

Development of E-Module for Drawing Body Proportions Based on Size in Basic Design for Grade 10 Fashion Design Vocational Students

Filly Ratna Artini¹, Widiastuti²

¹ Universitas Negeri Yogyakarta, Yogyakarta, Indonesia; fillyratna.2023@student.uny.ac.id

² Universitas Negeri Yogyakarta, Yogyakarta, Indonesia; widiastuti@uny.ac.id

ARTICLE INFO

Keywords:

e-module;
body proportion drawing;
vocational education;
fashion design;
instructional media

Article history:

Received 2026-01-31

Revised 2026-04-30

Accepted 2026-06-19

ABSTRACT

Drawing body proportions is a fundamental competence in fashion design education, yet many vocational students experience difficulties in understanding measurement relationships and procedural drawing steps. The limited availability of systematic, visual, and interactive learning materials indicates the need for digital instructional media that support independent practice. This study aimed to develop and evaluate an e-module for drawing body proportions based on the 7½-head-height ratio for Grade 10 Fashion Design vocational students. This study employed a Research and Development approach using the 4-D model, consisting of define, design, develop, and disseminate stages. The e-module was designed using Canva and integrated into a Flipbook format. Product feasibility was assessed by five expert validators, while practicality and perceived effectiveness were examined through student response questionnaires. A limited field trial involved 30 students, and an operational field trial involved 100 students from three vocational high schools. Data were analyzed using descriptive statistics. The expert validation results showed that the e-module was categorized as highly feasible. Student responses indicated that the practicality score increased from 80.69% in the limited field trial to 93.71% in the operational field trial. The perceived effectiveness score reached 92%, indicating that students considered the e-module useful, easy to understand, visually clear, and supportive of procedural learning. The findings suggest that the e-module can support vocational learning by providing structured visual guidance, step-by-step drawing procedures, and opportunities for independent practice. However, effectiveness was measured through student perceptions rather than objective performance outcomes; therefore, future studies should use experimental designs and practical drawing assessments to examine its impact on students' drawing competence.

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Corresponding Author:

Filly Ratna Artini

Universitas Negeri Yogyakarta, Yogyakarta, Indonesia, fillyratna.2023@student.uny.ac.id

1. INTRODUCTION

Drawing body proportions is one of the most important competencies in fashion design education because every fashion sketch, illustration, and pattern making begins with an accurate representation

of the human figure (Nurjanah et al., 2020). Drawing body proportions to scale means drawing human proportions based on the size ratios between body parts, using actual body measurements. The standard measurement used is a body proportion of $7\frac{1}{2}$ times the head height, meaning the total body height equals $7\frac{1}{2}$ times the head height. This ratio is commonly used in basic design drawings because it produces a figure that is realistic, balanced, and true to actual human body proportions, making it a suitable foundation for drawing body proportions (Palupi, Tata Busana, & Kesejahteraan Keluarga, 2020).

The skill of drawing body proportions according to the $7\frac{1}{2}$ -to-head-height ratio is taught in the Fundamentals of Design course for 10th-grade students in the Fashion Design Specialization Program at Vocational High Schools (Palupi, Tata Busana, & Kesejahteraan Keluarga, 2020). Learning in the Fashion Design Vocational Program includes vocational and general subjects that complement one another to develop comprehensive competencies (Farida, 2022). This aligns with SMK's objective to equip students with practical skills and expertise in their respective fields, so they are ready to enter the workforce (Munthe & Mataputun, 2021). Therefore, when drawing body proportions, students are expected not only to understand the concept of body proportions but also to be able to calculate, construct, and draw each body part accurately through systematic steps. Mastery of this competency is crucial because errors in drawing body proportions will affect the quality of subsequent learning outcomes, such as fashion design and fashion illustration (D. A. Kusuma & Wening, 2014). Students who do not understand how to draw body proportions accurately tend to produce designs with inaccurate body shapes, unbalanced clothing placement, and unrealistic silhouettes, resulting in disproportionate drawings and unclear outcomes (Nurjanah et al., 2020).

