The Development of E-Module with Blog Based in Basic Drawing of Software Engineering at Geomatics Competency

Abdul Mufid✉, Eko Supraptono, Adhi Kusumastuti

Pascasarjana, Universitas Negeri Semarang, Indonesia

Article Info	Abstract
	In Indonesia vocational high school (SMK) becomes one of the education levels that need to be developed. State vocational high school 1 Blora is a formal education that has many major competencies, one of them is geomatics engineering. Geomatics engineering is a major that carries out a series of learning activities covering various engineering subjects. In this field, the Basic Drawing of Software becomes crucial since it supports related subjects. E-module becomes one of the important requirements in the competency approach. These research aims are 1) developing the Autocad e-module; 2) Analyzing the worthiness e-module in Autocad; 3) Analyzing the practicality of the Autocad e-module to improve students' competency in Basic Drawing of Software for Geomatics students. The current research applied Research and Development (R&D) while feasibility and practicality validation analysis used intra-class correlation coefficients in SPSS v.25. The result of the study showed that an e-module with a blog based on the basic drawing was exclaimed very worthy based on material expert judgment with a 85,45 score. It is in line with the media expert who got a 86,43 score. The simplicity of the e-module was examined by geomatics engineering teachers and it achieved a 88,08 score. It can be concluded that this research is very worthy, simple, and very effective to improve geomatics students' skills in Basic Drawing of Software.

✉ Correspondence :
Pascasarjana, Universitas Negeri Semarang,
Jalan Kelud Utara III, Semarang, Jawa Tengah, Indonesia 50237
E-mail: abdulmufid24@students.unnes.ac.id

INTRODUCTION

Education is a place that endeavors human life and develops the potential to gain a good personality, intelligence, knowledge, skills, morals, and spirituals. It was needed for each individual, environment, and country to survive and compete in the real world. The fundamental of National education was in Pancasila and Indonesian constitution 1945 that rooted in the value of religion, culture, and responsive to the global issue (Law No. 20 of 2003 article 1 paragraph (2) the National Education System).

Education became an important thing in measuring the development of the nation and take a crucial role in constructing qualified human sources. This character means a person who believes in god and has a good personality. In Indonesia, vocational high school became one of the education levels that need improvement, especially for students' output. There is a gap between students' output and industrial needs since the graduate students cannot fulfill the requirement of industries such as mastering technology and lack of competency.

The development of business property should become a good opportunity for graduate students of vocational high school, especially for geomatics engineering as a drafter. It showed from many job vacancies that seek drafter positions. By seeking in Google with the keyword 'drafter vacancy 2017', 1.330.000 sites appeared with drafter vacancy in Indonesia. Unfortunately, the huge demand do not matched by students' output (2016, detik.com). In February 2016, unemployment touched 7,02 million and decreased by 430.000 compared with February 2015. The unemployment was dominated by the graduate of vocational high school (SMK). In February 2016, the unemployment level touched the peak by achieved 29,84%, and it was contributed by graduated students of SMK. This percentage increased by 0,79% compared with February 2015. It can be concluded that 9 to 10 had not got the job from 100 graduate students of SMK.

Geomatics Engineering is a major that carries out a series of learning activities covering various engineering subjects. The Basic Drawing of Software becomes one crucial subject since it supports other related subjects. State vocational high school (SMK) 1 Blora is a formal education that has many major competencies, and one of them is Construction Engineering. It consists of Building Information Modeling in Construction, Construction and Property Business, and Geomatics Engineering.

Basic Drawing of Software in Geomatics Competency may give the real illustration of basic competencies that are needed in industrial for the students. The purpose of this subject was to measure and navigate the measurement in the drawing. This purpose guided students to know, a skill that is needed in the industrial world. Unfortunately, in Basic Drawing of Software, the students are given theoretical material such as how to operate software till the printing process. The usage of information technology in this subject could give students an opportunity as production employees that enable them to use the technology.

Based on the pre-study, Basic Drawing of Software at XI Geomatics Engineering 2019/2020, the students have not known Cad software. This condition was different with their seniors who got the Cad software materials in their fresh year. It brought positive effect when they had to do learning activities with Cad Software in XI grade. Learning activities in 2020/2021 still adopted teacher center. This condition was not suitable with the 2013 curriculum where the student is the learning center. It happened because there was no learning source such as a module, and the students only had their teacher as a learning source.

