Research Article

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Development Of E-Module Based On Autoplay Media Studio 8 For Basic Machining Course For Undergraduate Students Of Mechanical Engineering Education, State University Of Malang

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Abstract

In the current machining practicum, the teaching material module used for learning is not enough to facilitate the teaching and learning process about the machining process because the printed module which contains materials and pictures alone is not able to understand the machining practicum because the machining practicum requires direct observation from an educator's demonstration so that students better understand the process. To directly demonstrate the process to students requires more time and concentration, students are not necessarily able to understand it immediately. Sometimes students do not concentrate or forget and in order to better understand them, they need media assistance that can display material in the form of text, images, demonstrations in the form of audio and visual so that they can be studied independently and are easy to understand. Therefore, in order to make it easier for the delivery of material and demonstrations, interactive learning media in the form of electronic modules are needed that can be given to students to help facilitate the delivery of material or direct demonstrations in the form of text, images, audio and visuals to overcome them. Automedia Studio 8 was chosen as the media in the development of e-modules because it has many advantages in its use that do not need to install additional applications, as well as in the manufacture of products that can combine various types of files. The research and development that has been carried out has produced a product in the form of an e-module learning media for basic machining practicum based on Autoplay Media Studio 8 for undergraduate students of Mechanical Engineering Education, State University of Malang. The development of this learning media was developed using the ADDIE development model which consists of several stages, namely: 1) Analysis; 2) Design; 3) Development; 4) Implementation; 5) Evaluation. Validation was carried out on material experts, media experts and test subjects, namely students. Based on the results of product validation on material experts, media experts, and users, data with a total average of 92.6% can be concluded that the e-module based on autoplay media studio that has been developed in the basic machining practicum course is categorized as feasible. It is recommended that in order to maximize learning, educators should explain the important points contained in the e-module directly on the machine. This module is only to support learning, not to replace practical work. How to do practical work can be learned from this e-module.

Keyword: Instructional Media, Electronic Module, Basic Machining

1. Introduction

A good education is the nation's pride, because a nation that has a high quality of education is more valued than a nation with a low quality of education. A developed and rapidly developing nation is due to a good education factor. This is evident from several developed countries such as America, Germany, and several other developed countries that have a good education system, highly developed industry, sophisticated technology, and so on. Education is also a means for the state to improve the quality of human resources and realize the state's goals in educating the nation's children. In the era of the industrial revolution 4.0, the need for human resources who are able to adapt to technological developments is very important.

According to Azmi, et al (2018, p. 271) to meet the needs of the industrial revolution 4.0 era, education must be able to adapt to the development of digital technology in order to produce human resources that can meet the needs of the industrial revolution 4.0. So it can be interpreted that if you want to produce human resources that can adapt to the era of the industrial revolution, education must integrate digital technology in learning.

One of the most important needs for every human being, society and country is education. Currently, education is being faced with the era of the industrial revolution 4.0. The existence of the 4.0 industrial revolution era is an opportunity as well as a threat, especially for the Indonesian state and the unprepared business sector. In addition, the impact also occurs on education, especially education in Indonesia, where quality has not yet been matched between educational output and the needs of the world market (Afrina, et al. 2018, p. 12). In this era of the industrial revolution 4.0, Indonesia is facing changes in various sectors with the presence of digital technology. For this reason, graduates from vocational education are expected to not only be able to master the practice but also be able to master the operation of digital equipment according to their field in order to meet market needs. The rapid growth of the industrial revolution 4.0 today, is no longer a competition between human workers, but with technology (Shahroom & Hussin, 2018, p. 316). Facing this, education must be able to adapt and must be relevant to the situation. The demand for relevance between education and the industrial revolution has resulted in the need for improvements, especially in skills that are in accordance with the needs in industry. According to Bhattacharyya (2018, p. 2) to be ready to work, various attributes and other skills are needed which have been considered as determinants in the era of the industrial revolution 4.0 such as social skills, accountability, a critical and innovative entrepreneurial mindset, driven by goals and enthusiasm and other skills. deemed relevant to be employed and ready to work.

The world of education is a place for the teaching and learning process where the interaction of educators and students occurs. According to Pane and Dasopang (2017, p. 334) learning is essentially a process where students feel the impact of changes from the educational process. According to Reigeluth (2013, p. 25) success in learning is identified into three, namely: 1) learning effectiveness which is usually measured by the level of achievement, 2) learning efficiency as measured by learning time and cost, 3) the attractiveness of students in learning is marked with an interest in learning activities. In order for success in learning from these three things, it is necessary to have the right learning media in the learning process. According to Handayani (2019, p. 67) the use of learning media can save learning time, increase student motivation, and be able to avoid misunderstandings between the delivery of educators to students.

