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Innovation in the Utilization of Fashion Pattern-Based Technology Computer Aided Design

Halimul Bahri[1], Farihah[1], Ulfa Annida Damanik[1], Netty Juliana[1]*
[1]Faculty of Engineering, Universitas Negeri Medan, Indonesia
Correspondence: E-mail: halimulbahri@unimed.ac.id

ABSTRACT

The purpose of this study is to produce a video tutorial on making digital patterns in Men's Fashion that is feasible, practical and effective. This research was conducted to align the demands of the curriculum where students are required to be able to make fashion patterns using computer-assisted applications. The method used is a development research method consisting of three steps, namely instructional, develop and implementation. The results of the analysis of student needs were obtained 47.5% needed teaching materials in the form of video tutorials in making men's fashion patterns. Men's Fashion digital pattern making video tutorial is stated to be very feasible on video material aspect 0.87 and video feasibility 0.85. Men's Fashion digital pattern making video tutorials based on the responses of lecturers and students are declared very practical. Effective video tutorials can improve student pattern making skills results by 12.89%. Based on the research findings, it was concluded that this Men's Fashion digital pattern making video tutorial is feasible, practical and effective to be used as learning material in Men's Fashion courses at the college level. Digital fashion pattern making reduces errors in the pattern making process and provides more capabilities in terms of speed, cleanliness and accuracy of students in pattern making compared to conventional techniques.

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1. INTRODUCTION

The good shape of a garment when used one of them is influenced by whether or not the pattern applied to the clothing. Producing a good form of clothing is inseparable from the systematic making of patterns and the flexibility of the results of pattern lines. This is what fashion design students experienced for the 2021/2022 academic year, where from the results of making fashion patterns manually, there are many shortcomings in the results of patterns made by students. Starting from the accuracy in connecting pattern lines, the flexibility of the shape of curved pattern lines and cleanliness in making patterns [1] [2].

Furthermore, difficulties can be seen from diverse school backgrounds such as: General High School (SMA) both from the Department of Natural Sciences (IPA) and from the Department of Social Sciences (IPS), Madrasah Aliyah Negeri (MAN), Vocational High School (SMK) both from the Department of Fashion Design and other majors. This clearly makes the learning process and outcomes for students who do not have a SMK (Fashion Style) background have difficulty following learning. The origin of the Fashion Design student school for the 2021/2022 academic year can be seen in the **Table 1** [3]:

Table 1. Data on Schools of Origin of Class of 2021 Students

No	Origin of school	Many
1	SMK (Fashion Vocational High School)	34 people
2	SMK (Vocational High School Other Than Clothing)	6 people
3	High School (High School)	43 people
4	MAN (Madrasah Aliyah Negeri)	12 people
	Sum	97 people

From the table above, it can be seen that fashion design students are dominated by high school graduates. Following in second place, students graduated from SMK fashion design and then filled by students who graduated from MAN and SMK in addition to fashion design. The quality of student input greatly affects the learning process in the classroom. For students who graduated from SMA/MAN and SMK in addition to fashion design, lessons in making fashion patterns are new knowledge that must be trained in pattern making, while students graduating from SMK foam.

Digital pattern making is a solution in the learning process. The effective implementation of new technology can transform traditional processes and address long-standing challenges. An example of this technological integration can be found in the development of futuristic trash bins with an automatic sorting system, which helps address improper mixed waste disposal and enhances efficiency [4]. In light of this, digital technology enables students to create pattern lines and ensure the accuracy of pattern sizes according to the specifications on the work sheet by checking the sizes using tools on the RP-DGS. The competency results of students who use video tutorial learning media are better than the competency results of students who only use modules in the practice of making blouse patterns with CAD RP-DGS. The use of digital pattern electronic learning media has been tested for feasibility to be used as an independent student learning aid and teaching media for teachers who teach Industrial Fashion Making subjects, digital shirt pattern making materials [5].

From the **Table 2**, it can be explained that in the men's fashion course that gets a score range of 85-100 in the practice of making patterns manually as many as 40 people. Students who get

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scores ranging from 75-84 are 18 people. Students who get scores in the range of 65-74 as many as 8 people and students who get scores in the range of 0-64 as many as 31 people. In the student assessment, as many as 31 people were declared to have not passed the practice of making patterns manually. In brief interviews with several students who have taken menswear courses, students argue that the difficulty that students often encounter when making patterns manually is to form the flexibility of pattern lines accurately and the technique of making pattern lines precisely has not been understood [6].

