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Development of E-Modules on Shirt Making for Phase F Students of the Fashion Design Program at SMK Widya Praja Ungaran

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Abstract
The results of observations of practical shirt-making lessons at SMK Widya Praja Ungaran revealed several problems, including slow achievement of learning objectives, students' lack of understanding of sewing techniques, incomplete learning media that are still based on the 2013 Curriculum, and the absence of e-modules integrated with the Merdeka Curriculum Phase F. In addition, most of the students' products did not meet the minimum passing grade of 75. This study aims to develop an e-module for shirt making, determine its feasibility, and assess its practicality. The method used is research and development with the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. A questionnaire was used as a research instrument to collect data. The feasibility of the e-module was assessed by three subject matter experts and three media experts. The validation results showed that the e-module obtained a feasibility percentage of 91.67% from subject matter experts and 96.05% from media experts, both of which were classified as highly feasible. The practicality of the e-module was assessed by 21 students in class XI DPB 1. The appearance aspect scored 85.24% (very practical), the material presentation aspect scored 84.05% (practical), and the benefit aspect scored 82.31% (practical), with an average practicality of 83.86% (practical). Thus, the developed e-module is highly feasible and practical for use as a learning medium for shirt-making material for students in the Fashion Expertise Program Phase F.

Keywords: research and development, ADDIE, e-module, shirt making, feasibility, practicality

INTRODUCTION

Vocational education plays a strategic role in preparing a skilled, creative workforce that is ready to meet the demands of the labor market and the creative industry.[1] In Indonesia, Vocational High Schools (SMKs) are designed to equip students with practical competencies, job readiness, and the ability to adapt to technological and industrial developments. In the creative industry sector, particularly in fashion, learning not only emphasizes mastery of technical skills but also fosters independent learning, creativity, and problem-solving abilities through hands-on practical learning.

The implementation of the Merdeka Curriculum presents both challenges and new opportunities for vocational education, particularly in aligning learning outcomes, instructional strategies, and learner-centered educational media. At the Vocational High School (SMK) level, the Merdeka Curriculum is divided into several learning phases, where Phase F (grades XI and XII) emphasizes the strengthening of technical competencies, the application of work standards, and the production of high-quality outputs that meet the needs of the business and industrial sectors. In the Fashion Expertise Program, one of the core competencies in Phase F is Garment Production, which requires students to apply proper sewing techniques, understand work stages systematically, and carry out

[1] Menteri Pendidikan dan Kebudayaan, "Peraturan Menteri Pendidikan Dan Kebudayaan RI Nomor 34, Tahun 2018, Tentang Standar Nasional Pendidikan SMK/MAK" 8, no. 1 (2018): 1–12.

quality control as well as final product completion.

In practice, sewing instruction in vocational high schools still faces various challenges. Observations and field findings indicate that students often struggle to understand the sequence of sewing steps, apply proper sewing techniques, and complete products independently. This situation results in prolonged practice completion times and lower product quality, ultimately causing some students to fail to meet the Minimum Competency Criteria (KKM).[2] These challenges highlight the need for educational media that can support students in learning independently, in a structured manner, and continuously, beyond direct teacher guidance.

Educational media play a crucial role in supporting competency-based practical learning. One form of educational media that is particularly relevant in the context of current technological developments is the electronic module (e-module). An e-module is a digital learning material designed systematically and interactively, enabling students to access it flexibly. According to Arsyad, e-modules represent an educational innovation that utilizes information technology to present learning materials in a more engaging and easily understandable manner, especially for learning activities that require practical skills.[3]

Previous studies have shown that the development of e-modules in vocational and fashion education has a positive impact on both the learning process and outcomes. Research by Amalia and Sawitri indicated that e-modules developed for fashion learning were deemed feasible and practical for student use. Lasaret and Suryawati also reported that e-modules on specific shirt-making materials could help students understand sewing techniques more effectively.[4] Lasaret and Suryawati also reported that e-modules on specific shirt-making materials could help students understand sewing techniques more effectively.[5] Another study by Zamanmulyana et al. demonstrated that a shirt-making e-module achieved a very high level of feasibility based on the module's characteristics and multimedia elements.[6] These findings underscore the potential of e-modules to serve as effective, flexible learning media that support independent student learning.

Nevertheless, most previous studies have primarily focused on the context of higher education, specific fashion materials, or the development of e-modules that have not been explicitly integrated with the Merdeka Curriculum. Research addressing the development of shirt-making e-modules aligned with the learning outcomes of the Merdeka Curriculum, particularly for Phase F in vocational high schools, remains limited. Furthermore, prior studies have tended to emphasize feasibility, while the practicality aspect from the perspective of vocational students engaged in intensive hands-on learning has not been extensively examined.