At this time the development of digital media is currently a lot, but the availability of media used in the world of education is still not fully utilized, even though digital learning media currently have a positive impact on students. There are many studies on digital media that can increase the interest of students to learn. According to Syahroni, et al (2020, p. 173) digital learning media in the form of audio-visual can provide an interesting learning experience and have a positive psychological effect on the learning process. According to Sadiman (2009, p. 6) media means intermediaries or messengers from the owner of the message to the recipient of the message. According to Garneli (2014, p. 1) learning based on digital technology media can help students achieve basic abilities and skills such as computational thinking and creativity. Maswan & Muslimin (2017, p. 116), defines the function of the media as a tool used to distribute messages or information from the sender to the recipient of the message. Learning media is a learning aid in the context of delivering material as a message so that it is more easily accepted by recipients, namely students, so that students are more motivated and active in participating in learning (Marsudi, 2016, p. 19). Media has the benefit of facilitating the interaction of educators and students so that learning activities are more effective and efficient (Abdullah, 2017, p. 36). According to Nurrita (2018, p. 177-178), teaching media has several benefits. First, the delivery of learning messages can achieve more standards. Second, learning can be more interesting. Third, learning becomes more interactive. Fourth, shorten learning implementation time by applying learning theory. Fifth, the quality of learning can be improved. Sixth, the learning process can be carried out wherever and whenever as needed. Seventh, the positive attitude of students towards learning materials and the learning process can be improved. Eighth, the role of educators changes in a more positive direction. According to Suartama and Ajar (2016, p. 12-15) the criteria for the quality of learning media have three aspects including: 1) learning aspects, 2) material aspects, 3) media aspects. These three aspects are the criteria for measuring the quality of learning media.

The selection of learning media will determine the learning process. Good media are media that can convey all learning information to students properly (Tafonao, 2018, p. 103). According to Mayer, (2002) a person can receive messages better through media that combines text, image design, video, and animation than media in the form of text or narration alone. So the use of learning media in the learning process will support the learning process for students.

It should be noted that in lectures in the mechanical engineering department the students are not only from SMK, but many are also from SMA/MA. In education, the process of exchanging information by lecturers and students is often called teaching and learning activities. In the implementation of teaching and learning activities in the machining practicum course in the mechanical engineering department, there is currently a learning module that can be used by students in learning but is still in hardcopy form. According to Rahdiyanta (2016, p. 1) said that the module is defined as one complete unit, consisting of a framework of learning activities that have been arranged to assist students in achieving operational learning goals, for effective learning activities. In education, of course, there is a communication process in a learning that is being carried out, which aims to convey and receive information. With modules and jobsheets as well as machine tools in the Mechanical Engineering laboratory, State University of Malang, machining lectures have been carried out until now. In the machining practicum at the State University of Malang the module of teaching materials used for learning is not enough to facilitate the teaching and learning process about the machining process because the print module which contains materials and pictures is not interesting, the machining practicum requires direct observation of an educator's demonstration to make it more interesting. understand the process. If it is explained in the laboratory directly to students, it will spend a lot of time so that it spends student practice time to work on worksheets in the laboratory because the material is a lot when explained in detail. In addition, in this all-digital era of the industrial revolution 4.0, many use learning media to support the learning process. According to (Bahri, et al, 2018, p. 395) learning technology in the form of using ICT-based media can overcome the learning problems of students and educators in delivering material. In addition, the use of electronic digital teaching materials can also be a solution to problems and new breakthroughs in the development of teaching materials in this 4.0 era (Cahyanto, 2020, p. 51).

One of the teaching materials that can be used in the teaching and learning process is e-module. According to Handayani, et al (2021, p. 96) the electronic module is the latest innovation from the print module, where this electronic module can be accessed with the help of a computer that is integrated with software that supports e-module access. According to Kadek, et al (2017, p. 42) electronic modules or e-modules are the display of teaching materials in book format that are displayed electronically stored on flash drives, CDs, diskettes, hard disks and can be read using a computer or electronic module reader. As teaching materials, electronic modules can be accessed online and offline, to be more flexible in accordance with the digitization of learning to utilize potential costs, space and time (Hold, et al, 2017, p. 149). According to Maskum and Purwanto (2020, p. 302) electronic modules are able to improve student learning outcomes both cognitive, affective and psychomotor as long as they are packaged properly. The e-module developed in this development research uses ICT-based media. Kuswandari & Suryanto (2015, p. 183) also said that learning by involving the media will foster interest in learning. The media used must be able to provide appropriate material, videos of the machining practicum process, questions and evaluations. One of the media that can be used is Automedia Studio 8 which is an interactive learning media that can display material, videos along with questions and answers and can be played over and over again. According to Husrah (2020, p. 36) autoplay media studio 8 is a media that is able to combine files in the form of text, images, video, audio, flash, exe files, html, and web links and others. Autoplay Media Studio has good quality and easier learning media so it is widely used as a learning medium (Alfan, 2015, p. 47). Learning media based on the Autoplay media studio 8 application is an application that is relatively easy to use, because in making using Autoplay it is not as complicated as script-based applications with programming languages (Shubhi, et al, 2015, p. 84).

