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Development of Learning Media Autocad Module on Competency Class Technical Drawing Subjects Modellingand Information Design Skills Building at SMK Negeri 1 Stabat 2020/2021

Muhammad Reza Al Hafiz[1], Kinanti Wijaya[2]
[1,2] *Universitas Negeri Medan, Indonesia*
Corresponding Author : hafizreza139@gmail.com

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ABSTRACT

The objectives of this study are to: (1) Develop learning media for *AutoCAD modules in the* teaching subjects of Technical Drawings of grade X students Competency in Building Modeling and Information Design Expertise at SMK Negeri 1 Stabat 2020/2021, (2) Knowing the level of validity and practicality of learning modules developed as learning media for students. This research was conducted at SMK Negeri 1 Stabat with research respondents of grade X students Competency in Building Modeling and Information Design Expertise. This research is a development research (*Reaserch and Deveplopment*). The development model used is the ADDIE instructional design model consisting of: *(1) Analysis, (2) design, (3) development, (4) Imlemention, and (5) Evalution.* The instrument used is in the form of a questionnaire. Questionnaires are used to test the feasibility of module media through validation of material experts, media experts, and linguists. Module assessment is also carried out by users (students). Based on the results of the study, it is known that the learning media *for the AutoCAD module* in the Technical Drawing subject refers to the SKKNI curriculum which consists of 4 chapters of subject matter. The feasibility testing results by material experts got a score of 77.57% with good criteria, the feasibility testing results by media experts got a score of 72.97% with good criteria, and the feasibility testing results of linguists got a score of 94% with very good criteria. Based on a practicality questionnaire filled with 15 students and teachers, obtained a feasibility rate of 90.78%, with very practical criteria. The results showed that the learning media *for the AutoCAD module* in the Technical Drawing subject is suitable for use by grade X students Competency in Building Modeling and Information Design Expertise of SMK Negeri 1 Stabat.

Key Word *Learning Media Development, AutoCAD, Technical Drawing*
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INTRODUCTION

Vocational education according to Law No. 20 of 2003, article 15, is secondary education that prioritizes the development of students' abilities for the implementation of certain types of work. So that Vocational High Schools (SMK) have an important role in efforts to increase human resources and can prepare a skilled and educated workforce needed in the world of work.

Some problems in productive learning in SMK that require attention and handling are quite serious, so that in its implementation the current curriculum emphasizes students to learn through thecurriculum used must be in accordance withthe objectives of SMK. Students are requiredto learn independently. The role of the teacher is only as a facilitator. Conditions like this the role of supporting media for teaching materials become important as a guide for students in carrying out learning.

The existence of teaching materialmedia has a function as a learning support, so that students can learn independently. According to Mudjiman, Haris (2007: 7) independent learning is an active learning activity, which is driven by the intention to master a competence to overcome problems and is built with the provision of knowledgeor abilities possessed by each individual.

SMK Negeri 1 Stabat is one of the best schools in Langkat. The majors at SMK Negeri 1 Stabat consist of Building Information and Modeling Design Expertise Competencies (DPIB). Competency in Building Modeling and Information Design Expertise there is one productive subject, namely Technical Drawing.

Based on the results of an interview withMrs. Erni Suryani at SMK Negeri 1 Stabat in the subject of Technical Drawing, there are problems, including: lack of student knowledge about the *AutoCAD* application, interest in trying it yourself is still low, and the lack of learning modules to demonstrate the steps of making drawings so that students are still attached to the teacher, and often students ask things that have been explained by the teacher so that the teacher must explain return. Another problem is that the lack of independence of students to learn isa problem that hinders the transfer of knowledge.

