



Learning Module Development AutoCAD in Drawing Course of 2 Floor House Program Building Engineering Education the State University of Surabaya

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ABSTRACT

The competency achievements of Building Engineering Education students are still low and there are differences between the learning materials and media taught in schools and those used in the industrial world, causing a lack of achievement of learning objectives. Factors that are predicted to affect student achievement are: teaching materials, learning media, student abilities, enthusiasm and student learning motivation. Teaching materials are one of the aspects that influence students' knowledge and understanding in capturing subject matter. Module teaching materials are one of the teaching materials that can be used to assist students in learning, because in the module there are various subject matter that can be read and understood.

The research method of this article was carried out by studying the literature on the results of previous research. The data taken is in the form of module feasibility results from several journals. Then, it is reviewed again to get the results of a comparison between the acquisition of the percentage of feasibility results of module teaching materials in the use of learning AutoCAD from several research results of previous journals.

In the six journals this research obtained the results of a comparison of the feasibility validation by experts with a decent to very feasible predicate. In [2] he obtained an average eligibility validation of 79.16% with a proper predicate, then in [1] he obtained an average eligibility validation value of 83.32% with a very feasible predicate, the same case with [1] in research by [17], [22], and [7] also received the title of very feasible validation with an average feasibility validation value of 83.32%, 95.12%, and 84.74%. And [21] obtained an average feasibility validation score of 79.73% with a proper predicate.

Keywords: *AutoCAD, Media Feasibility, Module, Literature Study.*

1. INTRODUCTION

Education is a major need that needs to be learned and must be fulfilled by humans. Education has a very big impact on human life. Everyone has the right to self-development and to receive education, science, technology, arts and culture to improve their quality of life for the sake of prosperity. Education is considered a form of major investment for a country, so that each country pays special attention to the education sector. In Indonesia, through the Ministry of Education and Culture it Directorate of higher education, research and technology, which is as an effort to improve the quality of competent human resources in this millennial era.

Building Engineering Education Study program is an educational institution that produces graduates who are ready to compete in the industrial world. Students who graduate are required to have sufficient competence as a provision to compete in the industrial world. Knowledge and skills that are relevant to the industrial world must be instilled in the learning process at Building Engineering Education Study program. The competency achievements of Study program students are still low and there are differences between the learning materials and media taught in university and those used in the industrial world, causing a lack of achievement of learning objectives. Factors that are predicted to affect student achievement are: teaching materials, learning media, student abilities,

enthusiasm and student learning motivation, teacher skill and learning strategies applied by teachers [10]. Teaching materials are one of the aspects that influence students' knowledge and understanding in capturing subject matter.

University facilities and infrastructure must support teaching and learning activities and make it easier for students to learn. States that the lack means and infrastructure Study can cause a decrease in student learning interest and affect results Study. Media and learning materials are needed to help students in learning. Module teaching materials are one of the teaching materials that can be used to assist students in learning, because in the module there are various subject matters that can be read and understood. AutoCAD is a 2D and 3D graphic design program that can be used to draw 2D and 3D buildings according to the conditions in the field. In addition, this program can be used as a teaching aid for teachers when students are studying in the class. This media is often applied to learning in the Drawing Course Of 2 Floor House Program Building Engineering Education. It's the same as in Surabaya State University Building Engineering Education Study Program which uses software AutoCAD as a learning medium in the subject of Software Applications and Planning Interior Building implemented from fourth semester students. Basically third semester student is the basic stage in understanding software AutoCAD, then in middle semester is an intermediate stage that requires students to learn and understand the components software AutoCAD and try to operate it, and in the last semester is an advanced stage that requires students to be skilled in running software AutoCAD to carry out various orders shortcut nor understand the icons on toolbar AutoCAD (Perdirjen Dikdasmen No. 464/D.D5/KR/2018 2018 concerning Core Competencies and Basic Competencies in Program Building Engineering Education). Several studies were conducted by applying the AutoCAD in the process of teaching and learning activities to find out the results of learning outcomes. The AutoCAD media has an impact on students' cognitive and psychomotor learning outcomes.

The low achievement of students is due to being less active and having low understanding in achieving basic competencies such as identifying AutoCAD and drawing 2 and 3 dimensional shapes. This lack of basic understanding causes students to experience difficulties in receiving further material. Especially in Program Building Engineering Education who have reached the intermediate stage in understanding and operating the AutoCAD software. So, it is necessary to have media

and teaching materials as a tool to help students in learning.