The development of media in the form of an e-module based on Autoplay media studio is accompanied by a video of the machining steps and jobsheets aimed at facilitating learning in practicum, especially to save time in delivering material, explaining jobsheet work, and so that there are no misunderstandings between educators and students. With the existence of electronic media in the form of modules, students can learn independently the basic machining practicum process and more time is used for practicum in the

laboratory. Electronic modules are independent teaching materials that are systematically arranged into learning to achieve certain learning objectives which are presented in electronic form (Cahyanto, 2020, p. 51). With the e-Module, it is hoped that students can learn without having to meet face-to-face with the lecturer to ask for an explanation of the basic machining practicum process. The material can be studied, the practical work steps and jobsheets can be viewed through the e-module media. In addition, the use of learning media in the world of education is very necessary because the development of digital media and technology will continue to be related to education.

Due to the absence of a machining practicum module in the form of an e-module in the teaching and learning process in the mechanical department that is used for learning materials, this development research will develop a module in the form of an e-module for basic machining practicum courses. Then test the level of product feasibility to material experts, media, and users, namely the test group students.

2. The art of Research

The development of digital learning media based on Autoplay Media Studio has several research relevances, including:

1. Development of interactive learning media based on the Autoplay Media Studio 8 application on the Water Turbine material conducted by Moh. Latif Risyda Shubhi, Widiyanti, and Yoto, Jurnal Pendidikan Profesional in 2014. The results of the research and development stated that the media developed was valid and suitable for use as a instructional media digital.
2. Development of interactive learning media based on Autoplay Media Studio 8.5 on the material of phenomena in the Atmosphere and Hydrosphere conducted by H. M. Maskam, Marta Putra Dinata, and Armin Subhani, Jurnal Kajian Ilmu in 2020. The results of the research and development stated that the media developed was valid and effective for use as a instructional media digital.
3. Development of interactive learning media based on the Autoplay Media Studio 8 application in learning Islamic Cultural History conducted by Rumainur, Thesis in 2016. The results of the research and development stated that the media developed was valid and effective for use as instructional media.
4. Development of interactive instructional media using Autoplay Media Studio 8 for Colloidal Chemistry material conducted by Miftahul Jannah, Jimmi Copriady, and Rasmiwetti, Journal of Educational Sciences in 2019. The research and development showed that the media developed was valid and suitable for use as instructional media digital.
5. Development of multimedia based on Autoplay Media Studio for Arabic language learning conducted by Anan Asnawi, Thesis in 2017. The results of the research and development stated that the media developed was valid and effective for use as instructional media digital.

From several previous studies, it was found that Autoplay Media Studio 8 can be used as an application that can be used to develop instructional media digital.

3. Development Method

According to Sugiyono (2020, p. 31-37), the notion of research and development or what is called Research and Development (R&D) is a structured research method used to research, design, produce and assess products developed with the aim of building an empirical study of the new product. . According to Borg and Gall (1983) development research is an activity to develop a product that can be used in the learning process. According to Mulyatiningsih (2012, p. 161), research and development is a development process that aims to produce new products from research activities. The products produced in research and development are different from the development that is intended simply. Simple development that will be carried out without any revisions which will have an impact on the level of validation and feasibility of the product to be produced. As expressed by (Setyosari, 2013, p. 223) reveals that development research is different from simple learning development, defined as a systematic study to design, develop, and evaluate learning programs, product manufacturing processes and product production must meet internal criteria that consistent and decent. According to Gay (1990) development research is an activity to develop products that are feasible and can be used for teaching and learning activities, not to test theories. This research includes research and development (Research & Development) by creating and developing a Machining Practicum e-module based on an existing e-module by modifying it into a new e-module with the Autoplay Media Studio 8 application. validated and tested to assess the feasibility of the product.