Table 2. Results of Manual Pattern Making for 2021/2022 Students

No	Manual assessment of patterning practices			
	Grade 85-100	Grade 75-84	Grade 65-74	Grade 0-64
1	40 student	18 student	8 student	31 student

The findings of the empirical data above require an educator to innovate in the learning process so that findings like this are not found again. Therefore, the author makes a solution in the pattern making learning process that utilizes technological developments by using the Reachpeace-DGS application in pattern making. This application has had many positive effects in the pattern making process. This application aims to overcome errors in making patterns encountered manually with the help of the Reachpeace-DGS application. With the transformation of pattern making digitally, students' abilities and skills will increase thanks to the help of the Reachpeace-DGS application [7] [8] [9].

2. METHODS

Research and development is the term for this kind of study. Research and development is a research technique used to create a specific product and boost its efficacy [10] [11] [12] [13] [14] [15] See **Figure 1**.

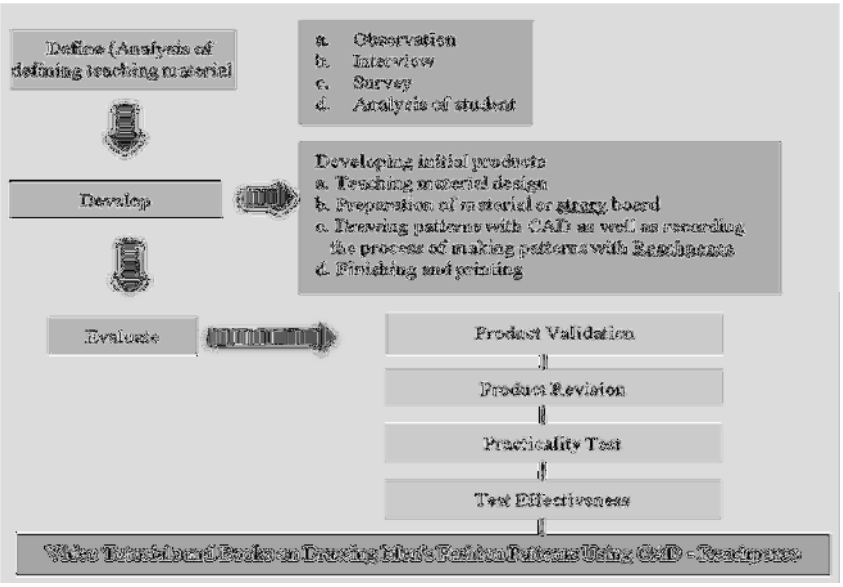

Figure 1. Research Procedure.

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2.1 Define

2.1.1. Observation

Observation activities are carried out to get an overview of the research activity plan to be carried out.

2.1.2. Interview

The interview was conducted to obtain in-depth data related to men's fashion courses. Interviews were conducted with lecturers and students who had taken men's fashion courses.

2.1.3. Survey

Survey activities include looking at learning activities, documentation and collecting supporting data needed.

2.1.4. Analysis of student

Analysis of student needs is carried out to obtain information related to what kind of learning media students want during the learning process.

2.2 Develop

2.2.1. Teaching Material Design

The first product development activity is to design teaching materials that will be used in men's fashion courses.

2.2.2. Preparation of material of strory board

After the teaching materials are designed, the material is arranged according to learning outcomes.

2.2.3. Drawing pattern with CAD

Creating patterns with the Reachpeace-DGS application while recording pattern making activities with the ultimate goal of producing a digital pattern making tutorial video.

2.2.4. Finishing dan printing

Finishing activities include setting video speed, video sound and duration.

2.3 Evaluate

2.3.1. Product validation

After the teaching material product has been made, then product validation is carried out to experts. Product validation is carried out to two experts, first material experts and two media experts.

2.3.2. Product revission

After validation with material and media experts. If there are improvements in accordance with expert comments, then the teaching material products are revised according to the suggestions.

2.3.3. Practicallity test

After the product is valid, trials are carried out for students and lecturers related to the practicality of the teaching materials made.

