philosophy , Aalborg. *The Electronic Journal of E-Learning*, *13*(4), 278–290.

Seso, M. A., Laksana, D. N. L., & Dua, K. (2019). Pengembangan Bahan Ajar Elektronik Bermuatan Multimedia Untuk Siswa Sekolah Dasar Kelas Iv Di Kabupaten Ngada. *Journal of Education Technology*, *2*(4), 177. https://doi.org/10.23887/jet.v2i4.16546.

Setiawan, M. A., Dasna, W., & Marfu 'ah, S. (2016). Pengaruh Bahan Ajar Multimedia Terhadap Hasil Belajar dan Persepsi Mahasiswa pada Matakuliah Kimia Organik I. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *1*(2011), 746–751. https://doi.org/10.17977/jp.v1i4.6243.

Setiyani, R. (2020). Pemanfaatan Internet sebagai Sumber Belajar. *Jurnal Pendidikan Ekonomi Dinamika Pendidikan*, *V*(1), 117–133. https://doi.org/10.31004/jpdk.v1i2.603.

Setiyaningsih, G., Prasetyo, M. A. W., & Hidayah, D. U. (2019). Penerapan Aplikasi Media Pembelajaran pada SMP N 1 Nusawungu Berbasis Smartphone Android. *MATRIK : Jurnal Manajemen, Teknik Informatika Dan Rekayasa Komputer*, *18*(2), 246–256. https://doi.org/10.30812/matrik.v18i2.365.

Shee, N. K. (2020). Karen education department's multilingual education for language maintenance. *Kasetsart Journal of Social Sciences*, *41*(2), 389–394. https://doi.org/10.1016/j.kjss.2018.07.007.

Shetu, S. F., Rahman, M. M., Ahmed, A., Mahin, M. F., Akib, M. A. U., & Saifuzzaman, M. (2021). Impactful e-learning framework: A new hybrid form of education. *Current Research in Behavioral Sciences*, *2*(April), 100038. https://doi.org/10.1016/j.crbeha.2021.100038.

Siburian, M. F. (2016). Efektivitas Penggunaan Media Grafis untuk Meningkatkan Hasil Belajar IPA. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *6*(2), 125–133. https://doi.org/10.30998/formatif.v6i2.946.

Sitinjak, E. K., & Siahaan, F. E. (2021). Pengembangan Bahan Ajar Interaktif Berbasis E-Learning Untuk Meningkatkan Hasil Belajar Mahasiswa. *Jurnal Mimbar Ilmu*, *4*(2), 231–235.

https://doi.org/10.37081/mathedu.v4i2.2733.

Sofia, D. A. (2017). Pengembangan sistem pembelajaran berbantuan web dengan mengaplikasikan strategi self-regulated learning. *Jurnal Inovasi Dan Teknologi Pembelajaran*, *2*(2), 292–296. https://doi.org/10.17977/um031v2i22016p292.

Srika Ningsih Pasi; Yusrizal. (2018). Analisis Butir Soal Ujian Bahasa Indonesia Buatan Guru MTSN di Kabupaten Aceh Besar. *Master Bahasa*, *6*(2), 195–202.

Stecuła, K., & Wolniak, R. (2022). Advantages and Disadvantages of E-Learning Innovations during COVID-19 Pandemic in Higher Education in Poland. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(3), 159. https://doi.org/10.3390/joitmc8030159.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Sukarman, Rahayu, W., & Hakim, L. El. (2021). The Effectiveness of Mathematics E-Modules with a Contextual Approach on Geometry Matters to Improving Students' Learning Outcomes. *Jurnal Pendidikan Indonesia (JPI)*, *10*(2), 362–369. https://doi.org/10.23887/jpi-undiksha.v10i2.33530.

Suniasih, N. W. (2019). Pengembangan Bahan Ajar Neurosains Bermuatan Pendidikan Karakter dengan Model Inkuiri. *Mimbar Ilmu*, *24*(3), 417. https://doi.org/10.23887/mi.v24i3.22542.

Suprayogie, D. R., & Hakim, L. (2021). Pengaruh Pembelajaran E-Learning Terhadap Mutu Belajar Dengan Mutu Proses Belajar Mengajar Sebagai Variabel Intervening Mata Kuliah Perbankan Syariah. *Jurnal Pendidikan*, *9*(2), 24–35. https://doi.org/10.36232/pendidikan.v9i2.889.

Sutisna, I. (2020). Statistika Penelitian: Teknik Analisis Data Penelitian Kuantitatif. *Universitas Negeri Gorontalo*, *1*(1), 1–15.