According to the Vocational directorate (2008:1), teaching material development in the form of modules is an urgent and crucial need. This is a consequence of the implementation of the school-based unit-level curriculum. The competency approach requires the use of e-modules in the learning implementation. School infrastructure like computers plays an important role as devices for drawing with AutoCad software. Computer errors and software corrupt became one of the sttudents' obstacles when conducting learning activities.

E-module could be very effective media, efficient, and support the students to be independent. The module is a type of unified planned learning activities, designed to assist individual students in achieving their learning goals (Sukirman: 2012). Teaching with a module becomes an effort to organize individual learning that allows students to master a learning material unit before moving on to the next chapter. Recently, the technology is cheap, advanced, and affordable for all society, making the researcher think modules that are generally presented in printed form can be replaced with e-Module.

Based on the background above, the researcher purposed three research questions: 1) How is the development of an e-module in the subject of Basic Drawing with Autocad Landdekstop support students' competency. 2) How is the feasibility of the Basic Drawing e-Module with Autocad Landdekstop to support students' competency. 3) How is the practicality of the Basic Drawing e-Module with Autocad Landdekstop to support students' competency.

METHOD

The present research applied Research and Development (RnD) that is used to gain the product, and test its feasibility and practicality of the product. This research aimed to produce a product to improve students' competency in making digital patterns. The current study purposed to develop and validate a good educational product in the form of an electronic module that creates an educational product. Sugiyono (2009) stated that need analysis and effectiveness tests are crucial so that it uses for the community, research, and development.

The procedure of R&D developed by Dick and Carry (1996) is included in ADDIE. Warsita (2011) elaborated ADDIE model is a development model that is based on an effective system, dynamic, and supports the development media procedure. Dick and Carry (1996) divided the steps into five stages: (1) Need analysis, (2) Designing phase, (3) Development phase, (4) Implementation, and (5) Evaluation. E-module development can be seen in picture 1.
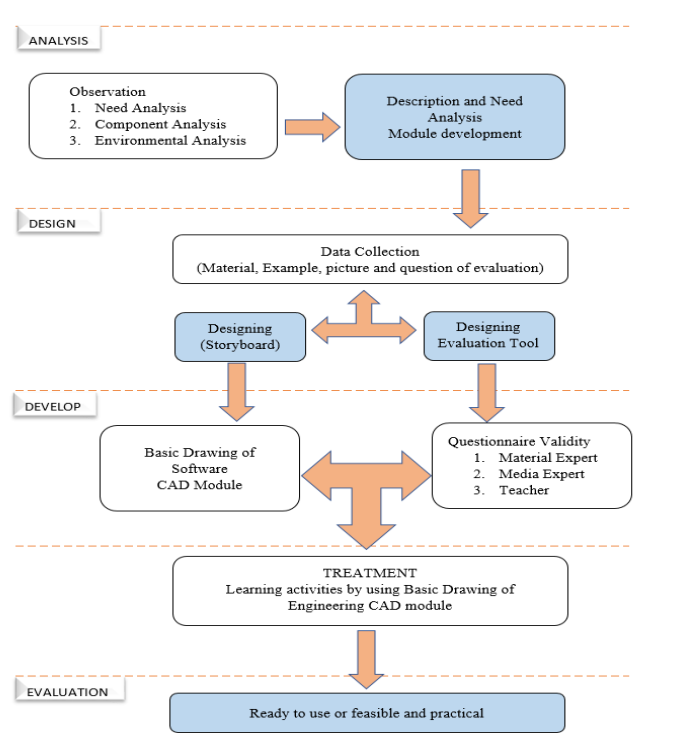
Picture 1. The development of e-module with ADDIE model procedure

The sample is a representative or part of the study population, while the population means the subject of the research (Suharsimi *Arikunto*: 2010). This study used the entire population as a sample. The target research is State Vocational High School (SMKN) 1 Blora, especially in Geomatics Engineering. Three teachers are recruited as the data source of research.