Based on classroom observations and interviews with teachers of the Basic Design course, many students still struggle to master drawing body proportions to scale. The primary issue in this learning process is not only students' poor drawing skills but also their lack of understanding of the process involved in drawing body proportions. Teachers generally provide examples of finished body proportion drawings or brief handouts without explaining measurement formulas, the relationship between the head and other body parts, or systematic steps for creating body proportions. As a result, students tend to copy finished drawings rather than understand how those body proportions are formed. This situation is reflected in several indicators. First, many students make repeated errors in determining the sizes of body parts, particularly when comparing the head to the torso, arms, and legs. Second, students often cannot begin a drawing independently because they rely on existing examples rather than drawing figures using guidelines and measurements. Third, students frequently procrastinate or fail to complete drawing assignments. Observation results indicate that students are less active during learning activities, struggle to follow drawing steps, and lack confidence when asked to create body-proportion drawings independently. The lack of appropriate learning resources further exacerbates these issues. Verbal explanations, teacher-directed demonstrations, and printed handouts still dominate current instructional materials. These teaching materials are generally brief and lack detailed illustrations of body proportions, visual demonstrations, or repetitive practice. Consequently, students struggle to review the material independently outside of class. This limitation is problematic because drawing body proportions requires repeated observation, step-by-step practice, and clear drawing guidelines.

The need for more effective learning materials is also linked to the characteristics of today's students (Jafar & Aisyah, 2022). Most 10th-grade students belong to Generation Z, who are accustomed to digital technology, visual information, and interactive learning experiences (Sobari, Wahyudin, & Dewi, 2023). Conventional learning resources that present only text and images often fail to sustain students' attention and motivation (Dzikri, 2023). In contrast, digital learning media can present material more clearly through visual, interactive, and systematic explanations (Wulandari, Yogica, & Darussyamsu, 2021). Therefore, learning problems do not lie solely in students' abilities but also in the mismatch between the characteristics of the learning material and the media used (Mutia, 2025).

One possible solution is the development of electronic modules (e-modules). E-modules are interactive digital learning materials that can integrate text, images, videos, and self-assessment activities into a single learning medium (Wulandari, Yogica, & Darussyamsu, 2021). E-modules are also more cost-effective because they reduce printing costs, more flexible because they can be studied anytime and anywhere, and clearer because they present material systematically with step-by-step illustrations (Erdi & Padwa, 2021). Regarding the competency of drawing body proportions to scale, e-modules can provide clearer explanations of body proportions using the $7\frac{1}{2}$ times the height of the head ratio, detailed measurement formulas, systematic drawing steps, examples of correct body proportions, practice exercises, and immediate feedback (Palupi, Tata Busana, & Kesejahteraan Keluarga, 2020). Through these features, students can learn independently, review difficult sections, and practice at their own pace (Hadawang, Sya'bania, & Nisa, 2025).

Previous research indicates that e-modules are effective in improving learning outcomes and motivation in vocational and design education. Wasyiatun Khoiriah (2015), Narulita Hidayati Hapsari (2016), and Siti Nur Hanifah (2017) found that e-modules enhance students' accuracy in drawing body shapes and proportions. Additionally, research by Nur Eka Wardahni (2024) indicates that e-modules can boost learning motivation and support self-directed learning through immediate feedback. Similar findings were reported by Annisa Willis Cahyaningtyas (2018), who also emphasized that e-modules are interactive learning tools that can enhance students' interest in learning and their conceptual understanding.

Nevertheless, these studies still leave some gaps. First, previous studies generally focused on e-modules covering drawing or design in general, without specifically addressing the competency of drawing body proportions to scale. Second, previous studies have not explained the creation of body proportions using the $7\frac{1}{2}$ times the head height ratio as a specific learning standard, even though this ratio is an important foundation that must be mastered early in drawing body proportions (D. A. Kusuma & Wening, 2014). Third, most e-modules generally include procedural learning. However, they still focus more on achieving the final drawing result than on presenting more detailed, in-depth procedural stages, such as the steps for calculating measurements, creating guidelines, and systematically drawing body proportions.

Based on these issues and gaps, this study proposes developing an e-module on drawing human body proportions to scale as part of the Basic Design curriculum for 10th-grade students at the Fashion Design Vocational High School. This e-module was designed in Canva to systematically develop visual content, which was then integrated into the Flipbook platform to create a presentation that is more interactive, engaging, and easily accessible to students. Through this combination, the e-module can present learning materials in a more structured, visual, and dynamic manner, thereby supporting both self-directed learning and classroom instruction. The use of this e-module is expected to help students understand the concept of drawing body proportions to scale using the $7\frac{1}{2}$ times the head height ratio, apply drawing procedures correctly, and enhance student motivation.

This study employs the 4-D development model, consisting of the define, design, develop, and disseminate stages. The objectives of this study are to identify the learning needs regarding drawing body proportions to scale, to design an e-module for drawing body proportions to scale that meets these needs, to assess the feasibility of the e-module according to experts, to determine the practicality of the e-module based on student feedback during limited field trials and operational field trials, and to determine the effectiveness of the e-module in improving students' ability to understand drawing body proportions according to scale in the basic design subject for 10th-grade vocational high school students in the Fashion Design program.

