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Development of Factory-Based Learning Modules in Clothing Production Units

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ABSTRACT

The aim of research and development is to develop a factory-based learning module in fashion production units in vocational schools that can be used in the classroom or for independent learning. This study was developed based on an analysis of the needs of class XI fashion students at SMK Negeri 1 Beringin. Development research using the 4D method by Thiagarajan. Has the Define, Design, Develop, and Disseminate research stages. The development process involves input from material experts, media experts, and instructional experts, as well as acceptability testing from students. The results of the research show that (1) the Teaching Factory-Based Learning Module in the Clothing Production Unit received a material expert score in the content feasibility aspect of 3.43, or 85.83% (very feasible). In the feasibility aspect of the presentation, it was 3.23, or 80.68% (feasible). Language assessment aspect: 3.54, or 88.46% (very decent). Instructional expert validation aspect: 3.32, or 82.93% (feasible). Media expert aspects of graphic feasibility are 3.68, or 91.94% (very feasible). Each validation shows that the product is suitable for use in learning. (2) The Teaching Factory Based Learning Module in the Clothing Production Unit is tested using the N-Gain Score to see the effectiveness of media use on learning outcomes. The research results showed a figure of 0.57 (medium effectiveness). Research conclusions: The Teaching Factory-Based Learning Module in the Clothing Production Unit at SMK Negeri 1 Beringin is suitable for use and is effective in improving learning outcomes.

KEYWORDS

learning module; teaching factory; fashion production

INTRODUCTION

Vocational school is a level of formal education that aims to improve intelligence, knowledge, morals, dignity, and skills needed to live independently and prepare students to work more actively as well as continue their education. Vocational high schools provide cognitive, effective, and psychological skills to prepare students to become more competent and skilled. Efforts to form quality human beings, ready to face various life challenges, start as early as possible with education.

Educational activities are offered, among others, through a number of subjects to provide meaningful and varied learning experiences for students. Apart from creating a skilled workforce, in the distribution of graduates, vocational schools are expected to also have an entrepreneurial spirit so that they can not only work but also create jobs for themselves and others. This, of course, requires seriousness because an entrepreneurial spirit is not easily formed just by receiving entrepreneurial knowledge. Entrepreneurship must be formed in a process that is integrated with the learning process so that a spirit of commitment, responsibility, and work ethic is developed in vocational school graduates. Setyawan et al. (2014) said that vocational schools are an important part of the world of education in Indonesia. Vocational school education is education that prioritizes developing students' abilities to carry out certain types of work. Vocational school graduates need to be equipped with entrepreneurial skills because not all vocational school graduates can compete in the industrial world. The increase in the number of graduates produced and the availability of job opportunities are still not balanced. Currently, vocational schools are the center of attention for all groups, so it is time for vocational schools to rise and maximize their existing potential.

Vocational schools will be effective if learning takes place in a real work environment. Therefore, the teaching factory aims to integrate the commercial/industrial environment into the school environment. Students who follow the same learning process will experience the real world of work. One of the goals to be achieved in the teaching factory is to develop entrepreneurial abilities in the school environment. Gozali et al. (2018) Implementation of a teaching factory in vocational schools is done by establishing a business unit or company within the school.

Nitiswito (2021) Through the effectiveness of the teaching factory-based module, it can be seen from the pretest and posttest of student learning, namely pretest 54.42 and posttest 85.00, with an increase in learning outcomes of 64.02%. Based on this research, it is known that the teaching factory-based learning module is seen as practical and effective for use as a learning module. Next, Baharuddin (2023) showed that students' understanding of learning increased by 80.63%, as evidenced by the average pretest score of 63.46 and posttest score of 92.92. This means that using the teaching-factory learning module can increase students' understanding of learning.

Learning media can improve the quality of students' learning processes, including teaching materials that will attract students' attention so that they can foster students' learning motivation. It is very important for teachers to choose the learning medium used. Choosing inappropriate learning media causes students to get bored quickly and not listen to the teacher, so they don't like the subject. Modules can also help students to understand the subject matter comprehensively (Sudjana in Khoerussani, 2019). The use of teaching materials in the form of modules can be used as a solution to overcome the problem of limited learning resources.

Currently, there are no factory-based modules for design subjects and production units in vocational schools, including the subject of Gamis clothing, This was identified based on student needs. Gamis fashion products have become quite a big need in society. The practice of making Gamis clothing in vocational schools is usually based on simple models, which then serve as a reference for students to develop abilities and skills in making various clothing models. Teaching factory is a learning concept in a real-world context, such as working in industry, which aims to bridge the skills gap between industry needs and school knowledge. Innovative, practical, and productive learning technology is a pedagogical concept directed at managing student learning in line with the needs of the industrial world. Presenting production units in schools is one of the efforts to overcome the gap between schools and DU/DI, at least providing effective in-school businesses to support the implementation of teaching factories.