Based on the results of the questionnaire distribution, students feel that they are able to learn independently. The following is the data from the distribution of the independence questionnaire at SMK Negeri 1 Stabat:

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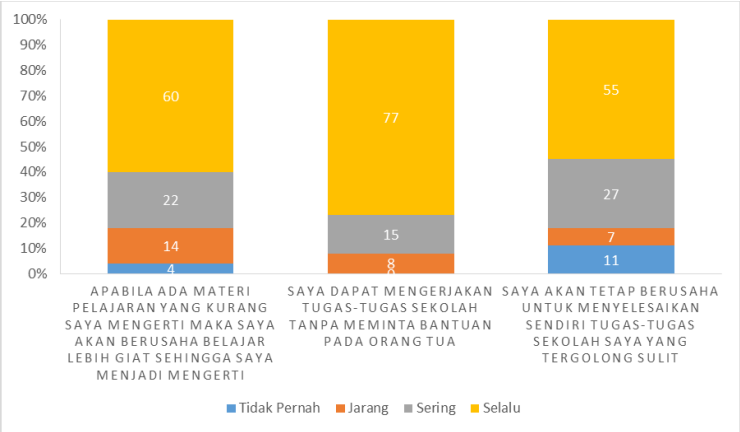

Picture 1.
Results of Initial ObservationQuestionnaire Dissemination

From the results of interviews and the results of questionnaire distribution, it is very appropriate to develop learning media in the form of modules, therefore researchersdevelop AutoCAD module learning media inclass X DPIB Technical Drawing subjects. With the development of this module, it is hoped that students can understand and have competence in drawing better than before because the module developed emphasizes more on how to make working drawingssuch as, tread plans, floor plans, looks, and cuts. So that the presence of the *AutoCAD* module is also expected to provoke students' potential to further develop their knowledge about drawing with *AutoCAD*, students can learn independently, and students can repeatlessons wherever they are.

In line with the problems that have beenformulated, the objectives of the study are Developing learning media for the *AutoCAD* module in the Technical Drawing subjects of grade X students Competency inBuilding Modeling and Information Design Expertise at SMK Negeri 1 Stabat 2020/2021, and (2) Knowing the level of validity and practicality of learning modulesdeveloped as learning media for students.

Learning Independence

The definition of learning independence according to Suparman (2014:84) states that learning independence is the ability of students to determine learning activities on their own initiative.

Furthermore, according to Mudjiman (2007: 10) the anatomy of the concept of independent learning consists of possessing certain competencies as learning goals, active learning as a learning strategy to achieve goals, the existence of learning motivation as a condition for ongoing learning activities and the constructivism paradigm as the basis of the concept. The anatomy of the concept is presented in the following figure:

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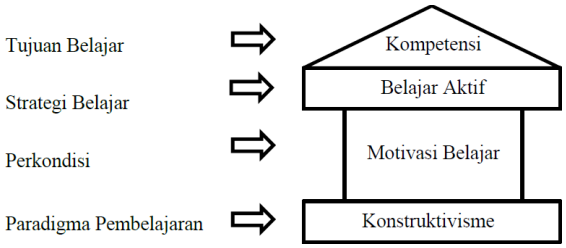

Picture 2.
Anatomy of Self-Learning Concepts

According to research by Eko & Kharisudin (2010: 79), mentioned several indicators of learning independence, including (1) self-confidence, (2) not relying on others, (3) willing to do it alone, (4) responsible, (5) wanting to be high achievers, (6) using rational judgment in providing judgments, making decisions, and solving problems, and wanting a sense of freedom, and (7) always having new ideas. Based on the indicators of learning independence according to Eko & Kharisudin (2010: 79), the author made questions for independence questionnaires distributed to students referring to number 2 and number 3 in the form of not relying on others and willing to do their own.

Learning Modules

Modules are teaching materials that are packaged as a whole and systematic, which contains a set of planned learning experiences and is designed to help students master specific learning (Daryanto, 2013).

Meanwhile, according to Daryanto(2013: 9-11), to produce modules that are able to increase learning motivation, module development must pay attention to the characteristics needed as modules, namely: 1) *Self instruction;* 2) *Self contained*; 3) *Stand alone*; 4) Adaptive; and 5) *User friendly*.

According to Daryanto (2013: 13-15), to produce learning modules that are able to present effective and efficient learning. Modules need to be designed and developed with attention to several elements that require namely: format, organization, attractiveness, font size, whitespace and consistency.

In producing good, interesting modules and having material that can produce effective and efficient learning, there needs to be signs in compiling modules. There are several methods put forward in the development of learning modules. Broadly speaking, according to Daryanto (2013: 16-24), put forward several steps in the preparation of modules as follows: (1) Analysis of module needs, (2) Preparation of *drafts*, (3) Trials, (4) Validation, and (5) Revisions.