2. METHODS

This study employs a Research and Development (R&D) approach to develop an e-module for drawing body proportions based on the $7\frac{1}{2}$ -to-head-height ratio. The R&D approach was chosen

because the objective of this study is not only to examine existing phenomena but also to develop a learning product and test its effectiveness before implementing it in schools. The product developed in this study is an interactive e- module created using the Canva application. The development procedure employs the 4-D model, which consists of four stages: define, design, develop, and disseminate. This model was chosen because it provides a systematic, structured framework for developing learning media. This model is also relevant to learning, as it encompasses analyzing student needs and learning problems, followed by design, product validation, field testing, and dissemination.

The 4-D model in this study was implemented through four stages. In the define stage, a comprehensive analysis was conducted, including an initial analysis to identify learning problems, an analysis of student characteristics, a conceptual analysis, and the formulation of learning objectives. The design stage involved developing research instruments, selecting learning media in the form of e-modules, determining an appropriate format, and initial design of the e-module. Next, during the development stage, the e-module was validated by product experts; the product was revised (Revision I); a limited field trial was conducted to identify weaknesses; further revisions were made (Revision II); and a comprehensive operational field trial was carried out. The final stage, dissemination, involves distributing the refined final e-module product to vocational high schools specializing in fashion design, as well as compiling it into a scientific article and publishing it in an electronic journal.

This study was conducted at three vocational high schools offering a Fashion Design program: State Vocational High School 4 Yogyakarta, State Vocational High School 6 Yogyakarta, and State Vocational High School 1 Depok. The study participants were 10th-grade students in the Fashion Design program, as drawing body proportions from measurements is taught at this level. 100 participants were selected via random sampling to serve as respondents in the e-module usability test. Random sampling provides each member of the population an equal chance of being selected into the sample. The subjects of this study were 34 students from SMK Negeri 4 Yogyakarta, 35 from SMK Negeri 6 Yogyakarta, and 31 from SMK Negeri 1 Depok.

The validity of the e-modules was evaluated by five expert validators selected using purposive sampling. This technique was used to identify product experts, as the researchers required validators with specialized expertise in Family Welfare Education and Fashion Design. With this technique, the sample was selected by identifying individuals who met specific criteria aligned with the research needs. The expert validators consisted of 5 experts, including 2 Family Welfare Education lecturers and 3 Fashion Design lecturers. Expert validators were selected based on relevant expertise and experience, including a Family Welfare Education lecturer (expert validator 1) who is an expert in educational technology and e- module development, a Family Welfare Education lecturer (expert validator 2) who is competent in drawing body proportions and learning evaluation, and a Fashion Design lecturer (expert validator 3) who is an expert in drawing body proportions and fashion illustration, a Fashion Design instructor (expert validator 4) with experience in teaching the fundamentals of design, and a Fashion Design instructor (expert validator 5) who is competent in developing instructional materials and creating learning media. Product expert validators assessed the e-module's feasibility in terms of appearance, content, and the learning media used to demonstrate how to draw body proportions according to size.

The pilot tests in this study included a limited field trial and an operational field trial. The limited field trial involved 30 10th-grade Fashion Design students to obtain an initial understanding of the e-module's use in the learning process before implementing it on a larger scale. At this stage, students used the e-module in their learning activities, completed a Likert-scale questionnaire, and provided feedback on ease of use, clarity of content, media presentation, and the implementation of learning assessments. The data collected served as the basis for product refinement before proceeding to the operational field trial phase. Subsequently, an operational field trial was conducted with 100 10th-grade Fashion Design students from three schools to test the e-module on a larger scale and gauge student responses to its implementation. The procedures carried out included conducting learning sessions

using the e-module and having students complete questionnaires to obtain assessment data and feedback on the quality of the developed product.

The data collection instruments and methods used in this research on the development of an e-module for drawing body proportions to scale include observation, interviews, and non-test instruments such as questionnaires. Observations and interviews were used in the initial stages to identify learning needs, the problems students faced, and the condition of the learning materials. Questionnaires were used as the primary instrument to measure the feasibility, practicality, and effectiveness of the developed e-module. The feasibility instrument was administered to product experts to assess aspects of content, media presentation, learning structure, and evaluation. This assessment used a Guttman scale with two response options: "yes" scored 1 and "no" scored 0 (Lusiana Komara, Subhan Pamungkas, & Sari Dewi, 2022). This scale was used to reach a definitive decision on the product's feasibility.