From this background, the author's desire arises to discuss "Literary Study of Learning Media Module Development AutoCAD in the Drawing Course of 2 Floor House Program Building Engineering Education" by doing review and analysis of several research articles.

Based on the identification of the problems above, the problems that can be formulated are as follows:

1. How is the module development model from several research articles on instructional AutoCAD media?
2. How to compare the results of the feasibility of the module from several research articles on learning AutoCAD media?
3. How to apply the results of the feasibility of modules from several research articles on learning AutoCAD media to the Program Building Engineering Education?

2. LIBRARY STUDY

2.1 *Instructional Media*

Learning media are materials, tools, or techniques used in teaching and learning activities with the intention that the process of educational communication interaction between teachers and students can take place in an effective and efficient manner [13]. The function of learning media according to Levie and Lets in suggests that there are four functions of learning media namely [12]; (1) visual media attention function as the core, (2) affective function of visual media, (3) cognitive function of visual media, and (4) the compensatory function of learning media.

2.2 *Learning Modules*

According to Bektı [3], learning is an information delivery activity created for facilitate the attainment of specific goals. To facilitate the learning process is inseparable from environmental factors that are not limited to the context of the place. The environment can be in the form of models, methods, strategies, media, and or facilities needed to facilitate the student learning process. The aim of the module is to increase the efficiency and effectiveness of learning. Based on the regulations of the Ministry of National Education (2008: 3-5) a good and attractive module for students if it has the following characteristics self-instruction,

Self-Contained, Stand Alone, Adaptive, and User Friendly.

2.3 AutoCAD (Auto Computer Aided Design)

Computer Aided Design (CAD) is a computer program for drawing. AutoCAD is a CAD program released by Autodesk, a manufacturing company software from America. CAD stands for Computer Aided Design. AutoCAD is one of software the most widely used in civil and architectural fields. AutoCAD offers the facility to draw both for 2d and 3d. The Usage of AutoCAD has a goal to produce design drawings that have high accuracy in terms of size and image detail.

3. METHOD

The research method of this article was carried out by studying the literature on some of the results of previous research. The data taken is in the form of module feasibility results from several journals. Then, it is reviewed again to get the results of a comparison between the acquisition of the percentage of feasibility results of module teaching materials in the use of learning media software AutoCAD from several research results of previous journals. The following will explain the flow of literature article research review on the picture flowchart below this:

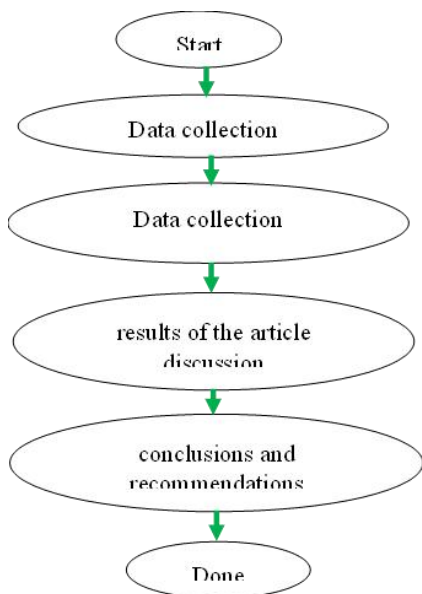


Figure 1. Flowchart Scientific Article Research.

4. RESULTS AND DISCUSSION

4.1 Data Description

Instructional AutoCAD media has been widely used by Program Building Engineering Education as a learning medium. As is AutoCAD can facilitate students' knowledge and understanding of the field of building construction modelling. The addition of module learning devices as additional teaching materials can increase students' understanding of operations software AutoCAD.

In this research using study literature from 6 (six) research journals that have previously been conducted. The research uses a research journal with the title of module development on learning AutoCAD media within the time span of research conducted in 2015-2020. To determine the feasibility of modules in learning AutoCAD media.

4.2 Module Development Model

Research results from 6 (six) journals using several module development models including 4 (four) research journals using the 4D development model (Define, Design, Develop, Disseminate) developed, 1 (one) research journal using the development model [5], and 1 (one) research journal using the development model [24]. On the 4D development model (Define, Design, Develop, Disseminate) can be seen in table 1.