2.3.4. Test effectiviness

From the results of product trials with students, the effectiveness of the teaching material products developed was obtained.

2.4 Research Locations

Research location Design of CAD (Computer-Aided Design) Based Teaching Materials to Improve the Quality of Pattern Drawing in Men's Fashion Courses in the Fashion Education Study

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Program, Department of Family Welfare Education, Faculty of Engineering, Medan State University, Jl. Willem Iskandar Psr.V- Post Box 1589 Medan 20221.

2.5 Research Population

The research sample is a subset of the population chosen at random from the study population, which is made up of all students enrolled in the study program for fashion education in 2021. Students in the fashion education study program who completed men's fashion courses in the even semester of 2022/2023 and who passed the fashion archetype construction course are the respondents to this survey.

2.3 Develop Model

The IDI (Instructional Development Institute) model is applied in the development model. The three steps of the systems approach—define, develop, and evaluate—are established by the IDI model. [14]. The define stage is the first and includes the stages for problem identification, needs analysis, needs analysis, interviews, surveys, observations, and reference gathering. The second step, known as the develop stage, is when the product developed and the product generated are validated. The third stage is assessment, which includes trial procedures and trial outcome analysis.

2.6 Data Collection and Analysis Techniques

2.6.1 Validity Questionnaire

Validation questionnaires are used to determine the validity of the product developed The validation sheet contains several aspects of assessment of the components of teaching materials. There are two categories of validation questionnaires, namely content validity and media validity [16] [17].

2.6.1.1 Material validation questionnaire

The material validation questionnaire contains several validator responses to the suitability of the material in the teaching materials with the syllabus and RPS, the correctness of concepts that can be accounted for and the suitability of descriptions with indicators.

2.6.1.2 Media validation questionnaire

The validation questionnaire for learning media includes the opinions and comments of the validators. By examining quantitative data from validation questionnaires supplied to media and material specialists, quantitative descriptive analysis techniques are used to analyze validity data. Aiken's calculation's outcome has a range of values from 0 to 1, and the number 0.6 may be considered to have a high coefficient. Accordingly, the Validity value of 0.6 and above is expressed in the valid category [17].

2.6.2 Practicality Questionnaire

This practicality questionnaire is used to see the practicality of the teaching materials developed. This questionnaire contains assessment responses by lecturers and students who take men's fashion courses. Practicality analysis is obtained from data in the form of response sheets given to lecturers and students to the use of developed teaching materials, to analyze response sheets and students used descriptive analysis.

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$$NA = \frac{S}{SM} x100\%$$

2.6.3 Effectiveness Sheet

The efficacy sheet is calculated using the outcomes of manual pattern-drawing techniques and digitally created men's fashion patterns. The difference between the findings of the study of the assessment of pattern drawing abilities when done manually and when done digitally is used to calculate the percentage of media effectiveness.

3. RESULTS AND DISCUSSION

3.1 Results of the Needs Analysis

The survey was conducted by distributing online questionnaires to 40 students, the aim was to obtain information from trial students on what teaching materials were most dominantly in demand during the learning process of men's fashion courses, can be seen in the **Table 3**.

Table 3. Results of Needs Analysis

No	Content of the question	Survey results
1	Book/Jobsheet/Module/Handout PRINT version	35%
2	Book/Jobsheet/Module/Handout ONLINE version	17,5 %
3	Video Tutorial	47,5 %

From the results of the student needs analysis survey that 47.5% of students need video tutorials in making patterns in men's clothing courses. 17.5% of students need printed versions of teaching materials and 35% of students need online versions of teaching materials. So it was decided that the learning media made was a video tutorial in making patterns in men's fashion courses [17] [18].