Table 1. Categories and Scores for E-Module Feasibility

Category	Score
Yes	1
No	0

Practicality and effectiveness instruments were administered to students to assess their perceptions of e-module use. The assessment used a four-point Likert scale: strongly agree (SS), agree (S), disagree (TS), and strongly disagree (STS). The score categories are as follows:

Table 2. Categories and Scores for E-Module Feasibility

Category	Score
Strongly agree	4
Agree	3
Disagree	2
Strongly disagree	1

All instruments include measurable indicators for each assessment aspect. The validity of the instruments was tested using correlation analysis in SPSS with a significance level (Sig.) of < 0.05 . In contrast, reliability was assessed using Cronbach's Alpha, with a criterion of reliability if the alpha coefficient was > 0.7 . Thus, the instruments used in this study have met the requirements for validity and reliability as tools for systematic, objective, and reliable data collection. Thus, the instrument used meets the criteria as a valid and reliable data collection tool.

This development study employs descriptive statistical analysis to systematically process, describe, and interpret data to obtain an objective picture of the quality of the developed e-module (A. M. Kusuma, 2021). This analysis focuses on three main aspects: feasibility, practicality, and effectiveness. Feasibility refers to the degree of product suitability, as assessed by experts, based on content, media presentation, learning structure, and evaluation. Practicality refers to the ease with which students can use the e-module to support their learning. In contrast, effectiveness refers to students' perceptions of acceptance, comprehensibility, ease of use, and the e-module's benefits in supporting learning.

Descriptive statistical analysis focuses on calculating percentage scores as the primary basis for evaluating the quality of e-modules based on responses from experts and students. Percentages are used to classify assessment results into specific categories according to criteria established for each aspect of feasibility, practicality, and effectiveness. This approach allows data to be interpreted in a more structured, consistent, and measurable manner, thereby providing a clear quantitative basis to support research on the quality of e-modules as a learning medium. Data analysis was conducted using a percentage formula, with evaluation criteria based on Zalfa Agustin, Sujana Wahyuri, & Sasmita (2023), to present the research results objectively and in accordance with the evaluation standards for learning development products. Data analysis in this study used a formula with the following percentage criteria:

$$P = \frac{F}{N} \times 100\%$$

Explanation:

P = Percentage score

F = Total score obtained

N = Maximum score

The calculation results are then interpreted using a category table to conclude.

Table 3. Eligibility Sheet Percentage Criteria

Percentage Range (%)	Qualitative Criteria
86 – 100%	Very Eligible
71 – 85%	Eligible
56 – 70%	Fair
41 – 55%	Poor
< 40%	Failed

Effectiveness measurement in this study was based on students' perceptions of e-module use, covering aspects of acceptance, comprehensibility, ease of use, and suitability, as well as the benefits of e-modules in supporting learning. Therefore, effectiveness in this study is more appropriately understood as the effectiveness of the learning media based on students' experiences and responses, rather than as a direct measure of improvements in student learning outcomes. Thus, the effectiveness results indicate the extent to which the e-module supports the learning process, as perceived by students. Effectiveness was measured as follows:

Calculating the Average Value (Mean)

$$X = \frac{\text{Total Score}}{\text{Number of Participants}}$$

Explanation:

X = Average value

Calculating Average Value to Percentage (% X_i)

$$X_i = \frac{X}{\text{Maximum Score}} \times 100\%$$

Explanation:

X = Average value

X_i = Average value to percentage

The effectiveness measurement criteria refer to the assessment guidelines developed by Widoyoko (2012), which are used as the basis for interpreting the level of e-module effectiveness based on the average score. The classification of effectiveness can be seen in the following table (Pratiwi & Widyaningrum, 2021):

Table 4. Classification of Effectiveness Criteria

Classification	Average Score
Very effective	$80 \leq X_i < 100\%$
Effective	$60 \leq X_i < 80\%$
Moderately Effective	$40 \leq X_i < 60\%$
Less Effective	$20 \leq X_i < 40\%$
Ineffective	$10 \leq X_i < 20\%$

This study was conducted in accordance with research ethics principles. The research process was carried out after obtaining official permission from the school where the study was conducted. All participants were provided with an explanation of the research objectives and gave informed consent. Participant identities were kept confidential, and all data obtained were used solely for academic and research purposes. Thus, this study not only meets methodological standards but also adheres to ethical considerations in its implementation.