Iswahyudi (2021) expressed his opinion regarding the teaching factory concept, namely: (1) Achieving productive subject competencies by receiving or making orders according to specialization and production that can be accepted by the industry or market; (2) Production units as supporters of the learning process; (3) Production can be in the form of goods or services; and (4) Students as employees carry out work practices according to request.

Risdiana et al.'s (2014) teaching factory model aims to improve students' abilities in production subjects by creating social relationships in the form of communication and working as workers in an industrial environment for a certain period of time at school. The steps are as follows: (1) Acting as a worker, students receive orders by communicating well, paying attention to intonation, facial expressions, and body language; (2) Analyzing orders: reading work orders, determining tools and materials, work time, price, and work safety. Workers consult with consultants; (3) According to the results of the order analysis, the workers confidently stated that they were ready to carry out the order with good words; (4) Carry out orders by implementing work safety, preparing work, working steps according to SOP, evaluating work results and calculating work time, and consulting with consultants; (5) Carry out quality control, match factory specifications, ensure components and systems function properly, and consult with consultants; and (6) Speak well when handing over work results, ask for customer feedback on work, and try to establish good communication with customers.

These aspects are aspects that can support the achievement of ideal conditions for implementing teaching factories in vocational schools, as follows:

Table 1. Aspects of Support for Achieving Ideal Conditions for Implementing Teaching Factory in Vocational Schools

No	Aspect	Criteria for ideal conditions to be achieved
1.	Learning	• Teaching materials, which aim to achieve competency, are something that is multipurpose (marketable). Competency programs that do not produce products/services can be directed at simulating work situations in the field • TF-based assessment system • Block and continuous schedule learning system
2.	Human Resources	• Design engineering skills. • Applying Sense of quality, Sense of efficiency, Sense of creativity and innovation. • The activity process pays attention to the ratio of teachers and students
3.	Facilities	• Fulfills a 1:1 ratio (students and equipment) • Suitability and completeness of process aids • Continuous tool development (tool addition)
4.	Practical activities	• Applying industrial culture such as: • Quality standards, quality control • Target time • Production process efficiency • Work rotation (shifts) • Clear work procedures • Practice results become a source of income (generating incom) • Clear functions/responsibilities for each person in charge • Safe and comfortable work environment • Regularity/smoothness of learning activities with continuous control and monitoring
5.	*Network*	Industrial collaboration aimed at: • Technology and knowledge transfer • Building an industrial culture in the school environment.

No	Aspect	Criteria for ideal conditions to be achieved
6.	Products/services	• Roduce products/services that comply with standards.
7.	Transparency	• Recording of financial transactions in accordance with standard accounting procedures (financial governance)
8.	Legal aspects	• Availability of legal aspects for organizing TF

Anwar (2019) defines learning modules as teaching materials that are created systematically. In terms of content, it is packaged more comprehensively and interestingly and has methods and evaluation that are useful for achieving the goal, namely achieving the desired competency. According to Agushinta and Wijaya (2016), learning modules can also be interpreted as units of learning activities that are planned and systematic. Generally, this module was created with the aim of helping students achieve certain learning processes or goals. Apart from that, the module is also a program package module, which is basically intended for learning purposes. According to Setiyadi et al. (2017), learning modules are printed teaching materials that are arranged systematically in language that is easy for students to understand, and are appropriate to their age and level of knowledge so they can carry out independent learning.

The Fashion Design Skills Competency in the Merdeka Curriculum has been renamed the Fashion Design and Production Skills Concentration. In fashion design, the material limitations chosen are gamis clothing in the concentration of aesthetics and production. is a scientific and artistic discipline regarding design, aesthetics, and natural beauty in clothing and additional decorations. Fashion design is one of the majors that many design and art schools offer to interested people who want to pursue a career in the fashion industry. One of the material limitations chosen is gamis clothing in the concentration of fashion design and production.

Learning elements include: (1) preparation for making gamis clothing, which consists of (understanding making sample worksheets according to gamis design specifications, understanding the work steps for making gamis samples, understanding taking gamis sizes, understanding making gamis patterns, understanding cutting gamis materials, understanding calculating costs and determining the price of gamis products), (2) sewing gamis clothing products (understanding sewing techniques according to gamis procedures, understanding gamis trimming, understanding gamis pressing, understanding quality control of gamis clothing products, and understanding the implementation of final finishing of gamis clothing).