The data collecting technique is a technique that is applied to gain the data needed.

The data collecting technique used in the present research is e-module feasibility and practicality. An analysis of the feasibility and practicality of e-modules by experts was carried out to determine the feasibility and the practicality of blog-based e-modules. The validation results are then interpreted with the eligibility criteria, and the module practicality level can be seen in table 1 below:

Table 1. E-Module Feasibility and Practicality Criteria

| Score Interval	Result	Category
$X > Mi + 1.8\ Sbi$	X>4.2	Very Feasible/Practical
$Mi + 0.6\ Sbi < X \leq Mi + 1.8\ SBi$	3.4 < X < 4.2	Feasible /Practical
$Mi - 0.6\ Sbi < X \leq Mi + 0.6\ Sbi$	2.6 < X < 3.4	Quite Feasible/Practical
$Mi - 1.8\ Sbi < X \leq Mi - 0.6\ Sbi$	1.8 < X < 2.6	Not Feasible/Practical
$X \leq Mi - 1.8\ Sbi$	X < 1.8	Very Innapropiate

RESULT AND DISCUSSION

E-Module Development

The blog-based e-Module development supported digital drawing competence with AutoCAD for Vocational High School students in the Geomatics Engineering skill program. The planning stages of learning media are constructed based on student needs that focus on competency and learning objectives.

a)   **The Slide stages**

The slide stage is a stage that draws the initial-slide product, in this case, is blog-based e-module at Basic Drawing of Software. The initial product is the result of making e-modules before expert trials are carried out.
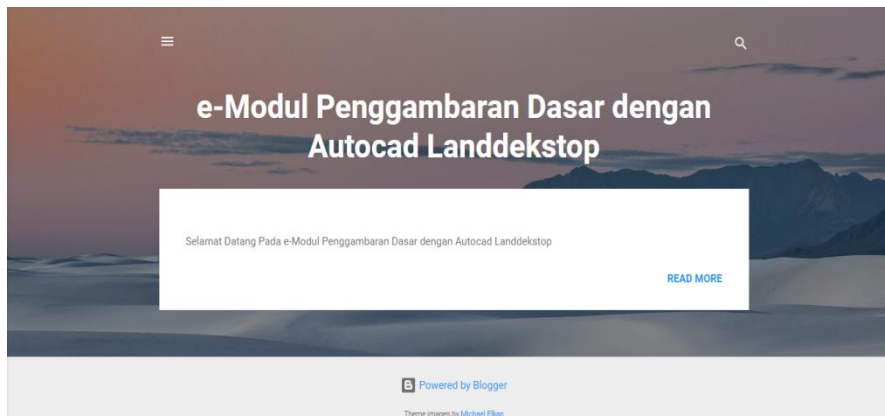
Picture 2. E-module homepage

The homepage is the first page where the title of the e-module existed. The aim is to make the page easy and understandable for the reader. The icon for skirt and shirt is also inserted on the homepage. This application is easy to use since it needs only one click, and the homepage will appear.
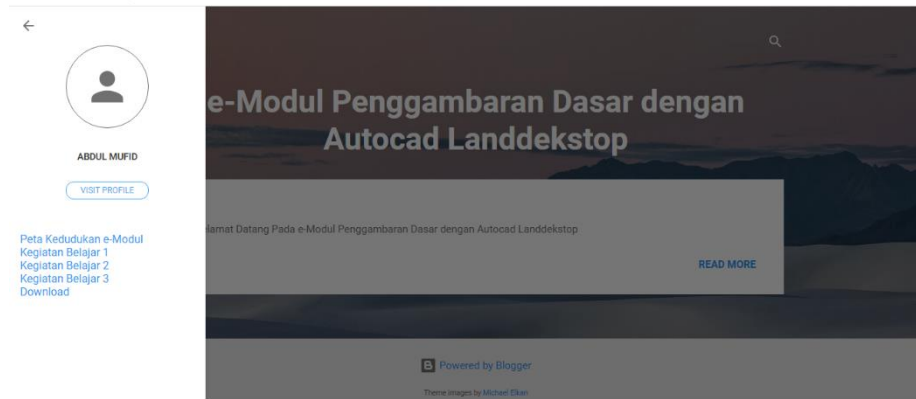
Picture 3. E-module main page