The Nature of Technical Drawing Learning

Learning according to Jerome S. Brunner (S. Nasution, 2008: 9-10), learning is defined as the process of adding information, changing and increasing student knowledge to subsequently conduct an evaluation of the process that has been done before.

Technical drawings are drawings that aim to convey the intention of the Picture maker objectively, this type of Picture uses internationally acceptable symbols (Juhana, Ohan and M. Suratman, 2012).

RESEARCH METHOD

Place and Time of Research

This research was carried out at SMK Negeri 1 Stabat which is located at Jalan KH. Wahid Hasyim Stabat, in the 2020/2021 academic year class X Building Modeling and Information Design (DPIB) in the subject of Technical Drawing. The research time was carried out in the even semester of the 2020/2021 academic year.

The subjects in this study were grade X students of the Building Modeling and Information Design Expertise Program (DPIB) who were taking Technical Drawing subjects.

Development Methods

This research uses *Research and Development* (R&D) research methods or research and development methods. *Research* and Development (R&D) and the model used is the ADDIE development model which stands for *Analyze, Design, Development, Implementation, and Evaluation*.

The stages of the ADDIE model according to Kinanti Wijaya, et al (2019) are as follows: (a) *Analysis Stage, The analysis process is a pre-planning stage that identifies product development needs in accordance with the objectives of learning objectives and students*, (b) Design Stage, The design *process is carried out after the analysis data is obtained, then the product design is designed according to the concepts illustrated in the analysis phase, (c) Development Stage*, The development process is carried out after the design of the new product is completed. Then validation is carried out by means of expert assessment. Products are assessed by several validators who are considered experts in the field of products to be developed through instrument sheets, *(d) Implementation* Stage, The implementation stage is carried out using new products that are valid in learning or real environments, and (e) *Evaluation Stage*, The evaluation stage is carried out after all implementation data has been collected to measure the achievement of product development objectives then analysis is carried out Statistics.

Development design refers to the stages of the ADDIE model. Here's from the development stage of ADDIE that researchers will do.

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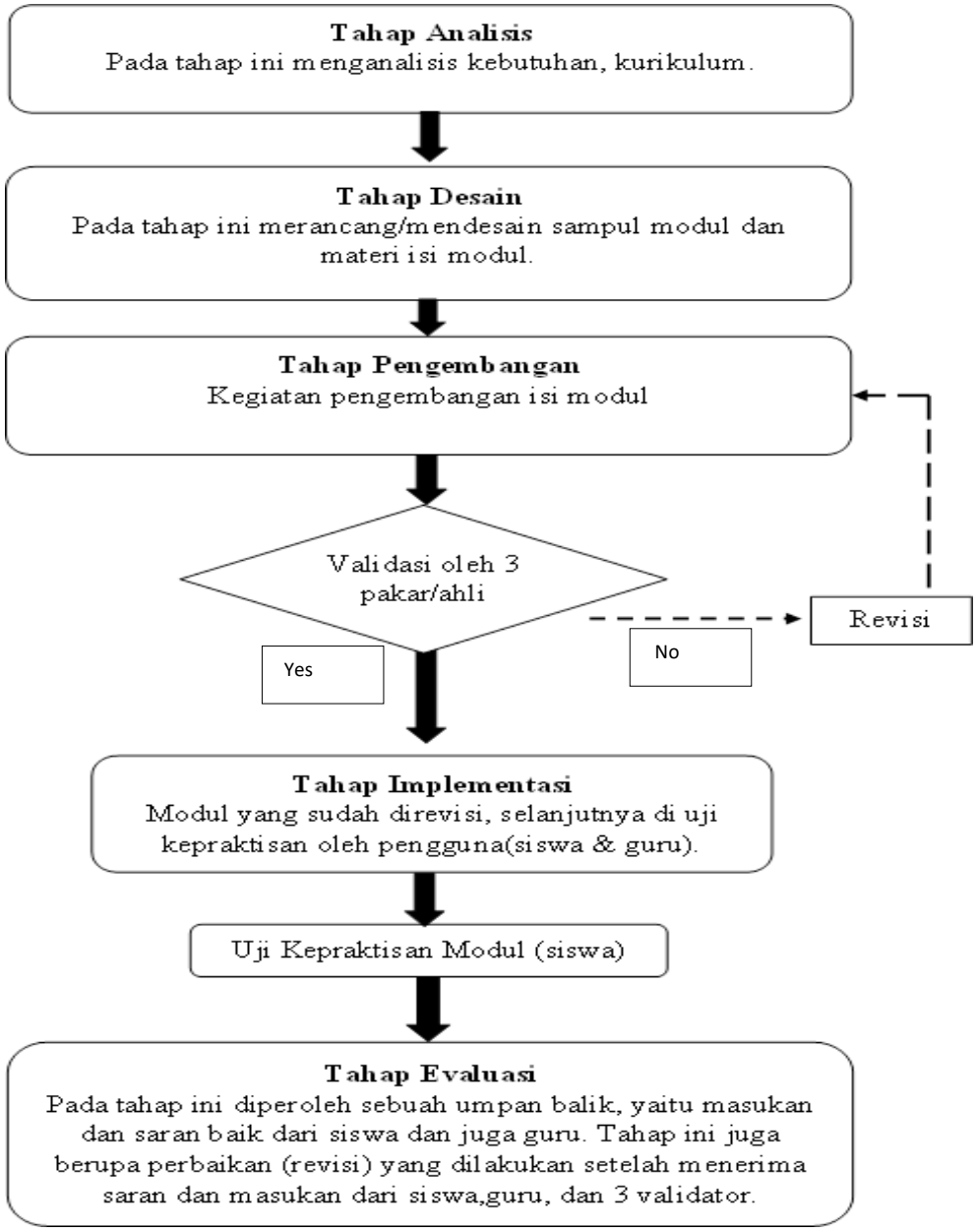