Production-based learning is a skills or competency-based learning process that is designed and implemented based on actual work processes and standards (real jobs) to produce goods or services according to market or consumer needs. Teaching factory is a combination of existing learning, namely competency-based training (CBT) and production-based training (PBT), in the sense that an expertise or skill process is designed and implemented based on actual work procedures and standards to produce products that meet market needs. or those of consumers (Irianto, 2012).

The formulation of the problem in this research is: (1) What is the level of feasibility of the teaching factory-based learning module in the production unit at SMKN 1 Beringin?; and (2) What is the level of effectiveness of the teaching factory-based learning module developed in the production unit at SMK 1 Beringin?

RESEARCH METHODS

The research uses the Research and Development (R&D) model. In the research and development cycle, which includes reviewing research findings related to the product that is the focus of development, carrying out development according to the findings, and testing the product until it is finally put into operation, the aim of improving the product is to revise things that are considered inadequate based on the findings during the testing step. The next stage is to repeat the product testing method until the test results of the product are suitable for operation.

This research was carried out at SMK Negeri 1 Beringin on Jalan Pendidikan No. 3 Kuala Namu Emplasm, Beringin District, Deli Serdang Regency, North Sumatra, in the even semester of the 2023–2024 year.

The procedures and development design in this research are research and development. There are various types of models in this type of research, but the model that will be applied to the development of teaching factory-based learning modules is the development of a 4-D (Four D) model. S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel (1974). This model includes four main steps, including the definition stage, the design stage, the development stage, and the dissemination stage. The choice of this model was motivated by the research objective of creating a product in the form of interactive learning media. The product to be made will go through a feasibility test stage through validity and product testing to review the ability of factory-based learning products to be suitable for use in classroom teaching and learning systems.

The research data collection method applies observation, interview, and questionnaire techniques. Observation is a way of collecting data by observing activities that occur directly. This method is the first stage in the media development mechanism, which aims to review problems and see what the needs are in their development. Interviews are a way of collecting data through direct interaction with informants, who are subject educators and students.

The research instrument used next is a validation sheet, which is applied to obtain data regarding expert evaluations of the learning modules being developed. The results of this evaluation become the basis for improving the product before it is tested. The validation sheet for teaching factory-based learning modules is filled in by expert lecturers and prepared using a Likert scale based on the media evaluation instrument grid for expert validation, which can be reviewed in Table 2 on the following page:

Table 2. Research Instrument Grid for Content Feasibility Aspects for Material Experts

Assessment Indicators	Assessment Items
A. Conformity of material with SK and KD	1. Material completeness
	2. Breadth of material
	3. Depth of material
B. Material accuracy	4. Accuracy of concepts and definitions.
	5. Accuracy of examples and Cases
	6. Accuracy of images, diagrams and illustrations.
	7. Accuracy of terms
	8. Accuracy of notation, symbols and icons.
	9. Accuracy of library references.
C. Update of Material	10. Suitability of material with scientific developments.
	11. Using examples of facts in everyday life
	12. Pictures, diagrams and illustrations in everyday life.
	13. Library updates..
D. Encourage Curiosity	14. Encourage curiosity..
	15. Creates the ability to ask questions

Table 3. Research Instrument Grid for Feasibility Aspects of Presentation for Material Experts

Assessment Indicators	Assessment Items
A. Teknik Penyajian	1. Systematic consistency of presentation in learning activities..
	2. Concept collapse
	3. Practice questions presented in the module
	4. Answer key to practice questions
	5. Introduction.
	6. Glossary.
	7. Bibliography.
	8. Summary
B. Learning Presentation	9. Student engagement
C. Coherence and Sequence of Thought Flow	10. Linkages between learning activities / sub-learning activities / paragraphs
	11. The integrity of meaning in learning activities / sub-learning activities / paragraphs.

Table 4. Language Assessment Research Instrument Grid for Material Experts

Assessment Indicators	Assessment Items
A. Straightforward	1. Accuracy of sentence structure..
	2. Sentence effectiveness.
	3. Standardity of terms.
B. Communicative	4. Message readability
	5. Accuracy in the use of language rules.
C. Dialogic and interactive	6. Ability to motivate messages or information.
	7. Ability to encourage critical thinking.
D. Suitability to the student's level of development.	8. Suitability of students' intellectual development
	9. Suitability to the level of emotional development of students
E. Sequence and integration of thought flow	10. Sequence and integration between learning activities
	11. Sequence and coherence between paragraphs
F. Use of terms, symbols and icons	12. Consistency in use of terms.
	13. Consistent use of symbols or icons.