The Borg and Gall (1983) development model can be seen in table 2.

In the development model by Sugiono (2012) can be seen in table 3.

4.3 Module Eligibility

Eligibility for the use of modules on learning AutoCAD obtained from the validation assessment data of the validators (media experts and material experts), as well as user validation (subject teachers and students). Feasibility validation is carried out by giving questionnaires to validators and users, then a descriptive analysis is carried out.

The first stage is to analyse research data which will later be qualified into the Likert scale contained in table 1 below:

Table 1. Likert scale

Validation Results	Information
0% - 20%	Not feasible
21% - 40%	Less Eligible

41% - 60%	Enough
61% - 80%	Worthy
81% - 100%	Very Worth it

Feasibility Validation by Material Experts Material experts conduct module validation assessments based on Ministry of National Education regulations by having characteristics self-instruction, self-contained, stand alone, adaptive, and anduser friendly. Assessment is carried out by material experts who come from lecturers with the appropriate knowledge cluster.

The recapitulation of the results from module validation assessment carried out by material experts in the six research journals is as follows:

Table 2. Feasibility Validation Recapitulation by Material Experts.

No	Journal Source	Percentage	Information
1	Ahmad Aldo [2]	88.89%	Very Worth it
2	Zainal Abidin [1]	72.97%	Worthy
3	Yan Permana [17]	86.82%	Very Worth it
4	Ariyanto Saputro [21]	75.81%	Worthy
5	Sivia Rara [22]	95%	Very Worth it

6	Chandra Setia [7]	90.91%	Very Worth it
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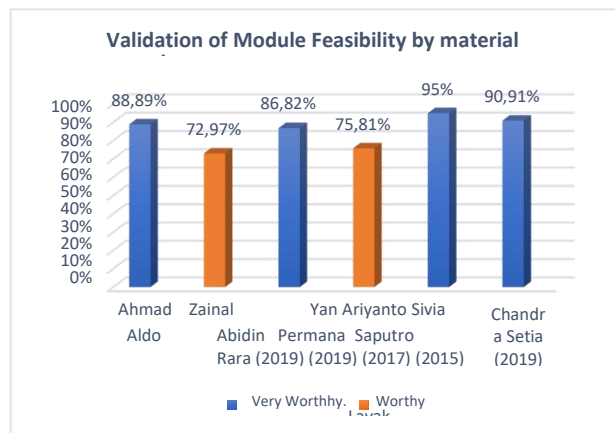


Figure 2. Feasibility Validation Recapitulation by Material Experts.

Based on the tables and graphs above regarding the development of modules in learning AutoCAD media the results of recapitulation of the percentage feasibility of the material that has been validated by material experts of vocational teachers and lecturers, show that the average feasibility of the module is in the very feasible category. The highest percentage of eligibility is found with a value of 95%, while the lowest percentage of eligibility is found in Zainal Abidin's study (2019) with a value of 72.97% [22].

Table 3. 4D Development Models.

Journal Source	4D Development Models			
	Define	Design	Develop	Disseminate
Siva Rara Savira [22]	a. Preliminary analysis b. Student analysis c. Task analysis d. Concept analysis e. Instructional object specification	a. Compilation of criteria b. Media selection c. Format selection d. Preliminary design	a. Expert validation b. User validation	Dissemination is done in 2 ways, namely hard copy and soft copy. Given to subject teachers.
Ahmad Aldo [2]	a. Preliminary analysis b. Student analysis c. Task analysis d. Concept analysis Instructional object specification	a. Compilation of criteria b. Format selection c. Initial plan	a. Expert appraisal b. Develop- mental testing	Dissemination is done in 2 ways, namely hard copy and soft copy. Given to subject teachers.
Zainal Abidin [1]	a. Module requirement analysis b. Student analysis c. Main task analysis d. Concept analysis e. Goal analysis learning	a. Preparation of test standards b. Media selection c. Format selection d. Preliminary design	a. Instrument validation b. Expert validation c. Module user assessment	Dissemination is done in 2 ways, namely hard copy and soft copy. Hard copy only for teachers eye cradle. APP lessons. Due to limited costs

Table 4. Development Model.