3. FINDINGS AND DISCUSSION

This section consists of two parts: findings and discussion, presented systematically to outline the research results and analyze them in greater depth.

3.1 Findings

The results of this study are divided into several aspects, including the analysis of learning needs, the development of e-module products, the results of the e-module product feasibility assessment by experts, the results of the e-module practicality based on field trials, and the results of the e-module effectiveness. The following is an explanation of these aspects:

3.1.1 Learning Needs Analysis

The results of the needs analysis indicate that the learning process for drawing human proportions to scale still faces various obstacles. Most students struggle to understand the formulas and steps for drawing independently because of a lack of learning resources and teaching materials that are not detailed enough. This situation highlights a mismatch between the available resources and the learning characteristics of Generation Z students, who are more accustomed to engaging, interactive, and easily accessible digital media (Dzikri, 2023).

These findings reinforce previous research, which confirms that conventional media tend to be unable to meet the learning needs of today's students, particularly in the context of practical and visual skills (Nurjanah et al., 2020). The lack of engaging, interactive media not only hinders conceptual understanding but also reduces students' motivation to learn, leading to assigned tasks and exercises that are often not completed to the best of their ability. This aligns with the findings of Erdi & Padwa (2021), who stated that interactive media can enhance motivation and learning outcomes through active student engagement. Therefore, the development of comprehensive, visual, and interactive e-modules serves as a relevant solution and primary support for learning body proportion drawing skills. These findings indicate that the success of the learning process for practical skills heavily depends on media that effectively integrate visual and interactive elements. The use of media tailored to today's students' characteristics will accelerate understanding, boost motivation, and strengthen students' practical skills. Thus, the development of e-modules that support self-directed and repetitive learning is not only theoretically relevant but also a real need in the context of vocational education, which is increasingly shifting toward digital technology as the primary learning tool.

3.1.2 E-Module Product Development

The e-module development process includes the following stages: Define, Design, Develop, and Disseminate.

a) Define

The analysis at this stage confirms a gap between learning needs and the characteristics of the media used. The findings indicate that the available media have not optimally supported conceptual and procedural understanding, particularly regarding the material on drawing body proportions using the 7½-to-head-height ratio. This is reflected in students' still-low learning achievements and in the uneven mastery of competencies. An analysis of needs, tasks, and concepts highlights the importance of developing media that not only present information but also facilitate a step-by-step learning process, independent practice, and feedback. These findings align with the research by Wulandari et al. (2021),

which emphasizes that interactive media is necessary to support skill-based learning. E-modules were developed to address learning needs that require the integration of visualization, interactivity, and independent learning.

b) Design

The results of the design phase indicate that the e-module for drawing body proportions based on the $7\frac{1}{2}$ x head height ratio has been systematically developed to meet the learning needs of Basic Design in vocational high schools. This learning medium was developed using Canva and Flipbook in an interactive digital format that includes all components, ranging from an introductory page and a map of the e-module's location to learning materials divided into four learning activities, instructional videos, and evaluations and conclusions. The e-module is designed to be sequential and interconnected, making it easier for students to understand basic concepts through application, particularly in drawing body proportions.



Figure 1. Design of E-Module on Drawing Body Proportions according to Size

The e-module design integrates students' cognitive, psychomotor, and affective aspects by presenting learning objectives, content descriptions, summaries, assignments, formative assessments, and student worksheets within each learning activity. The inclusion of instructional videos reinforces students' visual and practical understanding, while evaluations that include cognitive tests, practical assignments, and attitude assessments allow for comprehensive measurement of learning outcomes. The use of visual media and instructional videos helps students understand the drawing process procedurally. This reinforces research findings that visualization and interactivity play a crucial role in enhancing student engagement and understanding in practice-based learning and competency mastery (Hadaawang, Sya'bania, & Nisa, 2025). E-modules can enhance students' interest in learning, conceptual understanding, and skills in drawing body proportions according to the $7\frac{1}{2}$ times head height ratio through attractive design, systematic content, and a more student-centered learning approach.