Table 5. Research Instrument Grid for Graphic Feasibility Aspects for Media Experts

Assessment Indicators	Assessment Items
A. Book Size	Physical Size of the Book
	1. Conformity of book sizes to ISO standards..
	2. Suitability of size to book content material.
B. Book Cover Design (Cover)	Book Cover Layout
	3. The appearance of the layout elements on the front, back and back covers is harmonious, has rhythm and unity and is consistent.
	4. Displays a good center point.
	5. The composition and size of layout elements (title, author, illustration, logo, etc.) are proportional, balanced and in harmony with the content layout (according to the pattern).
	6. The colors of the layout elements are harmonious and clarify the function.
	The letters used are attractive and easy to read
	7. The size of the book title letters is more dominant and proportional to the size of the book and the author's name
	8. The color of the book title contrasts with the background color
	9. Don't use too many font combinations
	Book Cover Illustration

Assessment Indicators	Assessment Items
	10. Describe the content/teaching material and reveal the character of the object
	11. The shape, color, size, proportion of the object corresponds to reality.
C. Book Content Design	Layout Consistency
	12. Placement of layout elements is consistent based on patterns.
	13. The separation between paragraphs is clear
	Elements of Harmonious Layout
	14. Print area and margins are proportional
	15. The margins of two adjacent pages are proportional
	16. Spacing between text and illustrations is appropriate
	Complete layout element
	17. The placement of learning activity titles, learning activity subtitles, and page/folio numbers does not interfere with understanding.
	18. Placement of decorations/illustrations as a background does not interfere with the title, text, page numbers.
	The layout speeds up understanding
	19. Placement of decorations/illustrations as a background does not interfere with the title, text, page numbers.
	20. The placement of titles, subtitles, illustrations and image captions does not interfere with understanding.
	Simple Book Content Typography
	21. Don't use too many fonts
	22. Use of variations in letters (bold, italic, all capital, small capital) is not excessive.
	Easy to Read Typography
	23. Normal text layout width.
	24. The spacing between lines of text is normal.
	25. The spacing between letters (kerning) is normal.
	Book Content Typography Makes It Easier to Understand
	26. The level/hierarchy of titles is clear, consistent and proportional.
	27. Word cutting marks (hyphenation)
	Content Illustration
	28. Able to reveal the meaning/significance of objects
	29. Accurate and proportional shape according to reality.
	30. The overall presentation of the illustrations is harmonious.
	31. Creative and dynamic.

Table 6. Research Instrument Grid for Feasibility of Presentation for Instructional Design Experts

Assessment Indicators	Assessment Items
A. Presentation Techniques	Systematic consistency of presentation in learning activities.
	Concept collapse
B. Presentation Support	Exercise
	Answer key to practice questions
	Introduction.
	Glossary.
	Bibliography.
	Summary
C. Learning Presentation	Student engagement
D. Coherence and Sequence of Thought Flow	Linkages between learning activities / sub-learning activities / paragraphs.
	The integrity of meaning in learning activities / sub-learning activities / paragraphs.

Table 7. Research Instrument Grid for Student Trials Indicator

Assessment Indicators	Assessment Items
Interest	The appearance of this Teaching Factory Based Module is interesting
	This Teaching Factory Based Module made me more enthusiastic about learning in the production unit
	By using this Teaching Factory based module you can make learning in the production unit less boring
	The Teaching Factory-based module in this production unit supports me to master the lessons in the production unit, especially the Costome made component in home clothing
	Having illustrations can provide motivation to study the material
Material	The delivery of material in the Teaching Factory-based module in this production unit is related to everyday life
	The material presented in this Teaching Factory-based module is easy for me to understand
	In the Teaching Factory based module in this production unit there are several sections for me to find easier for myself
	The presentation of material in the Teaching Factory-based module in this production unit encouraged me to discuss it with other friends
	The material in the Teaching Factory-based module increased my confidence in producing custom made clothing

Table 8. Question Grid for Teaching Factory Based Learning Modules

Element	Learning Outcomes
Preparation for making gamis clothing	Understand making sample worksheets according to gamis design specifications
	Understand the work steps for making gamis samples
	Understand taking gamis sizes
	Understand making gamis patterns
	Understand cutting gamis material
	Understand cost calculations and price determination of gamis products
Sewing gamis fashion products	Understand sewing techniques according to gamis procedures
	Understanding gamis trimming
	Understanding gamis pressing
	Understand the quality control of gamis fashion products
	Understand the implementation of the final finishing of gamis clothing

Data analysis technuque

The average analysis validity criteria used in this research can be seen in Table 9. below:

Table 9. Validity Criteria for Average Value Analysis

No	Answer	Score
1	Very Good	4
2	Good	3
3	Not Good	2
4	Very Not Good	1

(Source: Sugiyono, 2019)

The research results for each respondent calculated the average score obtained. From the results of this data analysis, the feasibility of the product being developed can be determined. This can be used as a basis for revising the product being developed. The formula for measuring data per item is:

$$P = \frac{x}{xi} \times 100\%$$

Information:
P = percentage
X = Respondent's answer in 1 item
Xi = ideal value in 1 item
100% = constant
After measuring the data per item, the overall data is then measured using the formula:

$$P = \frac{number\ of\ scores\ obtained}{\text{sum of ideal scores for all items}} \times 100\%$$

U To see the feasibility criteria which state that the product being developed is suitable for use, see Table 10 below:

Table 10. Feasibility Percentage Scale

Percentage of Achievement	Criteria
76 – 100%	Very Eligible
56 – 75%	Eligible
40 – 55%	Enough Eligible
0 – 39%	Not Eligible

Source: Arikunto, S (2018:208)

The normality test is carried out to determine whether the research data is normally distributed or not. This means that the distribution of data in the population is normal or not. Testing the normality of this data uses the Chi Square formula as follows:

$$x^2 = \sum\left(\frac{(F_0 - F_h)^2}{F_h}\right)$$

Information:
x^2 = Chi Square
F_0 = Frequency obtained from the sample
F_h = Expected frequency of the sample

According to Arikunto (2014), the Chi Square value used is with a significance level of 5% and degrees of freedom equal to the number of frequency classes -1 (dk=K-1). If $x^2 count \leq x^2 table$, hen it can be concluded that the data is normally distributed.

The homogeneity test is carried out to determine whether the distribution of data in the population is homogeneous. According to Sudjana (2010), the homogeneity of variance test can be calculated using the Barlett test, namely:

$$F = \frac{s_1^2}{s_2^2}$$

If Fcount < Ftable, then Ho is accepted, and if Fcount > Ftable, then Ho is rejected.
The homogeneity of variance test using the Bartlett test is an effective method for determining whether the variances of two groups of data are the same or significantly different.

Hypothesis testing

To see whether there is a significant difference between learning outcomes with the use of factory-based learning modules and without the use of modules, this is done using a difference test (t-test) (Sudjana, 2010) namely: The pair of null hypotheses and alternative hypotheses that will be tested are: Hypotheses (Ha and Ho) in the sentence description:

The statistical model is:

$H_0: \mu_1 > \mu_2$ $H_a: \mu1 \leq \mu2$

To see whether there is a significant difference between learning outcomes using teaching factory-based learning modules and without using teaching factory-based learning modules, this is done using a difference test (t-test).

$$t = \frac{\overline{x_1} - \overline{x_2}}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where s is the root of the combined variance calculated by the formula:

$$s^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2} \qquad \text{Whare } s = \sqrt{s^2}$$

Information:

$\overline{x_1}$ = average score of the experimental class

$\overline{x_2}$ = average score of the control class

n_1 = average number of experimental classes

n_2 = average number of control classes

s_1^2 = experimental class group variance

s_2^2 = control class group variance

s = combined variance

r = calculation price

The test criteria are accepted by Ha if it is calculated t(count)>t(table) which is obtained from the t distribution list with dk = (n-1) and level α = 5%.

Analysis of the effectiveness of teaching factory-based learning modules was carried out to measure the effectiveness of the interactive learning media developed. Data analysis was carried out based on student learning outcomes tests (pretest and posttest) with N-gain scores.

Data analysis in the form of pretest-posttest learning outcomes data was carried out to identify increases in learning gains which was carried out by applying the N-gain score equation as follows (Sundayana, 2016):

$$N - Gain = \frac{Posttest\ Score - Pretest\ Score}{Maximum\ score - Pretest\ Score}\ x\ 100\%$$

fter obtaining the results from the data processed by applying this equation, the results are correlated with the N-Gain score criteria as presented in Table 11.

Table 11. N-Gain Score Criteria

Criteria	**Limitation**
High	*N-Gain score* ≥ 0.7
Medium	0.3 ≤ *N-Gain score* ≤ 0.7
Low	*N-Gain score* ≤ 0.3

(Source: Hake, 1998)

The teaching factory-based learning module is said to be effective if the N-Gain value is at least in the medium category, or, in other words, there is a significant increase in learning outcomes between post- and pre-use of the teaching factory-based learning module, and the number of students who meet the criteria increases after using the module. teaching factory-based learning.