The Borg & Gall Developmental Mode [5] in Yan Permana's research [17]	
Stagers	Description
Research and information collecting	Decreasing student learning outcomes caused by a lack of student understanding of the material provided by the teacher. Data collection was obtained from the subject syllabus, interviews with students, and looking for references
Planning	Compile KD, develop learning concepts.
Develop preliminary from of product	Beginning in drafting modules based on KD and concepts that have been formulated previously by writing module drafts, and providing module appeal.
Preliminary field testing	Conducting trials by way of design validation by presenting one media expert and two material experts from vocational high school teachers and lecturer.
Main product revision	Make improvements to the module from the results of the assessment by design and material experts before testing it on students.
Main field testing	Product trials were carried out to 11 students in class XI to find out the initial feasibility by distributing modules to students. then students observe the module and fill out the questionnaire that has been provided.
Operational product revision	Questionnaire assessment data was used for data analysis, while suggestions from students were used for module repair before testing the use of all students.
Operational field testing	Conducted trials using the revised modules for all 29 students in class XI by distributing the modules to students, then students observed the module and filled out the questionnaire that has been provided.
Final product revision	After the trial, the assessment data was obtained from a questionnaire and suggestions from students. Then make improvements to the module
Dissemination and implementation	After being validated by experts, it was then tested on class XI students, so the module was ready to be used as a learning medium for students in class. Modules are used in printed and e-book forms.

Table 5. Sugiono's Development Model.

Development Model by Sugiono [24] in Saputro's research [21]	
Stages	Description
Looking for potential and problems	Vocational High School State 2 of Pengasih has a lab where you can draw with AutoCad, and the majority of students have laptops. the constraints experienced the absence of adequate modules to be used to study Engineering Drawings by students.
Data collection	Conduct consultations with subject teachers in making modules so that students are more productive easier and more understandable in learning AutoCad software.
Designing Products	Compile KD according to the syllabus, Compile learning concepts or lesson plans, collecting references, writing drafts of learning modules.
Designing Validation	Assessment of learning modules is carried out by material and media experts who come from SMK teachers and lecturers. To assess how feasible the modules that have been made are before being used for teaching materials in class.
Editing	After being validated by experts, further editing is done to make it even better.
Product testing	It was carried out after repairing the design with experts, then it was tested on several students (10 students) to use the module and then put it into practice on the AutoCad software and do an assessment through a questionnaire.
Product revision	Module repairs are carried out after getting an assessment from students. The key to this module revision is the enthusiasm of students to provide feedback after reading its contents.
trials	The test was carried out on students of class X (31 students), to read the module then practiced using AutoCad software.
Second product revision	Improvements to the contents of the module were made after receiving suggestions and criticisms from students via a questionnaire, to get feedback after the module was used.
Product manufacture	After all the processes have been carried out and validated by experts, the module is ready to be printed for use as teaching material in class.

Eligibility Validation by Media Experts
 The recapitulation results of the module validation assessment conducted by media experts in the six research journals is as follows:

Table 6. Feasibility Validation Recapitulation by Media Experts.

No	Journal Source	Percentage	Information
1	Ahmad Aldo [2]	75%	Worthy
2	Zainal Abidin [1]	81.90%	Very Worth it
3	Yan Permana [17]	88.51%	Very Worth it
4	Ariyanto Saputro [21]	86.68%	Very Worth it
5	Sivia Rara [22]	92.86%	Very Worth it
6	Chandra Setia [7]	78.57%	Worthy

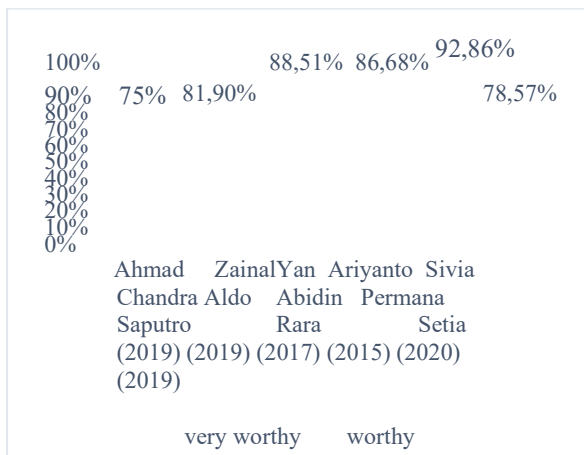


Figure 3. Feasibility Validation Recapitulation by Media Experts.