The development model in this study uses the ADDIE development model. According to Branch (2009, p. 2-3) ADDIE research and development consists of several steps as follows:

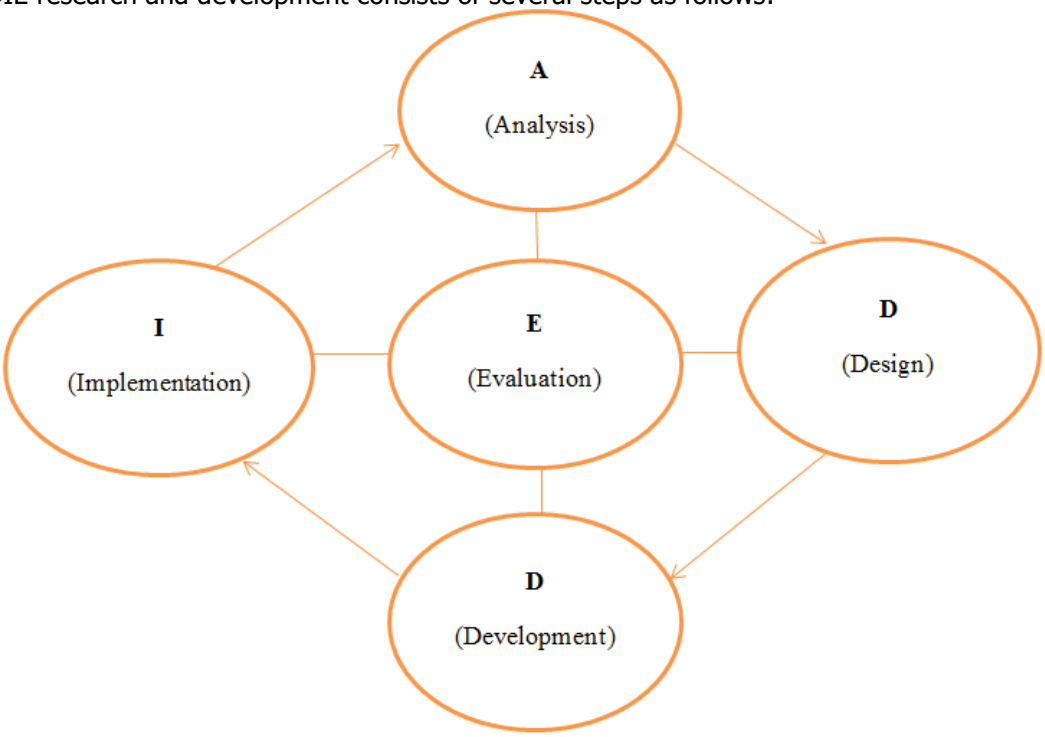

Figure 1 Steps of research and development according to ADDIE
(Source: Branch, 2009, p. 2-3)

The first stage is the Analysis stage which consists of needs analysis in the form of needs analysis in the field by observing lecturers and students in the S1 Laboratory of Mechanical Engineering Education, State University of Malang and looking for references on the development of learning media for selecting the right learning media. The next activity is front end analysis, namely looking for references about curriculum, RPS development, SAP, materials, jobsheets and previous references about developing learning media using Autoplay Media Studio 8. The second stage is the design stage. At this stage, the design of e-module development is carried out which includes media selection, material, e-module arrangement, formulation of objectives, location and test subjects, determination of objectives, product design, flowchat and storyboards, and research instrument design. The third stage is the development stage. At this stage the creation and development of e-module learning media based on autoplay media studio 8 is carried out based on the planned storyboard and flowchat designs. Then develop a validation instrument. The instrument used to collect data is a questionnaire.

According to Sugiyono (2020, p. 199), the Questionnaire "is a data collection technique carried out by giving a set of questions or written statements to respondents to answer". There are 3 data collection instruments here, the first is a validation instrument for media experts, materials, and test subjects. The validation instruments that have been compiled are validated to expert judgment. After the e-module has been created and developed, product validation is carried out to a material expert first and then to a media expert to assess and provide comments, suggestions and input so that the e-module is further refined. The material in the e-module that has been developed is tested for the feasibility of the content of the material on a material expert consisting of 2 expert lecturers of basic machining practicum courses S1 Mechanical Engineering Education, State University of Malang. Furthermore, the media in the e-module that has been developed is tested for the feasibility of media content on media experts consisting of 2 expert lecturers and very experienced in the field of learning media at the Faculty of Engineering, State University of Malang. Validation was carried out using the validation instrument of material experts, media experts, and test subjects which were developed based on the source of the eligibility criteria for learning media according to Suartama and Ajar (2016, p. 12-15). The fourth stage is the implementation stage where the

e-module that has been developed is tested on product users, namely the trial group. In determining the test subjects, Arikunto (2013, p. 254) stated that the number of respondents for product trials was between 15-50 people. The trial subjects in the trial use of this product were carried out on students who were or had followed the basic machining practicum course. The fifth stage is evaluation. At this stage, data collection and report preparation are carried out.