RESULTS AND DISCUSSION

Results

The learning module products developed were validated by material experts, media experts, and instructional design experts, with each validation assessed by two examiners to see the appropriateness of the media as well as the content and form of the learning modules contained in the factory-based clothing learning modules being developed. The results of the material expert validation can be seen from the validation questionnaire analysis data in Table 12.

Table 12. Material Expert Validation Results on Content Feasibility Aspects

No	Aspect	Score	%	Interpretation
1	Conformity of material with SK and KD	3,50	87,50	Very Eligible
2	Material accuracy	3,67	91,67	Very Eligible
3	Latest material	3,25	81,25	Eligible
4	Encourages curiosity	3,00	75,00	Eligible
Average		3,43	85,83	Very Eligible

The following are the results of material expert validation on the feasibility aspect of the presentation being developed, presented in Table 13.

Table 13. Material Expert Validation Results on the Aspect of Feasibility of Presentation

No	Aspect	Score	%	Interpretation
1	Presentation technique	3,31	82,81	Eligible
2	Learning Presentation	3,00	75,00	Eligible
3	Coherence and Sequence of Thought	3,00	75,00	Eligible
Average		3,23	80,68	Eligible

Results of language assessment tests on teaching factory-based learning module materials in production units. The following are the results of material expert validation on aspects of language assessment which are presented in Table 14.

Table 14. Material Expert Validation Results on Language Assessment Aspects

No	Aspect	Score	%	Interpretation
1	Straightforward	4,00	100,00	Very Eligible
2	Communicative	4,00	100,00	Very Eligible
3	Dialogic and Interactive	3,25	81,25	Eligible
4	Suitability to the level of student development	3,00	75,00	Eligible
5	Consistency and integration of thought flow	3,25	81,25	Eligible
6	Use of terms, symbols and icons	3,50	87,50	Very Eligible
Average		3,54	88,46	Very Eligible

Validation test results from instructional design experts on teaching factory-based learning modules. The following results from expert validation of the instructional design developed are presented in Table 15.

Tabel 15. Hasil Validasi Ahli Desain Instruksional

No	Aspect	Score	%	Interpretation
1	Presentation Techniques	3,00	75,00	Tinggi
2	Presentation Support	3,42	85,42	Very Eligible
3	Learning Presentation	3,50	87,50	Very Eligible
4	Coherence and Sequence of Thought Flow	3,25	81,25	Eligible
Average		3,32	82,93	Eligible

Media expert validation test results on teaching factory-based learning modules. The following results from expert validation of the media developed are presented in Table 16.

Table 16 Media Expert Validation Results on Graphic Feasibility Aspects

No	Aspect	Score	%	Interpretation
1	Book Size	3,75	93,75	Very Eligible
2	Book Cover Design (Cover)	3,61	90,28	Very Eligible
3	Book Content Design	3,70	92,50	Very Eligible
Average		3,68	91,94	Very Eligible

Table 17. Individual Trial Results

No	Aspect	Score	%	Interpretation
1	Interest in the learning module	3,67	91,67	Very Eligible
2	Learning Module Material	3,56	88,89	Very Eligible
Average		3,61	90,15	Very Eligible

Table 18. Results of Small Group Trials

No	Aspect	Score	%	Interpretation
1	Interest in the learning module	3,64	91,11	Very Eligible
2	Learning Module Material	3,54	88,43	Very Eligible
Average		3,59	89,65	Very Eligible

Table 19. Field Trial Results

No	Aspect	Score	%	Interpretation
1	Interest in the learning module	3,59	89,86	Very Eligible
2	Learning Module Material	3,43	85,76	Very Eligible
Average		3,51	87,63	Very Eligible

The scores in the pretest process show the learning outcomes scores of 36 students with an average score of 48.94. The frequency of pretest results before using the Teaching Factory-based learning module in fashion learning is presented in Table 20.

Table 20. Frequency of Student Pre-test Scores

Value	Frequency	Percentage (%)
25 – 30	2	5,6
31 – 38	4	11,1
39 – 46	9	25,0
47 – 54	11	30,6
55 – 62	6	16,7
63 – 70	4	11,1
Total	36	100,0

The posttest scores show the learning gains of 36 students, with an average score of 77.94. The frequency of learning outcome scores for students who have received the learning mechanism for implementing the teaching factory-based learning module in the fashion production unit is presented in Table 21.

Table 21. Frequency of Student Post-test Scores

Value	Frequency	Percentage (%)
60 - 65	2	5,6
66 - 71	5	13,9
72 - 77	10	27,8
78 - 83	13	36,1
84 - 89	4	11,1

90 - 95	2	5,6
Total	36	100,0

The N-Gain Score is used to see the comparison between the gain or achievement score obtained by students and the highest gain or achievement score that students may obtain. The results of the scores obtained after the pretest and posttest are shown in Table 22.