3.2 Results of Material Validity Analysis

Validity of the digital pattern making tutorial video for this menswear course is data obtained through input from validators using questionnaires. The results of the digital pattern making video tutorial for menswear courses can be seen in the following **Table 4**:

Table 4. Results of Material Validity Analysis

No	Material expert validation		
	Question indicator	Score Obs 1	Score Obs 2
1	Adaptability of the content to fundamental skills	4	5
2	The information is understandable	5	4
3	The information is in line with the goals of learning	4	4
4	The learning video's subject matter is of an appropriate size	4	4
5	The learning video's lesson material adheres to the syllabus in terms of content.	5	4
6	This video tutorial's learning curve is obvious.	4	5
7	This educational movie may pique kids' interests.	4	4
8	This educational movie can help pupils study on their own.	4	4
9	In line with Indonesian laws, the language in the video is utilized.	5	5
10	Sentences include information that can guide students' activities.	5	4

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No	Material expert validation		
	Question indicator	Score Obs 1	Score Obs 2
	Score of each observer	44	43
	Average result achieved	43,5	
	Maximum point	50	
	43/50		
	Validity = 0, 87		

*Obs1=Observer 1, *Obs2=Observer 2

Validation of men's fashion course video tutorial material is given to material experts who understand studies in the field of men's fashion courses. The validation results from both experts obtained an average score of 0.87. In accordance with the results of Aiken's calculations ranging from 0 to 1, the number 0.6 can be interpreted to have a fairly high coefficient, then the Validation value of 0.6 and above is declared in the valid category [18].

3.3 Results of Media Validity Analysis

Media validation of men's fashion course video tutorials is obtained from media experts who understand studies in the field of learning media. The validation results of the three experts obtained an average score of 0.85. In accordance with the results of Aiken's calculations ranging from 0 to 1, the number 0.6 can be interpreted to have a high enough coefficient then the Validation value of 0.6 and above is expressed in the valid category, can be seen in the following **Table 5**:

Table 5. Results of Media Validity

No	Media expert validation			
	Question indicator	A	B	C
1	The content and cover picture choices support the information offered.	5	4	4
2	The lesson video's pictures are simple to grasp.	4	4	4
3	The image's look is consistent with its dimensions.	4	5	4
4	Students' attention may be drawn by the sight of this instructional film.	4	4	4
5	Front cover (text and picture layout) cover layout that is proportionate to the necessities	4	4	5
6	For lecturers and students involved in the learning process, videos can serve as an alternate instructional resource.	4	5	4
7	color, text, and picture choices made in accordance with requirements	4	5	4
8	The hue of the text does not interfere with vision.	4	4	5
9	adjusting the video text size as necessary	5	4	4
10	The lesson films' text and phrases are simple to read.	4	4	5
	The sum of each observer's score	42	43	43
	Average result achieved	42,7		
	Maximum point	50		
	42,7/50			
	Validity = 0, 85			

Media validation of men's fashion course video tutorials is given to media experts. The validation results from both experts obtained an average score of 0.85. In accordance with the results of Aiken's calculations ranging from 0 to 1, the number 0.6 can be interpreted to have a fairly high coefficient, then the Validation value of 0.6 and above is declared in the valid category [18].

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3.4 Results of Media Practicality Analysis

3.4.1 Results of Lecturer Practicality Analysis

The usefulness of created Men's Fashion video tutorials is connected to their usability. Data regarding practicality was gathered by having men's fashion course teachers complete surveys, can be seen in the following **Table 6**:

Table 6: Results of Lecturer Practicality Analysis

.No	Results of the analysis of lecturer practicality		
	Question indicator	Score Obs 1	Score Obs 2
1	Adaptability of the content to fundamental skills	4	4
2	The information is understandable.	5	5
3	The content complies with the learning objectives.	4	4
4	The lesson video's subject matter is of an adequate size.	4	4
5	The learning video's lesson material adheres to the syllabus in terms of content.	5	5
6	The learning path in the video is clear	4	4
7	Learning videos can interest students in learning	4	4
8	Learning via videos can help pupils progress independently.	4	4
9	The language in the video complies with Indonesian regulations.	5	4
10	Sentences include information that can guide students' activities.	5	4
	Score of each observer	44	42
	Average result achieved	43	
	Maximum point	50	
	44/50 X 100%		
	Practicality = 86%		

The results of the practical analysis of men's fashion course video tutorials were given to lecturers who taught men's fashion courses. Practicality questionnaires were given to two lecturers who taught men's fashion courses. The practical results of learning videos by lecturers who teach men's fashion courses get a score of 86%. From the results of the practical analysis of the use of video tutorials, this learning media is very practical to use in the practice of making patterns, especially in men's fashion courses [19] [20] [21].

3.4.2 Results of Student Practicality Analysis

The practicality of learning videos for men's fashion courses also requires a response from students. This data was obtained through questionnaires given to students after learning using learning videos for men's clothing courses, can be seen in the following **Table 7**.