c) Develop

The results of the development phase indicate that the e-module has a high level of feasibility based on expert validation and field trials, with a maximum score (100%) from five validators. This achievement reflects strong alignment between the e-module components and the assessment indicators, ensuring that all criteria are met optimally. The results of the limited field trial showed 80.69%, while the operational field trial showed 93.71%. Additionally, the results of the validity test ($p < 0.05$) and reliability test (Cronbach's Alpha 0.870 and 0.939) indicate that the instruments used have high consistency. When considered alongside previous research, these findings reinforce Nur Eka Wardahni's (2024) study, which demonstrated that interactive e-modules possess a very high level of validity and are effective in supporting learning through systematic and engaging presentation of material. Furthermore, the results of this study are also consistent with those of Annisa Willis Cahyaningtyas (2018), who found that the use of interactive learning media can enhance students' interest in learning and their conceptual understanding. However, unlike previous studies that focused more on final learning outcomes, the development of e-modules in this study emphasizes the procedural steps involved in drawing body proportions to scale, thereby contributing more to the gradual, repetitive strengthening of students' practical skills.

d) Disseminate

The dissemination stage is the process of disseminating the final results of the research and development conducted. The researchers disseminated the e-module learning media on drawing body proportions according to size to State Senior High School 4 Yogyakarta, State Vocational School 6 Yogyakarta, and State Vocational School 1 Depok. Additionally, the results of this research were compiled into scientific articles and published in an e-journal managed by the Department of Family Welfare Education (Master's Program), Faculty of Engineering, UNY.

3.1.3 Product Feasibility Results for the E-Module by Experts

The experts' product feasibility results indicate that the e-module for drawing body proportions by size has very high validity. The validation conducted by five product experts resulted in a maximum score of 40 out of 40 statements (100%), placing the e-module in the "Highly Feasible" category. The assessment covers aspects of media display, Material, and learning evaluation. The following are the results of the e-module product feasibility by experts:

Table 5. E-Module Feasibility Score Intervals by Product Experts

Expert Judgment	Score Result	Percentage	Criteria
Product Expert 1 (Lecturer)	40	100%	Highly Feasible
Product Expert 2 (Lecturer)	40	100%	Highly Feasible
Product Expert 3 (Lecturer)	40	100%	Highly Feasible
Product Expert 4 (Lecturer)	40	100%	Highly Feasible
Product Expert 5 (Lecturer)	40	100%	Highly Feasible

$$\text{Percentage (\%)} = \frac{F}{N} \times 100\% = \frac{40}{40} \times 100\% = 100\%$$

Based on the validation results, this e-module has been categorically rated as "highly suitable," indicating that the product's quality fully meets the standards. This consistency in evaluation indicates that the e-module demonstrates high consistency across all assessed aspects, including media presentation, content relevance, and the learning assessment system. This demonstrates that the developed e-module maintains strong alignment among learning objectives, content, and assessment, thereby fulfilling the alignment principle in instructional design. These conditions allow the validators to assess that all components are well-integrated, with no aspects requiring significant improvement. Additionally, the e-module's systematic structure, supported by visual presentations, clear procedural steps, and interactive media, provides clarity in the learning process. This aligns with the characteristics of effective learning media, leading experts to conclude that the e-module has met the eligibility criteria

comprehensively. The validators' relevant experience and expertise in education and fashion design also enabled them to conduct a comprehensive assessment. The maximum score awarded by the system reflects a professional consensus (expert agreement) that the product has reached a high level of quality and is ready for implementation.

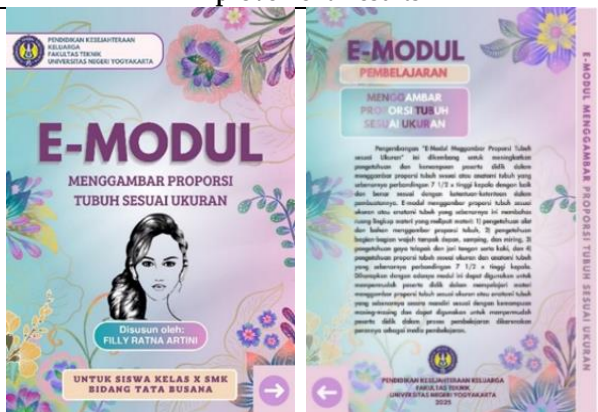
Before awarding the maximum score, expert validators provide various inputs and suggestions to refine the developed e-module. This indicates that the assessment is not given immediately but rather through a process of evaluation and revision until the product meets the expected quality standards. Thus, a 100% score does not mean the product is flawless, but rather indicates that the e-module has met the primary criteria and undergone improvements based on the expert validator's feedback. However, these results still require careful interpretation, as the use of a binary (yes/no) rating scale may limit the assessment's ability to distinguish quality levels in greater detail. Additionally, the maximum score may be influenced by a tendency to evaluate based on compliance with the e-module's quality standards. The following revisions, inputs, and suggestions from expert validators include:

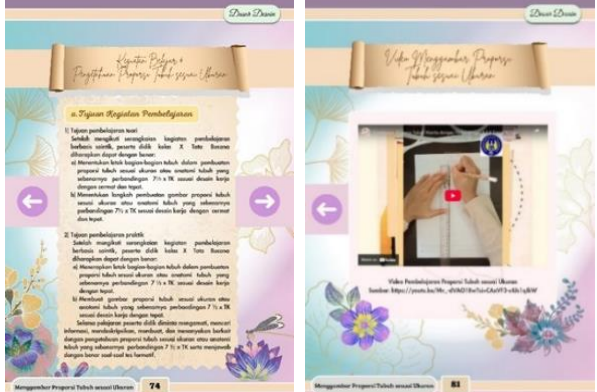
Table 6. Improvements and Suggestions from Validators

No.	Improvements and Suggestions from Product Expert Advice	Results of Improvements and Suggestions from Product Experts
1.	Simplify the Material so students can understand it more easily.	The Material has been simplified to be more concise and systematic, accompanied by visual examples.
2.	Redesign the cover and content to be simpler and more proportional.	The e-module's cover design and layout were simplified to make learning more comfortable for students.
3.	Improve the spacing between paragraphs and page numbering to make the layout neater.	The spacing between paragraphs and page numbering was improved to be neater, more structured, and easier to read.
4.	Organize the Material into chapters and add a table of contents to the e-module.	The Material is organized into several chapters and equipped with a map to help students understand the learning flow.
5.	Adjusting evaluation questions to be relevant to the Material.	Evaluation questions have been revised to match the Material and competency indicators.
6.	Completing the bibliography according to the content of the e-module Material.	The bibliography has been completed and adjusted to the references used.

The following is a discussion of the results of improvements to the e-module on drawing body proportions based on a 7½:1 head-to-body ratio, based on validator suggestions, including:

Table 7. Discussion of Validator Suggestion Improvement Results

No.	Validator Suggestions	Improvement Results
1.	The e-module's cover design, color, and layout have been improved and simplified to make learning more comfortable for students.	

2. The Material is organized into several chapters and includes a table of contents to help students understand the learning process.	
3. The Material has been simplified, and the spacing between paragraphs and page numbering has been improved to make it neater, more structured, and easier to read.	
4. The evaluation questions were revised to match the Material and competency indicators. The bibliography was completed and adjusted to match the references used.	

3.1.4 Practical Results of the E-Module Based on Field Testing

Results of the E-Module's Practicality Based on Field Trials consist of two stages, namely limited field trials and operational field trials; the results are as follows:

a) Limited Field Trial

The limited field test involved 30 10th-grade students at a vocational high school majoring in Fashion Design. The limited field test yielded a result of 80.69%, which falls within the 71–85% range and is classified as "acceptable." The following diagram presents the results of the limited field test for the students:

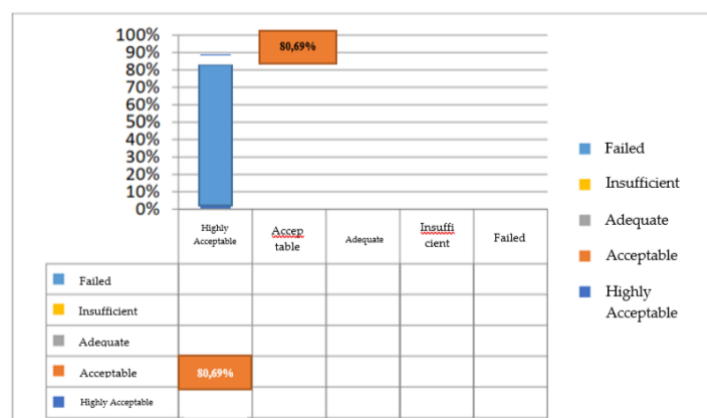


Figure 2. Limited Field Test Diagram for Students

The results of the limited field trial yielded a success rate of 80.69%, indicating that the e-module meets the standards for suitability as a learning medium in the context of vocational education. This achievement indicates that the e-module can present material on drawing body proportions according to the $7\frac{1}{2}$ x head-height ratio systematically, with clear procedural steps, supporting visualizations, and evaluations tailored to students' needs. From the user's perspective, the e-module was rated as easy to use, the material was easy to understand, and the media interface supported the learning process. Instrument testing during the limited field trial phase also demonstrated the high quality of the measurement tools. Based on validity testing using SPSS, all items obtained a significance value (Sig.) < 0.05, thus being deemed valid. Meanwhile, the reliability test results showed a Cronbach's Alpha of 0.870 (>0.7), indicating high internal consistency. Thus, the data obtained during the limited field trial phase can be deemed valid and reliable.