Picture 3.
Research Design Chart

The stages of module development fromresearch results according to ADDIE are as follows.

Analysis Phase

(1) Needs analysis: It is necessary to create a Technical Drawing learning module that has been adapted to the SKNNI curriculum as a student learning resource. (2) Curriculum analysis: The curriculum used at SMK Negeri 1 Stabat is the SKKNI curriculum, with the name of the competency standard for interpreting Technical Drawing subjects.

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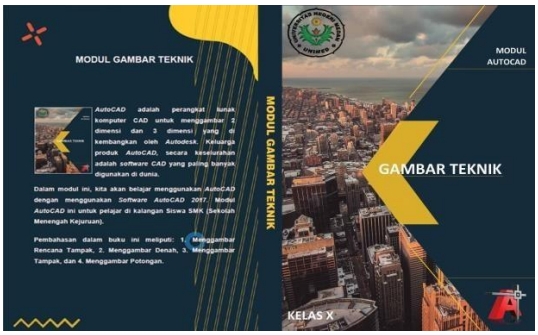
Design Stage

(1) Material preparation: determine the scope of material from the modules to be developed and have been adjusted to the syllabus of the SKKNI curriculum. (2) Designing the module cover: The module cover size uses A4 paper (21 x 29.7 cm). The type of text used on the module cover is *Arial Rounded MT Bold font* type with a textsize of 24. On the front there is a title (Technical Drawing), user (addressed to grade X students) and the UNIMED logo as an identity that this module is a product of UNIMED. (3) Design the content section ofthe module.



Picture 4.
Module Cover Design

Development Phase

At this stage, 3 development steps are carried out, namely product manufacturing, product feasibility validation, and product revision. At the product manufacturing stage, it is the stage of realizing the product according to design. The process of making products takes 1 month to be able to complete the materials in the module, both from searching for materials, typing materials, editing, and setting *module layouts*. In the second stage of product validation, at this stage instrument validationis carried out first after which expertvalidation is carried out for product assessment. In the third stage of productrevision, products that have been validated by media experts, material experts and linguists further improve the productaccording to comments and suggestions from experts.