The main page is a page that show the main menu of the e-module. At the top of the page, there is the title of the e-module, Basic Drawing with Autocad Landdekstop. The main page consisted of seven items: 1) profile, 2) mapping, 3) learning activity -one, 4) learning activity-two, 5) learning activity- three, 6) download, and 7) undo. The material item contained all material that would be studied.
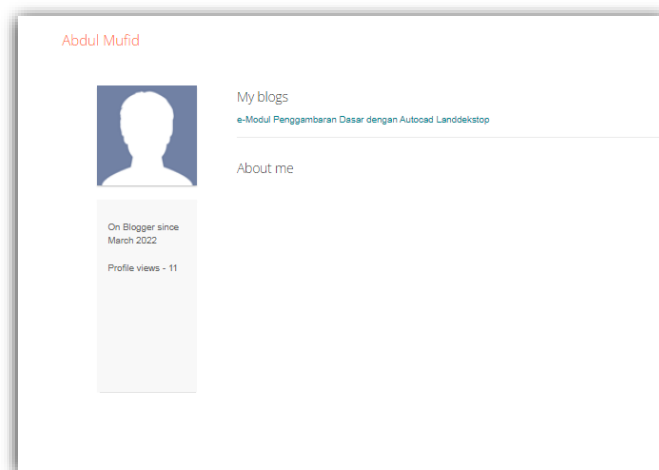
Picture 4. E-module profile

The profile menu showed the creator profile of the e-module. It consisted of biodata, student number, and undo menu to the main page. Mapping is a menu that provides leveling mapping of e-module. It explains basic competency, and indicator competency. Similar to profile menu, the undo button also was inserted to cancel or go to the page before. The leveling map can be seen as follows:
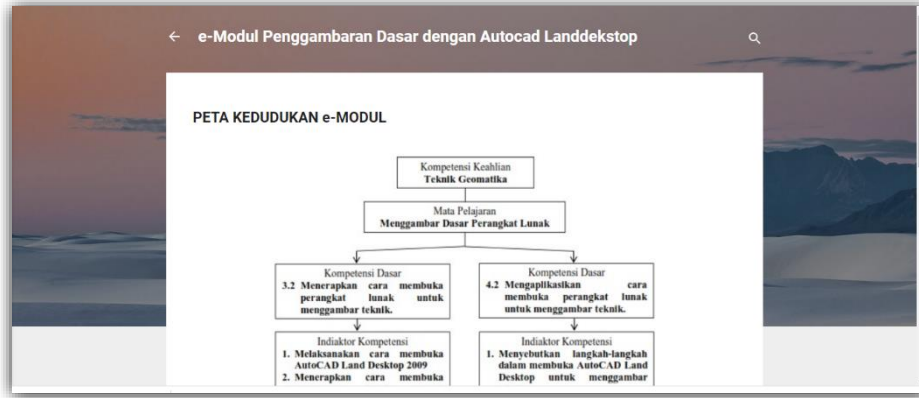
Picture 5. Levelling map of E-module

The learning activities menu is a menu that provides the materials such as creating a project, inputting the data, presenting the data including basic competency, indicator competency, learning purpos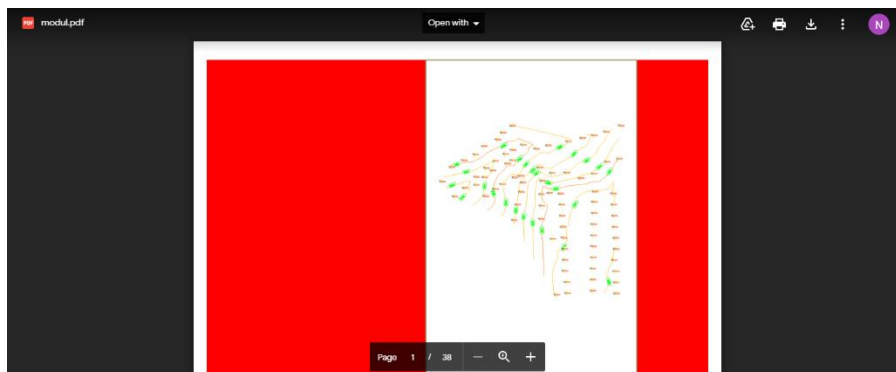es, detailed material, and exercises. This page has the next button and the previous button. The previous button has functioned as a bridge to go to the main page.