Data obtained from material experts, media experts, and feasibility trials based on questionnaire sheets were analyzed using descriptive analysis techniques. The data analysis technique used for the questionnaire is descriptive percentage analysis. This technique is used to see the percentage of responses or responses from material experts, media, and test subjects, namely students. The formula used to calculate the percentage is (Sudijono, 2005):

$$P = \frac{f}{N} \times 100\%$$

Information :

P : percentage number

F : the frequency you are looking for is the percentage

N : *numbering of cases* (number of frequencies / number of individuals)

To obtain product feasibility, a score is given to convert qualitative data into quantitative data with the following conditions:

Table 2. Product Scoring Terms

Category	Score
Very Good	5
Good	4
Enough	3
Low	2
Very low	1

Source: Sugiyono (2020, p. 412).

Data from the results of filling out the questionnaire with the provision of scoring were analyzed by adding up the average score of each aspect with the formula:

X = ∑X : N

Information :

X = Average score

∑X = Total score

N = Number of test subjects

Then interpret qualitatively the average number of scores for each aspect by using the following 5 scale score conversion formula:

Table 3. Conversion Formula for the Average Number of Scores on a Five Scale

Score	Formula	Classification	Kriteria
5	$\bar{X} > \bar{Xi}$ + 1,8 . SBi	Very Good	Worthy
4	$\bar{Xi}$ + 0,6 . SBi < $\bar{X} \leq \bar{Xi}$ + 1,8 . SBi	Good	
3	$\bar{Xi}$ - 0,6 . SBi < $\bar{X} \leq \bar{Xi}$ + 0,6 . SBi	Enough	Not Worthy
2	$\bar{Xi}$ – 1,8 . SBi < $\bar{X} \leq \bar{Xi}$ – 0,6 . SBi	Low	
1	< $\bar{X} \leq \bar{Xi}$ – 0,6 . SBi	Very low	

Information :

Max score = 5

Min score = 1

Max score ideal = number of indicatorsx highest score

Min score ideal = number of indicatorsx lowest score

X = score obtained

Xi = 1/2 (scoremaks ideal + score min ideal)

SBi = 1/6 (score maks ideal – score min ideal)

Source: Eko Putro Widyoko (2011, p. 245).

4. Result

Data from research and development of e-modules based on Autoplay Media Studio 8 basic machining practicum courses for undergraduate students of Mechanical Engineering Education, State University of Malang is descriptive qualitative data. Data from product validation results to material experts, media expert validation, and product testing to users in the form of percentage data described. The data is described as follows:

Table 4. Average percentage of evaluation of the basic machining practicum e-module

No	Responden	Average	Criteria
1	Material Expert Assessment 1	88%	Worthy
2	Material Expert Assessment 2	95%	Worthy
3	Media Expert Rating 1	89%	Worthy
4	Media Expert Rating 2	100%	Worthy
5	Test Subject Assessment	91%	Worthy
Average all		92.6%	Worthy

The development of the basic machining practicum e-module has been validated to material experts, media and test subjects. The e-module that has been developed is tested for the feasibility of the content of the material on the material expert consisting of 2 expert lecturers of the basic machining practicum course S1 Mechanical Engineering Education, State University of Malang. The data analysis of the results of the feasibility test of the content of this material includes several aspects according to Suartama and Ajar (2016, p. 12-15), namely: 1) Material aspects, 2) Learning aspects, 3) Language aspects, 4) Evaluation aspects. The results of the assessment of product material content on the first material expert on the material aspect got an average score of 92%, the learning aspect got an average score of 88%, the language aspect got an average score of 92%, the evaluation aspect got an average score by 80%. The total product assessment of material experts is valid with a total average score of 88%. Based on the conversion formula for the average number of scores on a scale of five according to Eko Putro Widyoko (2011, p. 245), the data obtained that the total value of the assessment of the product material content has an average score of 88% included in the good classification and the appropriate criteria. The results of the assessment of product material content on the second material expert on the material aspect get an average score of 80%, the learning aspect gets an average score of 100%, the language aspect gets an average score of 100%, the evaluation aspect gets an average score by 100%. The total product assessment of material experts is valid with a total average score of 95%. Based on the conversion formula for the average number of scores on a scale of five according to Eko Putro Widyoko (2011, p. 245), the data obtained that the total value of the assessment of product material content has an average score of 95% which is included in the very good classification and the criteria are feasible.