Based on the tables and graphs above regarding the development of modules in learning media for AutoCAD the results of the recapitulation of the percentage of media feasibility that have been validated by lecturer media experts, show the results of the average feasibility of the module in the very feasible category. The highest percentage of eligibility is found [22] with a value of 92.86%, while the lowest percentage of eligibility is in with a value of 75% [2]. Eligibility Validation by Users. The recapitulation results of the module validation assessment carried out by users (subject teachers and students) in the six research journals is as follows:

Table 7. Feasibility Validation Recapitulation By user.

No	Journal Source	Percentage	Information
1	Ahmad Aldo [2]	73.59%	Worthy
2	Zainal Abidin [1]	95.08%	Very Worth it
3	Yan Permana [17]	82.36%	Very Worth it
4	Ariyanto Saputro [21]	76.71%	Worthy
5	Sivia Rara [22]	97.5%	Very Worth it
6	Chandra Setia [7]	-	-

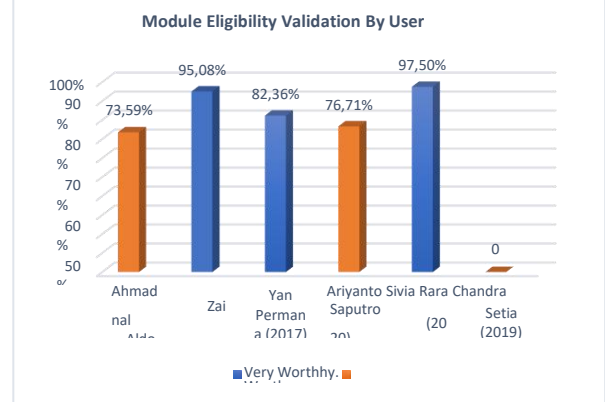


Figure 4. Feasibility Validation Recapitulation by Users.

Based on the tables and chart above regarding the development of modules in learning media AutoCAD the results of the recapitulation of the percentage of feasibility of the media that have been validated by module users (subject teachers and students), show that the average feasibility of the module is in the very decent category. The highest percentage of eligibility is found with a value of 97.5% [22], while the lowest percentage of eligibility is found with a value of 73.59% [2]. The feasibility validation of the module could not be analysed because this study did not carry out a feasibility validation analysis by users (teachers and students).

The recapitulation results of the feasibility validation assessment conducted by material experts, media experts, and users (subject teachers and students) in the six research journals is as follows:

Table 8. Feasibility Validation Recapitulation Modul

No	Journal Source	Eligibility Validation			Average
		Expert Material	Media Expert	Users	
1	Ahmad Aldo [2]	88.89%	75%	73.59%	79.16%
2	Zainal Abidin [1]	72.97%	81.90%	95.08%	83.32%
3	Yan Permana [17]	86.82%	88.51%	82.36%	85.90%
4	Ariyanto Saputro	75.81%	86.68%	76.71%	79.73%

	[21]				
5	Sivia Rara [22]	95%	92.86%	97.5%	95.12%
6	Chandra Setia [7]	90.91%	78.57%	-	84.74%



Figure 5. Module Feasibility Validation Based on the graphic data above shows validation.

The feasibility of the module to get results above 70% with the feasible category even touches the validity of 95% feasibility data with the very feasible category. It was found, that the results of the highest eligibility validation were obtained among other studies, with a validation value of 95% for material experts, 92.86% for media experts, and 97.5% for users with the overall category very feasible [22].

Application of Module Feasibility Validation Results

Based on the results of data analysis the six research journals, the feasibility of the learning module AutoCAD get the predicate worthy and very worthy by material experts, media experts, and users. Learning modules AutoCAD this can be used in Software Applications and Building Interior Design Subjects and can be used as a reference for the application of learning media modules AutoCAD which is used in students of the Department of Building Modeling and Information Design at Program Building Engineering Education for teaching and learning activities and can be used by teachers as companion books, and can be used by students as reading books to learn to understand material about software AutoCAD.