The results of the practical analysis of men's fashion course video tutorials are also given to students who take men's fashion courses. A practicality questionnaire was given to all students who took men's fashion courses. The results of the practicality of learning videos by students received a score of 93.18%. From the results of the practical analysis of the use of video tutorials, this learning media is very practical to be used by students in the practice of making patterns, especially in men's fashion courses [22] [23].

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Table 7. Results of Student Practicality Analysis

No	Results of student practicality analysis				
		Number of scores obtained by each respondent			
	Valuation indicator	4	3	2	1
1	I can learn material for making men's fashion patterns digitally by using this video tutorial media.	14	27	-	-
2	Video tutorial media provides an opportunity to learn according to my ability.	14	27	-	-
3	I easily follow the steps of making men's fashion patterns digitally in this video tutorial media.	9	30	2	-
4	Video tutorial media provides an opportunity to learn according to my ability.	12	29	-	-
5	I know well the difference between making conventional menswear patterns and digitally	16	25	-	-
6	I think this Men's Fashion digital pattern making video tutorial media provides benefits in my scientific field.	21	20	-	-
7	In my opinion, making digital patterns can be used as guidelines in making clothes in accordance with growing fashion trends.	20	21	-	-
8	I'm more interested in creating patterns digitally than conventionally	9	23	9	-
9	Making patterns digitally is more efficient in terms of pattern results and processing time.	16	21	4	-
10	This digital pattern provides my creative and innovative space in developing various types of fashion patterns.	15	26	-	-
11	I want to learn continuously in the use and making of digital fashion patterns.	14	27	-	-
	Number of scores per interval	160	276	15	-
	Total score count	451			
	Average score	41			
	Maximum score	44			
	41/44 X 100%				
	Practicallity = 93,18 %				

3.5 Results of Media Effectiveness Analysis

Learning outcome data was taken to see the results of students' ability to make men's fashion patterns digitally. The results of the ability test are given to students by giving assignments in the form of making shirt patterns digitally using the body measurements used at the beginning of the practice of making manual patterns. This is done in order to be able to take a psychomotor assessment of the results of making manual patterns and digital patterns, can be seen in the following **Table 8.**

The results of the analysis of the effectiveness of the use of learning media obtained an average assessment of manual patterning skills of 75.17, while the average value of digital pattern-making skills was 88,047. Thus, there was an increase in the average results of student pattern drawing skills by 12.89%. The results of the analysis showed a significant increase in the ability of students in the process of making special patterns of shirt patterns that were used as test objects in this study [24] [25].

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Table 8. Results of Media Effectiveness Analysis

Responden	Pre test dan post test		
	Observation indicator	Average Pre test	Average Post test
1	Accuracy and flexibility of the neckline	75.86	89.65
2	Shoulder line precision and flexibility	71.96	82.75
3	Front and rear shoulder down precision	70.27	90.86
4	Accuracy and suppleness of arm convoluted lines	72.41	82.75
5	Accuracy and flexibility of body side lines	73.22	84.25
6	Precision and flexibility of shirt bottom lines	86.22	92.31
7	Accuracy and flexibility of arm pattern peak lines	69.41	82.75
8	Compatibility of arm coil circumference body pattern and arm pattern	89.65	86.28
9	The accuracy of the size of the body circumference in the pattern	62.08	93.12
10	The accuracy of the length of the shirt on the pattern	80.62	95.75
	Average	75.17	88.047
	88.047 – 75.17		
	Efektivity = 12.89%		

4. CONCLUSION

The design of learning materials in the form of pattern making video tutorials in men's clothing courses has a positive effect on the learning process. This innovation breaks the opinion that those who can make patterns quickly, precisely and accurately are only students who graduate from SMK fashion design. After going through the research process, it turns out that all graduates who study in the fashion design study program can make good fashion patterns. This fashion design study program is an applied science. Every applied science always has factors that affect the ability of students both internally and externally. One of the external factors is how an educator can increase the interest and motivation of students in learning. This digital pattern making tutorial video greatly contributes greatly to the learning process. Based on the research findings, it can be concluded that this Men's Fashion digital pattern making video tutorial is feasible, practical and effective to be used as learning material in Men's Fashion courses at the college level.

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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