The E-Module that has been developed is tested for media content feasibility by media experts consisting of 2 lecturers of learning media experts at the Faculty of Engineering, State University of Malang. The data analysis of the results of this media feasibility test includes several aspects according to Suartama and Ajar (2016, p. 12-15), namely: 1) Aspects of the electronic media module, 2) Aspects of display. The results of the product media assessment on the first media expert obtained data on the electronic media aspect getting an average value of 88%, the display aspect getting an average value of 90%. The total product assessment of media experts is valid with a total average total score of 89%. Based on the conversion formula for the average number of scores on a scale of five according to Eko Putro Widyoko (2011, p. 245), it is found that the total value of the media product assessment has an average score of 89% which is included in the very good classification and the criteria are feasible. The results of the product media assessment on the second media expert obtained data on the electronic media aspect getting an average value of 100%, the display aspect getting an average value of 100%. The total product assessment of media experts is valid with an average total score of 100%. Based on the conversion formula for the average number of scores on a scale of five according to Eko Putro Widyoko (2011, p. 245), the data obtained that the total value of the media product assessment has an average score of 100% which is included in the very good classification and the criteria are feasible.

The e-module that has been developed is tested for the feasibility of the content of the material and media on the test subject, namely undergraduate students of Mechanical Engineering Education, State University of Malang who are still active and currently or have carried out basic machining practicum. The data analysis of the product feasibility test results to the test subject includes several aspects according to Suartama and Ajar (2016, p. 12-15), namely: 1) Material aspects, 2) Display aspects, 3) Product media usage aspects, 4) Product media usefulness aspects. The results of the assessment of material and product media on the test subject are valid with an average total score of 91%. Based on the conversion formula for the average number of scores on a scale of five, according to Eko Putro Widyoko (2011, p. 245), it was found that the total value of the media product assessment has an average score of 91% which is included in the very good classification and the criteria are feasible.

From the results of the validation of material experts, media and test subjects, the average total product validation data was 92.6%. It can be concluded that the e-module based on autoplay media studio in the basic machining practicum course is categorized as feasible.

5. Discussion Product

The use of learning media based on Automedia Studio 8 has been widely used in research and development. In the research and development conducted by Moh. Latif Risyda Shubhi, Widiyanti, and Yoto, Journal in 2015, namely the development of interactive learning media based on the Autoplay Media Studio 8 application on the Water Turbine material in the Machining Engineering expertise program. This development research aims to create interactive learning media using Autoplay Media Studio 8 because the Water Turbine learning at the National Vocational School still uses traditional learning. The research and development shows the results that the media developed in the learning process is stated to be good, valid, practical, effective, and feasible to help the learning process. It is proven by the results of validation on material experts, media, and test groups whose results are declared valid. Learning media based on autoplay applications can be used as a consideration for students in MKE learning in lectures (Shubhi, et al, 2015, p. 91). The difference in the development of the developed media lies in the development model used, the learning materials used, the validator and the test subject.

In the research and development conducted by Rumainur, Thesis in 2016, namely the development of interactive learning media based on the Autoplay Media Studio 8 application in learning Islamic Cultural History. This research and development aims to produce a learning media that was developed based on the criteria of material, navigation, language and display which were validated by experts and then to determine the effectiveness and attractiveness of the product developed for users. The research and development shows that the media developed is valid and has a high level of effectiveness and attractiveness. It is proven by the results of the validation and the results of the average daily test scores of students increasing by 18.49% from before. The difference in the development of the developed media lies in the development model used, the learning materials used, the validator and the test subject.

In the research and development conducted by Anan Asnawi, Thesis in 2017, namely the development of multimedia based on Autoplay Media Studio for learning Arabic. This research and development aims to develop learning media based on Autoplay Media Studio in Arabic subjects, product validation to material experts, media experts, user responses, and determine the effectiveness of using the developed media. The research and development shows the results that the media developed is valid and effective to use as a learning medium. It is proven by the results of validation on the validator and students whose results are declared valid and effective. The difference in the development of the developed media lies in the development model used, the learning materials used, the validator and the test subject.