Based on this research gap, this study focuses on the development of a shirt-making e-module integrated with the Merdeka Curriculum for Phase F students in the Fashion Expertise Program. The developed material centers on the production of school uniform shirts, covering two main learning components: Garment Preparation and Garment Sewing. This study aims to develop the shirt-making e-module, evaluate its feasibility through assessments by material and media experts, and determine its practicality based on student responses. The development of this e-module is expected to support more effective hands-on learning, enhance students' learning independence, and contribute to

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[2] Sicilia Sawitri Zulfatu Bintil Waidah, "Pengembangan Modul Elektronik Dasar Desain Sebagai Bantuan Belajar Secara Mandiri Untuk Kelas X Smk Widya Praja Ungaran," *Fashion and Fashion Education Journal* 9, no. 1 (2020): 105–10, https://journal.unnes.ac.id/sju/index.php/ffe/article/view/35269.

[3] Azhar Arsyad, *Media Pembelajaran* (Jakarta: PT RajaGrafindo Persada, 2011).

[4] Pujawati Khairul Amalia and Sicilia Sawitri, "Pengembangan E-Modul Pembuatan Pelengkap Busana Pada Mata Pelajaran Prakarya Di Ma Al Khoiriyyah Semarang," *Fashion and Fashion Education Journal* 10, no. 2 (2021): 96–101, https://doi.org/10.15294/ffej.v10i2.49076.

[5] Suryawati Putri Melinda Lasaret, "Penilaian Media Pembelajaran E-Modul Materi Kerah Kemeja," *Practice of Fashion and Textile Education Journal* 2, no. 2 (2022): 110–19, https://doi.org/10.21009/pftej.v2i2.26665.

[6] Fariskanur Zamanmulyana et al., "Media Pembelajaran E-Modul Kemeja," *Jurnal Edukasi Dan Multimedia* 1, no. 3 (2023): 39–48, https://doi.org/https://doi.org/10.37817/jurnaledukasidanmultimedia.v1i3 MEDIA.

improving the quality of fashion education in vocational high schools in response to the demands of the industry and the creative sector.

METHOD

This study is a research and development (R&D) aimed at producing a shirt-making e-module and examining its feasibility and practicality as a learning medium. The e-module was developed using the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation.[7] The study was conducted from January to May 2025 at SMK Widya Praja Ungaran.

The analysis stage included: (1) classroom observation; (2) problem identification; (3) content needs analysis, specifically on shirt-making materials; and (4) analysis of hardware requirements, such as laptops and smartphones, and software requirements, including design platforms like Canva and applications for accessing PDF files, such as Adobe Reader. The design stage involved: (1) creating the e-module framework consisting of the introduction, main content, and closing sections; (2) drafting the initial e-module outline detailing the content of each section; and (3) designing the e-module evaluation instruments, including feasibility and practicality questionnaires, followed by content validity and ICC reliability testing. The development stage included: (1) constructing content based on valid and credible reference materials; (2) developing supporting media such as pattern jobsheets, quality control checklists, and tutorial videos; (3) creating the e-module using a design platform (Canva); (4) assessing e-module feasibility by content and media experts; and (5) revising the e-module based on the feedback and suggestions from the experts. The implementation stage was carried out through practicality assessment by the students. The evaluation stage involved making improvements based on students' feedback and suggestions.

The research subjects consisted of content experts and media experts who assessed the feasibility of the e-module, as well as 11th-grade students of the Fashion Expertise Program (DPB 1) at SMK Widya Praja Ungaran, who evaluated the module's practicality. The data collection technique employed a questionnaire, which was structured in the form of written statements. The assessment criteria for the questionnaire followed Sugiyono's guidelines, as presented in Table 1.

Table 1. Questionnaire Assessment Criteria by Sugiyono[8]

Alternative Answers	Positive Score	Negative Score
Very Appropriate	4	1
Appropriate	3	2
Not Appropriate	2	3
Very Inappropriate	1	4

The e-module feasibility assessment instrument is compiled based on teaching material assessment standards, based on Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 8 of 2016 concerning books used by educational units.[9] Meanwhile, the e-module practicality assessment instrument is compiled based on aspects of appearance, material presentation, and the benefits of e-modules.[10]

The validity of research instruments is tested through validity and reliability tests. The validity

[7] Marinu Waruwu, "Metode Penelitian Dan Pengembangan (R&D): Konsep, Jenis, Tahapan Dan Kelebihan," *Jurnal Ilmiah Profesi Pendidikan* 9, no. 2 (2024): 1220–30, https://doi.org/10.29303/jipp.v9i2.2141.