Sutriyono, S. (2016). Uji Validitas dan Reliabilitas Kuisoner Kepuasan Konsumen Pengujian Sampel Laboratorium Terpadu Fakultas Sains dan Teknologi UIN Sunan Kalijaga Yogyakarta. *Integrated Lab Journal*, *4*(1), 103–108. https://ejournal.uin-suka.ac.id/pusat/integratedlab/article/view/1544.

Taufikurrahman, R. (2018). Dosen dan Pengembangan Bahan Ajar. *NUANSA: Jurnal Penelitian Ilmu Sosial Dan Keagamaan Islam*, *15*(1), 223. https://doi.org/10.19105/nuansa.v15i1.1918.

Tiara, Diarta, F., & Kantun, S. (2021). Penggunaan Buku Digital untuk Meningkatkan Motivasi dan Hasil Belajar Siswa Kelas XII IPS 3 SMAN Pakusari Jember (Studi Kasus Pada Mata Pelajaran Ekonomi Materi Jurnal Penyesuaian pada Perusahaan Dagang Semester Genap Tahun Ajaran 2019/2020). *Jurnal Ilmiah Ilmu Pendidikan, Ilmu Ekonomi, Dan Ilmu Sosial*, *15*(1), 146–151. https://doi.org/10.19184/jpe.v15i1.23444.

Utomo, B. (2019). Analisis Validitas Isi Butir Soal sebagai Salah Satu Upaya Peningkatan Kualitas Pembelajaran di Madrasah Berbasis Nilai-Nilai Islam. *Jurnal Pendidikan Matematika (KUDUS)*, *1*(2), 145–159. https://doi.org/10.21043/jpm.v1i2.4883.

Wardani, D. A., & Susilowibowo, J. (2021). Pengembangan Bahan Ajar Elektronik Berbasis Flipbook Sebagai Pendukung Implementasi Pembelajaran Scientific Approach Dalam Pembelajaran Daring Pada Materi Persediaan Kelas XI di SMK Yapalis Krian. *Jurnal Pendidikan Ekonomi: Jurnal Ilmiah Ilmu Pendidikan, Ilmu Ekonomi, Dan Ilmu Sosial*, *15*(2), 231–241. https://doi.org/10.19184/jpe.v15i2.26410.

Wiguna, I. W. A., & Indrayani, L. (2022). Pemanfaatan E-Learning Berbasis Moodle Terhadap Hasil Belajar Siswa Kelas XI IPS Mata Pelajaran Ekonomi di SMAN Bali Mandara. *Ekuitas: Jurnal Pendidikan Ekonomi*, *10*(1), 56–64. https://ejournal.undiksha.ac.id/index.php/EKU.

Wijayanti, H., Degeng, I. N., & Sitompul, N. (2021). Pengembangan Bahan Ajar Berbasis E-Learning Pada Pembelajaran Tematik Sekolah Dasar. *Edcomtech Jurnal Kajian Teknologi Pendidikan*, *6*(1), 26–35. https://doi.org/10.17977/um039v6i12021p026.

Wingga Pratami, Ngurah Ayu, & Henry Januar Saputra. (2019). Pengaruh Media Game Edukasi "Teka Teki Pengetahuan" Terhadap Minat Belajar Siswa Pada Mata Pelajaran IPA Kelas 5 SDN 03 Protomulyo. *Jurnal Profesi Keguruan*, *5*(1), 15–22. https://journal.unnes.ac.id/nju/index.php/jpk/article/view/10752.

Zahidah, & Bambang Sujatmiko. (2016). Peningkatan Hasil Belajar Siswa dengan Menggunakan Bahan Ajar (LKS) pada Mata Pelajaran Pemrograman WEB Kelas X yang di Integrasikan pada E-Learning Berbasis Moodle. *Jurnal IT-Edu*, *01*(1), 1–8.

Zaini, H., Darmawan, D., & Hernawan, H. (2019). Penggunaan Bahan Ajar Berbasis Digital Book Untuk Meningkatkan Hasil Belajar Siswa Dalam Mata Pelajaran Matematika Pada Materi Logika Matematika (Penelitian Kuasi Eksperimen Di Kelas X SMKN 2 Garut). *Teknologi Pembelajaran*, *4*(1), 816–825. https://doi.org/10.31004/basicedu.v5i6.1733.

Zalat, M. M., Hamed, M. S., & Bolbol, S. A. (2021). The Experiences, Challenges, and Acceptance of E-Learning as a Tool for Teaching During the COVID-19 Pandemic among University Medical Staff. *PLoS ONE*, *16*(3 March), 1–12. https://doi.org/10.1371/journal.pone.0248758.