In the research and development carried out by H. M. Maskam, Marta Putra Dinata, and Armin Subhani, the Journal in 2020 is the development of interactive learning media based on Autoplay Media Studio 8.5 on material symptoms in the Atmosphere and Hydrosphere. The purpose of this research and development is to produce appropriate and effective media in terms of validity, practicality, and effectiveness due to the ineffectiveness of learning in the classroom and students only relying on physical books as learning media. The research and development shows the results that the media developed is valid and effective to use as a learning medium. It is proven by the results of validation on the validator and students whose results are declared valid. The difference in the development of the developed media lies in the development model used, the learning materials used, the validator and the test subject.

In research and development conducted by Miftahul Jannah, Jimmi Copriady, and Rasmiwetti, the Journal in 2019 was the development of interactive learning media using Autoplay Media Studio 8 for Colloidal Chemistry Material. This research and development aims to develop interactive learning media using Autoplay Media Studio 8 that is suitable for use as a learning medium because chemistry studies concepts that are mostly abstract so that they are difficult to understand when explained in two-dimensional form. The research and development shows the results that the media developed is valid and feasible to be used as a learning medium. It is proven by the results of validation on the validator and students whose results are declared valid. The difference in the development of the developed media lies in the development model used, the learning materials used, the validator and the test subject.

From some previous research and development, it can be concluded that the development of learning media based on the Autoplay Media Studio application can be done as an alternative media and problem solving in the learning process. Therefore, in the research and development of the basic machining practicum e-module based on Autoplay Media Studio 8.

This E-Module is structured to support the basic machining practicum lectures in the Mechanical Engineering department, State University of Malang. This E-Modul contains practical material in the basic machining practicum by adjusting the S1 curriculum for Mechanical Engineering Education, State University of Malang. This E-Module is arranged based on the module arrangement. Automedia Studio 8 is used because it is very easy to use, especially because it does not require a programming language that is too complicated. This e-module contains a combination of Microsoft office files, images, mp3, mp4, flash slides, wallpapers, buttons, font size, rich text, and other supports. E- This module provides an explanation of the steps for working on a jobsheet along with pictures and videos related to working on a jobsheet for the basic machining practicum course majoring in Mechanical Engineering Education, State University of Malang. It is also equipped with material and pictures so that you can understand the things you need to know before starting practicum activities. This e-module makes it easier for you when you practice, the step by step described in this e-module will provide directions and instructions for you so that you can do the jobsheet well and smoothly. This E-Module consists of four learning activities, each lesson has a lecture program unit (SAP), materials, job sheets, working steps accompanied by image and video explanations to make it easier for you to carry out basic machining practicum.

The material in learning activity 1 contains about sharpening flat lathe chisels and eccentric lathes equipped with enrichment materials, jobsheets, how to read jobsheets, working steps, tools and materials, and videos on how to do them. Learning activity 2 contains about the work process with a lathe, a job sheet lathe and an eccentric lathe equipped with enrichment materials, jobsheets, how to read a jobsheet, working steps, tools and materials, and videos of the process. Learning activity 3 contains the work process with a milling machine equipped with enrichment materials, jobsheets, how to read jobsheets, working steps, tools and materials, and videos of the process. Learning activity 4 contains the process of working with a scrap machine equipped with enrichment materials, jobsheets, how to read the jobsheet, working steps, tools and materials, and videos of the process. This E-Module is also equipped with practice questions related to the existing material along with the answer key. There is also a summary, a list of pictures, a bibliography and a glossary. This e-module is in the form of an application file that does not require the installation of a special application, it is enough to have this e-module file intact and double-click on the basic machining practicum e-module application file and it can be used. For the specifications of the computers and laptops used, see the specifications and how to use them. The file size of this application is 2.4 GB arranged in one folder containing the complete basic machining practicum e-module application file. This basic machining practicum E-Modul application can be used on computers and laptops with a minimum specification of Pentium IV, 1GB RAM, Windows XP installation. The appearance of the application is as follows:

Figure 2. Initial View

Figure 3. Content display

Figure 4. Display of the contents of learning activities

Figure 5. Display of jobsheet contents

6. Conclusion

The research and development that has been carried out has produced a product in the form of an e-module learning media for basic machining practicum based on Autoplay Media Studio 8 for undergraduate