[8] Prof. Dr. Sugiyono, *Metode Penelitian Kuantitatif Kualitatif*, 2019.

[9] Menteri Pendidikan dan Kebudayaan, "Peraturan Menteri Pendidikan Dan Kebudayaan Republik Indonesia Nomor 8 Tahun 2016 Tentang Pedoman Buku Yang Digunakan Oleh Satuan Pendidikan," *Kementrian Pendidikan Dan Kebudayan*, 2016, 11, https://jdih.kemdikbud.go.id/arsip/Permendikbud Nomor 8 Tahun 2016.pdf.

[10] Jannah, Kaspul, Nurul Hidayati Utami, "Kepraktisan Modul Elektronik Menggunakan Aplikasi Sigil Berorientasi Pendekatan Saintifik Materi Perubahan Lingkungan Kelas X Jenjang Sekolah Menengah Atas," 156 Jurnal AL-AZHAR INDONESIA SERI SAINS DAN TEKNOLOGI 7, no. 3 (2022): 155–60, https://doi.org/10.36722/sst.v7i3.1091.

test used is content validity. Kusumastuti et al.[11] explain in their book that Aiken's (1985) content validity test is based on the results of research conducted by a panel of n experts on an item in terms of the extent to which the item represents the construct being measured. Aiken's V formula is as follows:

$$V = \frac{\sum s}{n\,(c-1)}$$

The reliability test in this study used inter-rater reliability with the ICC (Interclass Correlation Coefficient) approach because more than two assessors were involved. The type of ICC used was ICC (3,k), which can be used to assess reliability or agreement between fixed raters on several assessment objects, where the assessment results are averaged (average measures). ICC (3,k) is included in the model classification of Shrout & Fleiss (1979). The ICC (3, k) formula is as follows:

$$\frac{MS_R - MS_E}{MS_R}$$

The e-module feasibility questionnaire instrument in this study was tested by three expert instrument validators. The validity result of the material expert questionnaire was 0.873015873, which is categorized as very high validity. The validity result of the media expert questionnaire was 0.842105263, which is also categorized as very high validity. The reliability result of the material expert questionnaire was 0.673, which is categorized as moderate. The reliability result of the media expert questionnaire was 0.616, which is categorized as moderate.

Data analysis techniques were used to answer the questions in this study so that conclusions could be drawn. According to Sugiyono, the analysis techniques used to measure product feasibility are as follows:

$$V = \frac{\sum n}{\sum N} \text{ x } 100\%$$

The feasibility criteria are shown in Table 2.

Table 2. Feasibility Level Criteria

Score Range (%)	Feasibility Criteria
81% - 100%	Very Feasible
61% - 80%	Feasible
41% - 60%	Fairly Feasible
21% - 40%	Less Feasible
< 21%	Not Feasible

The data analysis techniques used to measure the practicality of e-modules are as follows:

$$V = \frac{f}{N} \text{ x } 100\%$$

The practicality criteria are shown in Table 3.

Table 3. Practicality Level Criteria[12]

Score Range (%)	Practicality Criteria
85,01% - 100,00%	Very Practical
70,01% - 85,00%	Practical
50,01% - 70,00%	Less Practical
01,00% - 50,00%	Not Practical

[11] Ph.D. Adhi Kusumastuti and M.Pd. Ahmad Mustamil Khoiron, M.Pd. Taofan Ali Achmadi, *Metode Penelitian Kuantitatif*, 2020.

[12] Yenita Roza Marintan Butar-butar, Atma Murni, "Praktikalitas Pengembangan Perangkat Pembelajaran Dengan Penerapan Model Discovery Learning"," *Jurnal Cendekia: Jurnal Pendidikan Matematika* 04, no. 02 (2020): 480–86.

Using data analysis techniques, the scores given by validators and students are converted into percentages to determine the feasibility and practicality of the e-module. These scores are then interpreted based on criteria to conclude the feasibility and practicality of the developed learning media.

RESULTS AND DISCUSSION

Development of an E-Module for Shirt Making

The results of this study are in the form of an E-Module learning medium for shirt-making, developed using the ADDIE model, which consists of five stages, namely analysis, design, development, implementation, and evaluation. The development of the e-module focuses on material for making school uniforms (OSIS) that is integrated with the Merdeka Curriculum and adapted to the elements of Preparation for Making Clothes and Sewing Clothing Products.