This statement is supported by the results of the validation of the feasibility of the module in research which shows the results of validating the eligibility of the module in class XI students in the Software Applications and Building Interior Design is very feasible with an average feasibility of 79.16%, 83.32%, 85.90%, and

95.12%. Meanwhile, showed the results of validating the feasibility of the module in class X students in Engineering Drawing subjects were feasible with an average feasibility value of 79.73%. In [7] it shows that the results of validating the feasibility of the module in class XI students in the Mechanical Technology subject are very feasible with an average feasibility value of 84.74%.

5. CONCLUSION

Based on the comparative results of several previous relevant studies in review, it can be concluded as follows:

1. That the use of modules in media learning for AutoCAD very effective in the process of teaching and learning activities because it influences students' interest in learning to understand the learning material that has been given by the teacher in class.
2. The six research journals use the 4D module development model (Define, Design, Develop, Disseminate) which was developed with the stages of the development model define, design, develop, disseminate on the module. Meanwhile, uses the Borg and Gall module development model with the stages of the development model research and information collecting, planning, develop preliminary from of product, preliminary field testing, main product revision, main field testing, operational product revision, operational field testing, final product revision, and dissemination and implementation. And research conducted uses the module development model initiated [24] with the stages of the development model looking for potential and problems, data collection, product design, design validation, editing, product testing, product revision, testing, second product revision, and product creation.
3. In the six journals this research obtained the results of a comparison of the feasibility validation by experts with a decent to very feasible predicate. In [2] he obtained an average eligibility validation of 79.16% with a proper predicate, then in [1] he obtained an average eligibility validation value of 83.32% with a very feasible predicate, the same case is with [1] in research by [17], [22], also received the title of very feasible validation with an average feasibility validation value of 83.32%,

95.12%, and 84.74%. Obtained an average feasibility validation score of 79.73% with a proper predicate. So that in these six research journals, four research journals received very feasible module feasibility validation, and two research journals received valid module feasibility validation. The highest eligibility for module validation occurred [22] which obtained an average feasibility validation score of 95.12% with a very decent predicate.

4. So based on the results of data analysis of the six journals study the module qualification learning AutoCAD get the predicate worthy and very worthy by material experts, media experts, and users. Learning modules AutoCAD This can be used in Software Applications and Building Interior Design subjects and can be used as a reference for the application of learning media modules AutoCAD which is used in Program Building Engineering Education and Information Design for teaching and learning activities and can be used by teachers as companion books, and can be used by students as reading books to learn to understand material about software AutoCAD.

Suggestion

Based on the results of the literature study that has been carried out, it is necessary to reconsider the results review this as follows:

1. The module testing for students is carried out when the school year is already underway, so it is less optimal to find out the impact caused by having students given learning modules AutoCAD or not, because it was not implemented at the start of the new semester.
2. The use of learning media modules is recommended AutoCAD This can be used by all universities as an additional learning media facility, because in previous studies the learning media module for AutoCAD was only given to teachers of Software Applications and Building Interior Design subjects.
3. Mass printing of modules can be done so that students can study individually through the provided modules, due to limited funding by researchers so mass printing cannot be done. But it is hoped that the university can do mass printing and can disseminate it to students.
4. Re-development is needed to improve the modules in media learning for AutoCAD This is in terms of module material, the media presented in the module, and grammar that students can understand and easily understand. By making this learning module attractive, it can increase the attractiveness of students to learn, and can improve learning achievement.