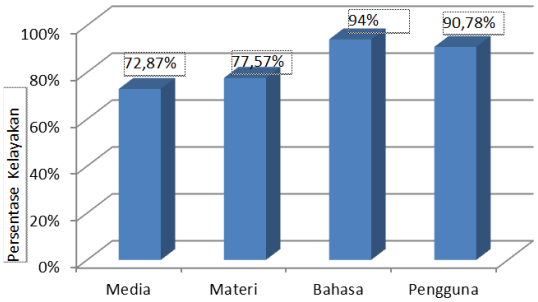
Implementation Stage

At this stage product trials are carried out to determine the feasibility of modules that have been developed and revised by experts. Product trials were carried out on Monday and Tuesday, May 24-29, 2021, carried out *online* by filling out user questionnaires. The trial was attended by class X DPIB-2 students totaling 15 students and teachers. The equipment needed in this trial is a laptop / computer.

Evaluation Stage

At this stage analyze the instrument data that has been assessed by experts and users. (1) Media validation was carried out on March 26, 2021, (2) Material validation was carried out on March 29, 2021, and (3) Language validation was carried out on March 26, 2021, (4) The trial was attended by 15 grade X DPIB-2 students and was held

on May 24-29, 2021. Here's a graph of the results of data analysis from media experts, material experts, linguists, and users.



Picture 5.
Module Qualification Graphic

RESULTS AND DISCUSSION

Research Results

Results and revisions of the validation of the development of *AutoCAD module learning media*.

Table 1.
Material Expert Advice

No.	Saran Revisi	Sebelum Revisi	Sesudah Revisi
1.	Perbaikan pada penggunaan kalimat efektif / bahasa instruksional agar mudah dipahami siswa	Bahasa ada yang belum baku	Bahasa yang belum baku sudah diperbaiki menggunakan bahsa baku
2.	Tugas diberikan harus lengkap informasinya dan jelas	Informasi pada tugas peserta didik belum lengkap	Sudah dilengkapi dengan menambahkan informasi berupa skala gambar, satuan gambar, dan ukuran lahan
3.	Gambar harus lengkap	Tidak ada gambar rencana atap, rencana kusen, detail pondasi 1 dan detail pondasi 2	Sudah dilengkapi gambar kerja rencana atap, rencana kusen, detail pondasi 1 dan detail pondasi 2
4.	Pada bab 2 gambar denah saja tidak di gabung dengan gambar rencana tapak		

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Table 2.
Media Expert Advises

No.	Saran Revisi	Sebelum Revisi	Sesudah Revisi
1.	Jarak spasi baris diperkecil	Spasi 1.5	Spasi 1.15
2.	Soal latihan bisa dibuat dengan mekanisme memberikan softcopy atau melengkapi elemen yang dikosongkan (siswa hanya melengkapinya saja)		

Table 3.
Linguist Advice

No.	Saran Revisi	Sebelum Revisi	Sesudah Revisi
1.	Perbaikan pada penggunaan kalimat efektif / bahasa instruksional agar mudah dipahami siswa	Bahasa ada yang belum baku	Bahasa yang belum baku sudah diperbaiki menggunakan bahsa baku
2.	Dilihat dari sisi bahasa Indonesia yang digunakan, modul ini sudah baik dan layak digunakan bagi siswa. Bahasa yang digunakan sederhana dan komunikatif.	-	-

Discussion

Material Expert Validation

The results of the research obtainedcan be seen in the table below.

Table 4.
Material Expert Assessment Results

	Aspek	Jumlah Butir	Skor (x)	Skor Maksimum	Rata-rata	Persentase (%)
1	*Self intruction*	26	101	130	3,88	77,7
2	*Self contained*	3	12	15	4	80
3	*Stand alone*	2	7,5	10	3,75	75
4	*Adaptive*	2	8	10	4	80
5	*User friendly*	4	15	20	3,75	75
	Jumlah	**37**	**143,5**	**185**	**3,88**	**77,57**

After validating the material by material validators 1 and material 2, then the assessment was calculated using references from Prof. Sukardjo (2008: 53), the results of material expert assessments were obtained from the aspects *of Self intruction* with an average of 3.88 (77.7%), Self contained *with an average of 4 (80%), Standalone* with an average of 3.75 (75%), Adaptive with an average of 4 (*80%),* and *User friendly* with an average of 4 (80%). Sothat the overall average total score obtained
3.88 (77.57%) and was included in the "Good" category.