In the analysis stage, the development of e-modules was based on the results of observations of practical shirt sewing lessons, identification of learning problems, and analysis of learning material and media requirements. The design stage included the design of the e-module structure, the compilation of learning materials, and the design of assessment instruments. The development stage was carried out by developing a PDF e-module equipped with supporting media in the form of job sheets, quality control sheets, and video tutorials, and validated by subject matter experts and media experts. The implementation stage was carried out through trials with students, while the evaluation stage was carried out based on input from validators and students.

The final e-module product consists of 74 pages with a file size of 52 MB. The visual appearance of the e-module cover is as shown in Figure 1.

Figure 1. Cover of the E-Module for Shirt Making
Sources: Authors, 2025

The e-module can be accessed via the QR code in Figure 2.

Figure 2. QR Code Access to E-Module for Shirt Making
Sources: Authors, 2025

Feasibility of E-Module for Shirt Making

The feasibility of the e-module was assessed by three subject matter experts and three media experts using a feasibility assessment instrument. The assessment results showed that the e-module was very feasible.

Based on the results of subject matter expert validation, the e-module obtained a feasibility percentage of 91.67% with a category of very feasible. Meanwhile, the results of media expert validation

showed a feasibility percentage of 96.05% with a category of very feasible. A summary of the results of the subject matter and media feasibility assessment is shown in Tables 4 and 5.

Table 4. Recapitulation of Material Feasibility Results

No.	Subject Matter Expert	Total Score
1.	Validator 1	**71**
2.	Validator 2	**79**
3.	Validator 3	**81**
	Total Score	**231**
	Maximum Score	**252**
	Percentage	**91, 67%**
	Criteria	**Very Feasible**

Sources: Authors, 2025

Table 5. Recapitulation of Media Suitability Results

No.	Media Expert	Total Score
1.	Validator 1	**74**
2.	Validator 2	**71**
3.	Validator 3	**74**
	Total Score	**219**
	Maximum Score	**228**
	Percentage	**96,05%**
	Criteria	**Very Feasible**

Sources: Authors, 2025

The high level of feasibility indicates that the e-module has met quality standards in terms of content, presentation, language, and graphics. In terms of material, the e-module has been compiled in accordance with the principles of the Merdeka Curriculum, which emphasizes essential material and strengthening student competencies, and has been adapted to related elements. In terms of media, the e-module utilizes multimedia elements such as text, images, illustrations, and QR codes integrated with video tutorials to support visual and independent practical learning.

These results are in line with previous studies by Lasaret and,[13] Waidah and Sawitri,[14] Farihah et al.[15] which shows that e-modules with good visual design and relevant material are considered very suitable as learning media. However, the difference in this study lies in the integration of the Merdeka Curriculum and the focus of the material on making school uniform shirts for students in Phase F of the Fashion Expertise Program.

The Practicality of the E-Module

The practicality of the e-module was assessed by 21 students in class XI DPB 1 of the Fashion Design Program at SMK Widya Praja Ungaran. The assessment was conducted using a practical questionnaire that covered aspects of appearance, presentation of material, and the benefits of the e-module.[16]

The assessment results show that the appearance aspect received a score of 85.24% in the very practical category, the material presentation aspect received a score of 84.05% in the practical category, and the usefulness aspect received a score of 82.31% in the practical category. The average practicality level of the e-module was 83.86%, which falls into the very practical category. A summary of the practicality results is shown in Tables 6 - 8.

[13] Putri Melinda Lasaret, "Penilaian Media Pembelajaran E-Modul Materi Kerah Kemeja."

[14] Zulfatu Bintil Waidah, "Pengembangan Modul Elektronik Dasar Desain Sebagai Bantuan Belajar Secara Mandiri Untuk Kelas X Smk Widya Praja Ungaran."

[15] Rezeki Aritonang Farihah, Dermawan, Sarah Sinambela, Nia Ramadani, "Pengembangan Media E - Modul Pada Mata Pelajaran Teknik Dasar Menjahit Kelas X Di SMK Gelora Jaya Nusantara" 8 (2024): 29720–28.

[16] Jannah, Kaspul, Nurul Hidayati Utami, "Kepraktisan Modul Elektronik Menggunakan Aplikasi Sigil Berorientasi Pendekatan Saintifik Materi Perubahan Lingkungan Kelas X Jenjang Sekolah Menengah Atas," 156 Jurnal AL-AZHAR INDONESIA SERI SAINS DAN TEKNOLOGI 7, no. 3 (2022): 155–60, https://doi.org/10.36722/sst.v7i3.1091.