Table 22. Frequency of Pre-test and Post-test Testing

Limits	Frequency	Interpretation
N-Gain score ≥ 0.7	6	High Effectiveness
0.3 ≤ *N-Gain score* ≤ 0.7	30	Medium Effectiveness
N-Gain score ≤ 0.3	0	-

Table 22 above shows that each student gets varied results. A total of 6 students showed effectiveness with "high" criteria, while 30 students had "medium" criteria. Thus, the overall result was that implementing the teaching factory-based learning module in the fashion production unit provided a significant increase in learning gains for students in Class XI-1 Clothing at SMK Negeri 1 Beringin

Discussion

This Gamis fashion module was created and developed systematically based on the needs of teaching factory-based Fashion Design Vocational School students to create students who are competitive in the business world as entrepreneurs. This module product is made systematically, starting with making worksheets according to design specifications, making production work steps, taking measurements, making patterns, cutting materials, and being able to calculate costs and determine product prices. According to Anwar (2019), the learning module emphasizes teaching materials that are created systematically. In terms of content, it is packaged more comprehensively and interestingly and has methods and evaluation that are useful for achieving the goal, namely achieving the desired competency.

The development of a factory-based learning module at the fashion production union, namely in making class Material about gamis clothing, starting from aspects of appropriateness of content, appropriateness of presentation and language assessment, becomes content included in the Teaching Factory-based learning module which was developed with a score of 3.43 in the aspect of content suitability with the criteria "very appropriate", a score of 3.23 in the aspect feasibility of presentation with the criteria "decent" and language assessment starting from straightforward, communicative, dialogical and interactive language arrangement, suitability to the level of development, coherence and integration of thought flow as well as the use of terms, symbols and icons obtained an average score of 3.54 in "very feasible" criteria. The feasibility of the media being developed also received a positive assessment, with a score of 3.68 with the criteria "very feasible." Next, the instructional design expert presented an evaluation of the learning module developed with a score of 3.32 with the criteria "decent.

The validation results from the development of the teaching factory learning module in the production unit are feasible and in accordance with learning needs, both learning with educators in the classroom as well as learning that is set to be able to learn independently. The availability of teaching factory learning modules in production units is expected to make students have higher motivation to learn and can increase students' interest in learning while contributing to improving student learning outcomes.

The use of factory-based learning modules in the fashion production unit involves taking measurements, making patterns, cutting materials, and being able to calculate costs and determine product prices. This learning module is applied as one of the learning resources used by educators in the classroom when studying the fashion production unit. This is in accordance with the function of media as a learning resource, which makes it easier for educators to explain abstract concepts and systems so that students can understand the concepts given.

Hamalik (2007) defines learning outcomes as changes in a person's behavior that can be researched and measured in the form of knowledge, skills, and attitudes. This change can be interpreted as an improvement and development that is better than before from knowing things whose origins were unknown. Learning outcomes can be interpreted as the maximum results achieved by students after undergoing the learning process of the subject matter. In an effort to increase learning outcomes, students were previously given a pretest to find out how much understanding they had about Gamis clothing. The teaching factory-based Gamis fashion learning module is then applied in the teaching and learning mechanism between educators and students. At this time, the researcher acts as an observer as to whether the use of learning modules is appropriate or not. The posttest is given after all content or material in the media has been studied.

The N-Gain (normalized gain) score is used to measure the effectiveness of using a particular approach or method in a study. By implementing a pretest and posttest, the n-gain score measures whether there is an increase in knowledge and cognitive learning outcomes between before using the teaching factory-based learning module and after using it in learning the fashion production unit. The n-gain score measurement results obtained a mean score of 0.57 (medium effectiveness), thus the use of factory-based learning modules in fashion production units is effective in improving learning outcomes.

Based on the descriptions above, it can be concluded that the teaching factory-based learning media in the fashion production unit that was developed is suitable for application in teaching and learning mechanisms in the classroom or as an independent learning module for fashion students, especially in fashion lessons on the material of making gamis clothing. And in general, it is considered effective in increasing student learning gains in an effort to achieve teaching and learning goals.

CONCLUSION

The conclusions that can be put forward are as follows:

1. The product, in the form of a teaching factory-based learning module, has very suitable results for application to classroom learning procedures. This is supported by several validation processes involving material experts, media experts, and instructional design experts, all of which were assessed as "very feasible" and "suitable" for use. As well as getting an average result of 3.51 in field trials, which means "very high" acceptability.
2. The effectiveness test using the N-Gain Score of learning using factory-based learning modules in fashion production units shows an increase in learning outcomes pre- and post-application of the developed fashion learning module with a coefficient of 0.57, or getting into the "medium" category. Thus, it can be said that the teaching factory-based learning module is effective in clothing production units to be applied in improving learning about making gamis clothing for students.