Media Expert Validation

The results of the research obtained canbe seen in the table below.

Table 5
Media Expert Assessment Results

No.	Aspek	Jumlah Butir	Skor (x)	Skor Maksimum	Rata-rata	Persentase (%)
1	Format	4	17	20	4,25	85
2	Organisasi	9	34	45	3,77	76
3	Daya tarik	5	17	25	3,4	68
4	Bentuk dan ukuran huruf	6	21	30	3,5	70
5	Ruang (spasi kosong)	5	14	25	2,8	56
6	Konsistensi	8	32	40	4	80
	Jumlah	**37**	**135**	**185**	**3,62**	**72,97**

After conducting media validation by media validators, then the assessment was calculated using references from Prof.Sukardjo (2008: 53), then the results of media expert assessments were obtained from the aspect of Format with an average of 4.25 (85%), from the aspect of Organizationwith an average of 3.77 (76%), from the aspect of Attractiveness with an average of 3.4 (68%), from the aspect of Form and fontsize with an average of 3.5 (70%), from the aspect of Space (white space) with an average of 2.8 (56%), and from the aspect of Consistency with an average of 4 (80%). While overall obtained a score of 3.62 (72.97%) and included in the "Good" category.

Linguist Validation

The results of the research obtained canbe seen in the table below.

Table 6
Results of Linguist Assessment

No.	Aspek	Jumlah Butir	Skor (x)	Skor Maksimum	Rata-rata	Persentase (%)
1	Lugas	3	14	15	4,67	93,33
2	Komunikatif dan interaktif	1	4	5	4	80
3	Kesesuaian dengan perkembangan siswa	2	10	10	5	100
4	Kesesuaian dengan kaidah bahasa	2	9	10	4,5	90
5	Penggunaan istilah, simbol, atau ikon	2	10	10	5	100
	Jumlah	**10**	**47**	**50**	**4,7**	**94**

After conducting languagevalidation by language validators, then the assessment was calculated using references from Prof. Sukardjo (2008: 53), then the results of linguist assessments were obtainedfrom the straightforward aspect with an average of 4.67 (93.33%), from the Communication and interactive aspects with an average of 4 (80%), from the aspect of conformity with student development with an average of 5 (100%), from the aspect of conformity with language rules with an average of 4.5 (90%), and from the aspect of Use of terms, symbols or icons with an average of 5 (100%). While overall obtaineda score of 4.7 (94%) and included in the "Very Good" category.

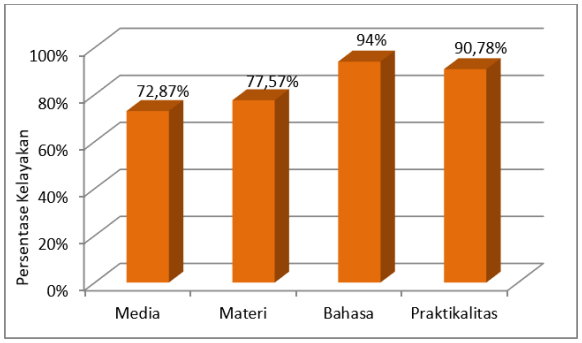
Module Practicality

In this study, researchers used class X DPIB as a class that uses learning media for the practical value of the valid media. The practicality value is then calculated using descriptive statistics according to KinantiWijaya (2020). The results of the calculationcan be seen in the table below.

Table 7.
Hasil Penilaian Praktikalitas Oleh Siswa

	Kelas	Aspek Penilaian	Skor Total	Rata-Rata
1.	X DPIB SMKN 1 Stabat	Kelayakan Isi	49,93	4,48

The results of practical instrument research by students were then calculated using descriptive data analysis to obtain the mean value of all respondents, and the resultwas that the overall average assessment got an average value of 4.48 (90.78%) so that itcould be categorized as "Very Practical".



Picture 6.
Module Feasibility &;Practicality Graphic

CONCLUSION

The learning media of the AutoCAD module which was developed as a learning medium in technical drawing subjects is veryfeasible to be used as a learning medium in class X DPIB SMK Negeri 1 Stabat and the level of acceptance by students of the AutoCAD module learning media is high.

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