Picture 6. Levelling map of E-module

The download menu provided a google drive link that contained all material. This page is also completed with the previous button to the homepage.

Picture 7. E-module downloading menu

b)   The Mapping Stages

The mapping stage is a stage to make the title and materials in an e-module. On the homepage, the title was inserted 'e-module: Basic Drawing by using Autocad Landdesktop'. The chosen title was taken based on the faced problem at SMK N 1 Blora, especially in the Basic Drawing of Software subject. The mapping stage also was done by constructing the material based on basic competency and subject indicators.

There are two basic competencies in the present e-module. Those are how to open software for a Drawing machine and how to apply software in a Drawing machine. This material consisted of creating a project, inputting the data, presenting the data digitally, and conducting an evaluation after all material had been given.

c)   Database Using Stages

Database using stages was a stage to insert the picture. Tutorial pictures were made by using screenshot then it was attached to e-module.

d)   E-venting Stages

E-venting stage is a stage to input the event or instruction in the button of the e-module. This button was only a box with an instruction menu to enter the main page. The previous button is a button that contain an instruction to bring the user to the page before. The next button is a button that have instruction formulas to bring the user to the next page. In this e-module, an exit button was inserted to log out from the application.

e)   Publishing Stages

The publishing stage is a stage to publish an e-module in the web form (blogger.com). This web allowed the users to use and construct the learning media. In this blog, the user can directly make the media and transform it into as website. Furthermore, the link can be spread through WhatsApp or e-mail so that the students can assess it easily.

E-module Feasibility Result

The results of the e-module feasibility test were carried out by giving a questionnaire to material experts and media experts to assess the Basic Drawing e-module with Autocad Landdekstop. It based on the development assessment aspect by John Nesbit, namely the Learning Object Review Instrument (LORI). The feasibility validation test results from material experts and media experts was carried out using the SPSS v.25 programs and Microsoft Excel. The test results can be seen as follows:

a)   Media Expert Test

The feasibility test for the Basic Drawing e-module with Autocad Landdesktop was carried out by four media experts. It was conducted by providing assessments and suggestions using a questionnaire from the Presentation design aspect. The present media got 85 or declared very feasible. Furthermore, the Interaction Usability aspect achieved 83 or pronounced as very feasible. In the accessibility aspect got a 92 score or exclaimed as very feasible. Reusability aspect gained 88 or stated with a very decent category. The media expert test comes from elements of lecturers and teachers from Bhinneka PGRI Tulungagung University, and Pelita Harapan University Yogyakarta, and SMKN 1 Blora, the calculation of the expert test are as follows:

Table 2. Media Expert Validation Test

No	Experts	Score	Average Score
1	Okta Purnawirawan, S.Pd.,M.Pd.	84.29	
2	Urip Muhayat Wiji Wahyudi, M.Pd.	85.71	86.43
3	Drs. Bambang Priyanto	87.14	
4	Drs.Sri Suprihatiningsih	88.57	

Source: Processed Primary Data (2022)

Table 2 showed the purpose media achieved 86,43 of average score or very feasible category. Based on the classification that had been determined in the method study, the data were grouped into five categories, namely: very inappropriate, not feasible, quite feasible, feasible,

and very feasible. The obtained results can be seen as follows:

Table 3. Media Expert Test Results

Range of Score	Classification	Total	Percentage (%)
4.21 – 5.00	Very Feasible	4	100.0
3.41 – 4.20	Feasible	0	0.0
2.61 – 3.40	Quite Feasible	0	0.0
1.81 – 2.60	Not Feasible	0	0.0
0 – 1.80	Very Inappropriate	0	0.0
Total		4	100.0

Source: Processed Primary Data (2022)

Based on table 3, the media expert's feasibility test are very feasible, which means that the e-module is very feasible for the subject research.