students of Mechanical Engineering Education, State University of Malang. The material contained in this basic machining practicum e-module is material that refers to the S1 curriculum of Mechanical Engineering Education, State University of Malang. The advantages of this e-module are: 1) this e-module based on autoplay media studio 8 is in the form of an application file that can be directly used on a computer or laptop without requiring special application installations, 2) this e-module based on autoplay media studio 8 is in the form of a display like interesting flash to be used as learning media, 3) this e-module based on autoplay media studio 8 provides key features to access links or files of documents, videos, images, and others, 4) this e-module based on autoplay media studio 8 capable of loading various types of files, be it text, images, sound, video, flash, html, exe, and web links in one application file, 5) this e-module based on autoplay media studio 8 contains basic machining material in the form of an e-module. The module consists of several learning activities equipped with lesson plans, SAP, materials, worksheets, working steps, working videos, and practice questions. The disadvantages of this e-module are: 1) this e-module based on autoplay media studio 8 can only be used on computers and laptops with a minimum specification of a Pentium IV processor with 1 gigabyte of RAM, 2) this e-module based on autoplay media studio 8 can only be used offline, for online requires integration with other applications such as google meet, zoom meet, or other applications.

The development of this e-module learning media was developed using the ADDIE development model which consists of several stages, namely: 1) Analysis; 2) Design; 3) Development; 4) Implementation; 5) Evaluation. The e-module that has been developed is tested for the feasibility of the content of the material and media on the user. The suggestions from material experts that have been carried out are: 1) adding a tool grinding machine that is used specifically for sharpening chisels, 2) chisel sharpening videos are given that can show the measurement of chisel sharpening results, 3) milling machine images are proportional so that they are not too flat, 4) milling video using practical clothes. The suggestions from media experts that have been carried out are: 1) in general the e-module is good and can be used, 2) made some improvements to the button position. From the comments and suggestions, improvements were made in accordance with the comments and suggestions given by experts. From the results of the development that has been carried out, several conclusions are obtained, namely: 1). Research and development produces a product in the form of a basic machining practicum e-module that can be used to support the learning process in machining practicum courses at the Department of Mechanical Engineering, Faculty of Engineering, State University of Malang. E-modules can be used for teaching and learning because e-modules contain material developed based on the S1 Mechanical Engineering Education curriculum, State University of Malang which is arranged based on the module arrangement using the Autoplay Media Studio 8 learning media which can combine various types of files and can be used on various types. a computer or laptop with a minimum specification of Pentium IV, 1GB ram, Windows XP installation. 2). Products developed are tested for product feasibility by material experts, media experts, and test subjects. The data on the results of the assessment of the content of the product material for the first (88%) and second (95%) material experts obtained an average score of 91.5% which was included in the good classification and the criteria were feasible. The results of the media product assessment on the first (89%) and second (100%) media experts obtained an average score of 94.5% which was included in the very good classification and the criteria were feasible. The results of the product media assessment on the test subject obtained an average score of 91% which was included in the very good classification and the criteria were feasible. Based on the results of product validation on material experts, media experts, and test subjects, data with a total average of 92.6% can be concluded that the e-module based on autoplay media studio that has been developed in the basic machining practicum course is categorized as feasible.

Suggestion

Based on the research and development of the basic machining practicum e-module for the Department of Mechanical Engineering Education, State University of Malang, several suggestions were obtained including: 1) the results of the development of learning media for the basic machining practicum e-module for the Department of Mechanical Engineering Education, State University of Malang, are expected to be used for basic machining practicum learning, so that it is expected to make it easier for students to learn and become a guide for teaching and learning in the future, 2) it is recommended for lecturers to make this e-module one of the teaching materials and provide basic machining practicum e-modules to students at the beginning lectures so that students can study independently and can directly carry out practicum during practice hours and become a source of reference for student learning materials, 3) this e-module can be used as a source of student learning to study independently wherever they are regarding practical courses m basic machining, 4) it is recommended for users of this e-module to read the instructions for use contained in the e-module, 5) it is recommended that students in addition to studying this basic machining practicum e-module increase their knowledge about basic machining practicum by reading other sources and references so that students get broader insights and knowledge, 6) the basic machining practicum e-module can be used and studied independently with or without the internet, no need to install other applications, just have 1 application file folder, click 2 times the practicum e-module application file basic machining on a computer or laptop with a minimum specification of Pentium IV, 1gb ram, windows XP installation, 7) there is a need for further development of learning media in basic machining practicum courses to support the learning process, make it easier for students to learn and understand the machining practice process, keep abreast of technological developments and in accordance with developments of the times, such as argumented reality, virtual reality, and other electronic learning media that can be used on mobile phones or other latest media, 8) hopefully with the development of learning media in the basic machining practicum course, it is expected to increase knowledge, skills, creativity, and confidence students in learning and working.It is recommended that in order to maximize learning, educators should explain the important points contained in the e-module directly on the machine. This module is only to support learning, not to replace practical work.How to do practical work can be learned from this e-module.

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