REFERENCES

- [1] Z. Abidin, Pengembangan Modul Autocad Sebagai Alternatif Media Pembelajaran Mata Pelajaran Aplikasi Perangkat Lunak dan Perancangan Interior Gedung Kelas XI SMK Negeri 1 Pajangan, Universitas Negeri Yogyakarta, 2019.
- [2] A. Aldo, Pembuatan Modul Pembelajaran AutoCAD Pada Mata Pelajaran Aplikasi Perangkat Lunak Dan Perancangan Interior Gedung Di SMK Negeri 3 Yogyakarta, Jurnal Pendidikan Teknik Sipil (JPTS) UNY, Vol. 2 (1), 2019, pp. 37-51. DOI: <http://dx.doi.org/10.21831/jpts.v2i1.31964>
- [3] B.H. Beki, Mahir Membuat Website dengan Adobe Dreamweaver CS6, CSS dan JQuery, Yogyakarta: Andi, 2015.
- [4] BNSP, Instrumen Modul Teks Pelajaran. Jakarta: Badan Standar Nasional Pendidikan, 2014.
- [5] W. R. Borg, M. D. Gall, Educational research: and introduction (seventh edition). New York and London: Longman Inc., 1983.
- [6] Daryanto, Menyusun Modul (Bahan Ajar untuk Persiapan Guru dalam Mengajar), Yogyakarta: PT Gava Media, 2013.
- [7] C.S. Dinata, Pengembangan Modul Autocad Untuk Meningkatkan Aktivitas Dan Hasil Belajar Siswa Kelas XI TPM 1 SMK PGRI 1 Gresik, Jurnal Pendidikan Teknik Mesin (JPTM) UNESA, Vol. 8 (2), 2019, pp. 123-128.
- [8] Direktorat Tenaga Kependidikan, Teknik Penyusunan Modul, Jakarta: Departemen Pendidikan Nasional, 2008.
- [9] S.B. Djamarah and A. Zain, Strategi Belajar Mengajar, Jakarta: Rineka Cipta, 2010.
- [10] Hartoyo, Upaya Meningkatkan Prestasi Melalui Pembelajaran dengan Modul Berbasis Kompetensi, Jurnal Pendidikan Teknologi dan Kejuruan UNY, 18(1), 2009, pp. 61-84. DOI: <http://dx.doi.org/10.21831/jptk.v18i1.7679>
- [11] C. Kustandi and B. Sutjipto, Media Pembelajaran Manual dan Digital, Bogor: Ghalia Indonesia, 2011.
- [12] J.D. Latuheru, Media Pembelajaran Dalam Proses Belajar-Mengajar Masa Kini, Jakarta:

- Departemen Pendidikan dan Kebudayaan, 1988.
- [13] A. Majid, *Perencanaan Pembelajaran: Mengembangkan Standar Kompetensi Guru*, Bandung: PT. Remaja Rosda, 2006.
- [14] Munadi, *Media Pembelajaran Sebuah Pendekatan Baru*, Jakarta: Gaung Persada Press, 2008.
- [15] S. Nasution, *Berbagai Pendekatan Dalam Proses Belajar dan Mengajar*, Jawa Tengah: Bumi Aksara, 2005.
- [16] Perdirjen Dikdasmen No. 464/D. D5/KR/2018 tahun 2018 Tentang Kompetensi Inti dan Kompetensi Dasar Mata Pelajaran SMK.
- [17] Y. Permana, Pengembangan modul pembelajaran AutoCAD dengan konsep pembelajaran berbasis proyek di jurusan Teknik Arsitektur SMK Negeri 2 Wonosari, *Jurnal Pend. Teknik Sipil dan Perencanaan UNY*, 5(8), 2017, pp. 57-66.
- [18] Purwanto, *Pengembangan Modul*, Jakarta: Departemen Pendidikan Nasional, 2007.
- [19] Riduwan, *Skala Pengukuran Variabel-Variabel Penelitian*, Bandung: Alfabeta, 2015.
- [20] S. Nasution, *Berbagai Pendekatan Dalam Proses Belajar dan Mengajar*, Jakarta: PT. Bumi Aksara, 2008.
- [21] A. Saputro, Pengembangan Modul Pembelajaran Autocad Untuk Mata Pelajaran Gambar Teknik Siswa Kelas X Jurusan Teknik Ketenagalistrikan SMKN 2 Pengasih Yogyakarta, *Jurnal Pendidikan Teknik Mekatronika UNY*, 6(2), 2015, pp. 135-142.
- [22] S.R. Savira, *Pengembangan Modul Autocad Untuk Mata Pelajaran Aplikasi Perangkat Lunak Dan Interior Gedung Siswa Kelas XI Program Keahlian Desain Pemodelan Dan Informasi Bangunan SMK Negeri 2 Klaten*, Skripsi, tidak diterbitkan. Universitas Negeri Yogyakarta, 2020.
- [23] Sukoco, Pengembangan Media Pembelajaran Interaktif Berbasis Komputer Untuk Peserta Didik Mata Pelajaran Teknik Kendaraan Ringan, *Jurnal Pendidikan Teknologi dan Kejuruan UNY*, 22(2), 2014, pp. 216-226. DOI: <http://dx.doi.org/10.21831/jptk.v22i2.8937>
- [24] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*, Bandung: Alfabeta, 2012.

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