b)   Material Expert Test

The feasibility test of the material was carried out by providing assessments and suggestions from four experts. It used a questionnaire based on the content quality aspect. The current research got an 88 score or declared very feasible. The learning goal aspect achieved 78 or stated as feasible, while the Accessibility, Reusability, Feedback, and Adaptation gained an 88 score or declared as very feasible. Furthermore, the motivation aspect achieved 90 or stated as a very feasible category. The material expert test came from lecturers and teachers from Semarang State University and SMKN 3 Salatiga. The calculation of the expert test is as follows:

Table 4. Material Expert Validation Test Results

No	Experts	Score	Average Score
1	Alfita Ilyiningrum, S.T., M.T.	84.55	
2	Naufal Tinov, S.Pd., M.Pd.	85.45	85.45
3	Evita Rintasih, S.Pd.	87.27	
4	Endang Priyaningsih, S.T.	86.36	

Source: Processed Primary Data (2022)

Based on table 4, the purposed material achieved 85,45 of average score or very feasible category. The data were grouped into five categories, namely: very inappropriate, not feasible, quite feasible, feasible, and very feasible. The obtained results can be seen as follows:

Table 5. Media Expert Test Results

Range of Score	Qualification	Total	Percentage (%)
4.21 – 5.00	Very Feasible	4	100.0
3.41 – 4.20	Feasible	0	0.0
2.61 – 3.40	Quite Feasible	0	0.0
1.81 – 2.60	Not Feasible	0	0.0
0 – 1.80	Very Inappropriate	0	0.0
Total		4	100.0

Source: Processed Primary Data (2022)

Based on table 5, the results of the material expert's feasibility test are very feasible, which means that the e-module is very feasible for the subject research.

The results of the practicality of the e-module

By providing a response questionnaire to the teachers referring to 8 assessment indicators, the result of practicality tests was conducted. The result showed that aspect of content quality got 95

or declared very practical, and Learning goals gained 80 or stated very practical. Usability interaction, presentation design, feedback, adaptation, and accessibility achieved 89 or pronounced as very practical. Motivation got an 87 score or stated as very practical, while reusability gained 90 or stated as very practical. The practicality test came from geomatics engineering teachers of SMKN 1 Blora. The result can be seen as follows.

Table 6. Teacher Validation Test Results

No	Teacher	Score	Average Score
1	Sri Hikmah, S.Pd., M.T.	86.92	
2	Wawan Wahyudi, S.Pd.	87.69	88.08
3	Azizah, S.Pd.	89.23	

Source: Processed Primary Data (2022)

The data showed the validation achieved 88,08 of average score or declared very feasible (without revision). The data were grouped into five categories, namely: very inappropriate, not

practical, quite practical, practical, and very practical. The obtained results can be seen as follows:

Table 7. Teacher Test Result

Range of Score	Classification	Total	Percentage (%)
4.21 – 5.00	Very practical	3	100.0
3.41 – 4.20	Practical	0	0.0
2.61 – 3.40	Quite Practical	0	0.0
1.81 – 2.60	Not Practical	0	0.0
0 – 1.80	Very Inappropriate	0	0.0
Total		3	100.0

Based on table 7, the purposed e-module is very practical, which means it is very practical for vocational students in Geomatics Engineering.

Discussion

The e-module development of Basic Drawing by using Autocad Landdekstop produced an application that can be used on a mobile phone. This e-module application can be utilized without adding other applications, and it is easy to use. This research is in line with Izza Ariffatur R (2019), the e-module that had been produced is very feasible, and the e-module proved effective to improve the learner output. This CAD e-module was very practical as learning media tools and achieved 87,73%. The

feasibility of e-module in Basic Drawing by using Autocad Landdekstop achieved 85,45 of the average score in material expert while 86,43 in media expert. The practicality of the Basic Drawing e-module with Autocad Landdeskstop to improve the competence of opening software for a technical drawing for students of the Geomatics Engineering got an average teacher validation test of 88.08 or declared very practical. It is necessary to maintain e-learning in the Basic Drawing module by using Autocad Landdekstop.