Table 6. Recapitulation of Display Practicality Results

Display Aspect	
Score Obtained	**358**
Maximum Score	**420**
Percentage	**85,24%**
Criteria	**Very Practical**

Sources: Authors, 2025

Table 7. Recapitulation of Material Presentation Practicality Result

Aspects of Material Presentation	
Score Obtained	**353**
Maximum Score	**420**
Percentage	**84,05%**
Criteria	**Practical**

Sources: Authors, 2025

Table 8. Recapitulation of Usefulness Practicality Result

Aspect of Usefulness	
Score Obtained	**484**
Maximum Score	**588**
Percentage	**82,31%**
Criteria	**Practical**

Sources: Authors, 2025

The results show that the e-module is easy to use, visually appealing, and helps students understand the stages of shirt-making. This is in line with Van den Akker's opinion, which states that practicality refers to the level of usability of a learning product in real conditions.[17] The findings of this study are also consistent with the results of research by Jannah et al.,[18] Nisa et al.,[19] dan Zulharfi et al.[20] which shows that e-modules with a high level of practicality can be used effectively in learning. The uniqueness of this study lies in the context of applying e-modules to practical shirt sewing lessons in vocational schools with project-based learning and industrial practice characteristics.

Implications of Research Result

The results of the study show that the e-module for shirt making that was developed is not only feasible and practical for use as a learning medium, but also has the potential to improve the effectiveness of practical sewing lessons in vocational schools. The integration of the material with the Merdeka Curriculum and multimedia-based presentation allows students to learn independently and in a structured manner according to their practical learning needs.

Thus, this e-module can be a relevant alternative learning medium for vocational learning in the Phase F Fashion Expertise Program.

[17] Jan van den Akker, "Principles and Methods of Development Research," dalam Design Approaches and Tools in Education and Training, ed. J. van den Akker et al. (Dordrecht: Kluwer Academic Publishers, 1999), 1–14.

[18] Jannah, Kaspul, Nurul Hidayati Utami, "Kepraktisan Modul Elektronik Menggunakan Aplikasi Sigil Berorientasi Pendekatan Saintifik Materi Perubahan Lingkungan Kelas X Jenjang Sekolah Menengah Atas," *156 Jurnal AL-AZHAR INDONESIA SERI SAINS DAN TEKNOLOGI* 7, no. 3 (2022): 155–60, https://doi.org/10.36722/sst.v7i3.1091.

[19] Rini Sefriani Afdilatun Nisa , Indra Wijaya, "Uji Praktikalitas E-Modul Pembelajaran Project Based Learning Menggunakan Sigil Pada Mata Pelajaran Dasar-Dasar Kejuruan Siswa Kelas X Pengembangan Perangkat Lunak Dan GIM (PPLG) Di SMK N 1 Singkarak," *PIJAR: Jurnal Pendidikan Dan Pengajaran* 2, no. 1 (2023): 12–20, https://doi.org/10.58540/pijar.v2i1.427.

[20] Zulharfi, Nur Azizah, Annisatul Khairat "Pengembangan E-Modul Berbasis Forward And Backward Chaining Untuk Meningkatkan Kemandirian Belajar Siswa," Ideas: Jurnal Pendidikan, Sosial, Dan Budaya 8, no. 4 (2022): 1503, https://doi.org/10.32884/ideas.v8i4.1014.

CONCLUSION

This study produced an e-module on shirt making developed based on the Merdeka Curriculum and learning elements of Fashion Design Preparation and Fashion Product Sewing for students in Phase F of the Fashion Expertise Program. The development of the e-module using the ADDIE model shows that the resulting product meets the criteria of feasibility and practicality as a medium for learning sewing practices in vocational high schools.

The results of the study indicate that e-modules are not only feasible in terms of material and media, but also practical and easy to use by students in learning. E-modules can help students understand the stages of shirt-making systematically, support independent learning, and have the potential to optimize practical learning time.

In practical terms, the e-module on shirt making can be used as an alternative learning medium in Fashion Design and Production classes at vocational schools, particularly to support project-based practical learning. This e-module also has the potential to be further developed with the addition of interactive features or adapted for other fashion-related materials. Further research is recommended to test the effectiveness of the e-module in improving student learning outcomes and skills in a broader learning context.

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DECLARATION OF CONFLICTING INTERESTS

The author declares that there is no conflict of interest in the conduct of the research or publication of this article.

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