REFERENCES

Anwar, M. (2019). *Pengantar Kewirausahaan Teori dan Aplikasi*, Jakarta: Kencana.

Arikunto, S. (2014). *Prosedur Penelitian Suatu Pendekatan dan Praktik*. Jakarta: Rineka Cipta.

Baharuddin, R. Z. (2023). *Penggunaan Modul Pembelajaran Teaching Factory (Teaching Factory) Teknik Otomotif Untuk Meningkatkan Pemahaman Siswa dI SMK* (Doctoral dissertation, Universitas Pendidikan Indonesia). http://repository.upi.edu/91271/8/S_TM_1808394_Title.pdf

Khoerussani, F. N. (2019). Pengembangan Modul Kimia Berbasis Teaching Factory Pada MateriRedoksTerintegrasiKompetensiKeahlian Teknik FabrikasiLogam Dan Manufaktur, *Journal of Educational Chemistry*, *1*(2), 107-117. https://journal.walisongo.ac.id/index.php/jec/article/view/4433/0

Gozali, G., Dardiri, A., & Soekopitojo, S. (2018). Penerapan Teaching Factory Jasa Boga untuk Meningkatkan Kompetensi Entrepreneur Siswa Sekolah Menengah Kejuruan. JSHP. *Jurnal Sosial Humaniora dan Pendidikan*, *2*(1), 46. https://jurnal.poltekba.ac.id/index.php/jsh/article/view/264/319

Hake, R. R. (1998). Interactive engagement v.s traditional methods: six- thousand student survey of mechanics test data for introductory physics courses. *American Journal of Physics*. *66*(1). https://www.researchgate.net/publication/228710512_Interactive-Engagement_Versus_Traditional_Methods_A_Six-Thousand-Student_Survey_of_Mechanics_Test_Data_for_Introductory_Physics_Courses

Hamalik, O. (2007). *Psikologi Belajar dan Mengajar*. Bandung: Sinar Baru Algensindo.

Iswahyudi, I. (2021). Metal Craft Studio Development: An Idea to Prepare a Teaching Factory Education Concept Model in the Craft Education Study Program, Yogyakarta State University. *Randwick International of Education and Linguistics Science Journal*, *2*(3), 339-357. https://doi.org/10.47175/rielsj.v2i3.302

Irianto, A. (2012). Teaching Factory. www.scribd.com/doc/teachingfactory.

Nitiswito, T., & Maksum, H. (2021). Pengembangan Modul Pembelajaran Berbasis Teaching Factory pada Pembelajaran Pengelolaan Bengkel Sepeda Motor Siswa Kelas XII SMK Rokan Hulu. *JTEV (Jurnal Teknik Elektro dan Vokasional)*, *7*(2), 221-228. https://ejournal.unp.ac.id/index.php/jtev/article/view/113193

Risdiana, Tyan, at al. (2014). Meningkatkan Hardskills Siswa Melalui Penerapan Model Pembelajaran Teaching Factory 6 Langkah. *Journal of Mechanical Engineering Education*, *1*(1). https://ejournal.upi.edu/index.php/jmee/article/view/3748

Setiyadi, M. W., Ismail, & Hamsu, A. G. (2017). Pengembangan Modul Pembelajaran Biologi Berbasis Pendekatan Saintifik Untuk Meningkatkan Hasil Belajar Siswa. *Journal of Educational Science and Technology*, *3*(2), 102-112. https://www.researchgate.net/publication/320051517_Pengembangan_Modul_Pembelajaran_Biologi_Berbasis_Pendekatan_Saintifik_Untuk_Meningkatkan_Hasil_Belajar_Siswa

Setyawan, D., Hidayat, D., & Suherman, A. (2014). Meningkatkan Sikap Entrepreneurship Siswa Melalui Penerapan Model Pembelajaran Teaching Factory 6 Langkah. *Journal of Mechanical Engineering Education*, 35-44. https://ejournal.upi.edu/index.php/jmee/article/view/3734

Sudjana, N. (2010). Penilaian Hasil Proses Belajar Mengajar, Bandung: PT. Remaja Rosdakarya,

Sugiyono. (2019). *Metode Penelitian Kualitatif dan Kuantitatif dan R&D.* Bandung: Alfabeta

Sundayana, R. (2016). *Statistika Penelitian Pendidikan*. Bandung: Alfabeta.