Lenggis and Supriyanto (2016: 821-827) conducted research entitle the development of mobile learning media with the help of android smartphones in electrical engineering subjects at SMK Negeri 1 Madiun. The result showed that

the learning media was feasible to use with a validity percentage of 81.17% and a practicality percentage of 78.85% and declared effective. While in the present research achieved 85.45 for an average validation test material expert, 86,43 for media expert, and 88,08 for practical sides. In other words, it was declared very feasible and very practical for teaching and learning.

The development of media in the same subjects was carried out by Frediarto Rudi Aditya (2014). The learning media for three-dimensional drawing used the main Autocad software packaged in Macromedia Flash. The average validation results obtained from each criterion were as follows: 1) the validation from three-dimensional drawing learning media experts got a percentage of 76%, 2) three-dimensional expert validation of drawing learning material achieved a percentage of 88%, while in learning media got a percentage of 82%. Furthermore, the student's response gained 79% or declared good. Compared to the presented e-module, media expert validation gained 85.45 and media expert of 86.43 with a very decent classification, while the practicality of 94.23 achieved a very practical level. Meanwhile, the research conducted by Mubassyiraat Zaid Jawami (2014) developed learning media for Autocad video tutorials to improve student learning activities on the basic competence of drawing with software at SMKN 2 Trenggalek. It got expert validation of the material on the learning media of Autocad video tutorials that were valid and feasible to be used in learning activities in the classroom with an average percentage of 87%. The results of media expert validation on Autocad video tutorial learning media showed an average percentage of 88%.

CONCLUSION

Based on the results and discussions the following conclusions are obtained:
1. The development of blog-based e-modules Basic Drawing of Software produced a media that can be run on gadget based web. It can be used without installing additional software. So it is very easy to use.
2. The Feasibility of blog-based e-modules achieved an average validation test of material experts of 85.45 and media experts of 86.43, or it was declared very feasible. It means very good and feasible. So it is necessary to maintain a blog-based e-module.
3. The practicality of blog-based e-modules support the practical competence of Basic Drawing of Software at the Geomatics Engineering Vocational School with an average teacher validation test of 88.08 or gained very practical, so it is necessary to maintain a blog-based e-module.

REFERENCES

Aditya, Frediarto Rudi. "Pengembangan Media Pembelajaran Menggambar 3 Dimensi Pada Standar Kompetensi Menggambar Dengan Perangkat Lunak." Jurnal Kajian Pendidikan Teknik Bangunan 3.1/JKPTB/14 (2014).

Arikunto, S. 2010. *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.

Dick and Carey. (1996). *The Systematic Dessign of Instuction, New York* :Harper Collins Publishers.

Irmayanti, Shabrina, and Mahendra Adhi Nugroho. "Pengembangan Media Pembelajaran Akuntansi Berbasis Web Blog untuk Meningkatkan Motivasi Belajar." Jurnal Pendidikan Akuntansi Indonesia 14.1 (2016).

Izza Ariffatur Ramadhani. (2019). Pengembangan *E-Modul Pembelajaran CAD Berbasis Android Untuk Meningkatkan Hasil Belajar Menggambar 3D*. Skripsi. Jurusan Teknik Mesin Universitas Negeri Semarang.

Izza Ariffatur R.(2019). Pengembangan e-Modul pembelajaran CAD Berbasis Android untuk Meningkatkan Hasil Belajar Menggambar 3D.Jurnal Pendidikan Teknik Mesin Vol. 19, No. 2, Desember 2019 (85-90).

Jawami, Mubassyiraat Zaid. Pengembangan media pembelajaran video tutorial autocad untuk meningkatkan aktivitas belajar

siswa pada kompetensi dasar menggambar dengan perangkat lunak di SMKN 2 Trenggalek. Diss. Universitas Negeri Malang, 2014.

Sugiyono. (2010). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, kualitatif, dan R&D.* Bandung: Alfabeta.

Weni, Devita Mustika, and Gatot Isnani. "Meningkatkan hasil belajar siswa dengan pengembangan media pembelajaran e-learning berbasis blog." JPBM (Jurnal Pendidikan Bisnis Dan Manajemen) 2.2 (2016): 114-122.