Based on these results, the findings from the limited field trial provide a strong initial indication of the level of acceptance, ease of use, and suitability of the e-module for students' learning needs. The e-module is deemed suitable and practical enough to be used as a learning medium, while also showing good potential for implementation on a broader scale. Therefore, the e-module on drawing body proportions according to the $7\frac{1}{2}$ x head height ratio meets the criteria to proceed to the next stage, namely the operational field trial.

b) Operational Field Trial

The results of the operational field test indicate that the e-module has improved and has been well received by students. The test, which involved 100 tenth-grade students majoring in Fashion Design, achieved a score of 93.71%, which falls into the "highly satisfactory" category. The following diagram presents the results of the operational field test among students:

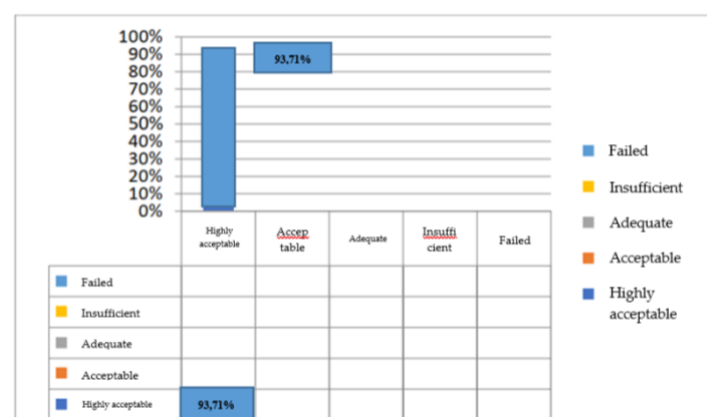


Figure 3. Operational Field Test Diagram for Students

The operational field test yielded a result of 93.71%, which falls into the “highly feasible” category, i.e., within the score range of 86–100%. This achievement reflects a high level of student acceptance of the e-module for drawing body proportions to scale. This high percentage can be attributed to the media presentation, material delivery, and learning assessment being aligned with the students’ needs and characteristics. The e-module not only presents concepts but also facilitates a procedural learning process through step-by-step instructions, structured material presentation, and student self-practice. This score indicates that the majority of students responded positively to the ease of use, visual presentation, and the relevance between the material and the assessments presented in the e-module; thus, in practice, this medium is deemed suitable and easy to use in learning. Based on these results, the findings at this stage also provide a stronger picture of the level of acceptance, ease of use, and suitability of the e-module for students’ learning needs in drawing body proportions according to the $7\frac{1}{2}$ x head height ratio. Thus, based on the feasibility criteria, the operational field test of the e-module for drawing body proportions according to scale is deemed highly practical and highly suitable for use as a learning medium.

Instrument testing during the operational phase also indicated that the quality of the measurement tools used was in the “very good” category. Based on validity testing using SPSS, all items achieved a significance level (Sig.) of < 0.05 and were therefore deemed valid. Meanwhile, the reliability test results showed a Cronbach’s Alpha value of 0.939 (> 0.7), indicating that the instrument has a very high level of internal consistency. Thus, the data obtained during the operational field trial phase can be deemed valid and reliable. Based on these results, the operational field trial provides stronger evidence that the e-module has excellent levels of acceptability, ease of use, and suitability for students’ learning needs. This e-module is highly practical and well-suited as a learning medium because it supports more independent, focused, visual, and procedural learning.

In line with previous research, these findings reinforce the study by Hadawang et al. (2025), which found that e-modules with a clear structure and immediate feedback can enhance students’ independent learning. More specifically, the high practicality in this study indicates that the developed e-modules have successfully integrated systematic design with the characteristics of vocational learning, which emphasize procedural and visual understanding. The presentation of sequential work steps, clear illustrations, and repetitive exercises provides a more focused learning experience and facilitates students’ understanding of the drawing process, step by step and independently. This study confirms that the practicality of e-modules is significantly influenced by the quality of instructional design that bridges students’ needs in mastering skills in an applied manner. The pilot test results indicate that the e-module on drawing body proportions to scale is highly practical for supporting vocational learning, particularly in developing the skill of drawing body proportions to scale.

3.1.5 Results on the Effectiveness of the E-Module

The effectiveness test results showed a percentage of 92%, which falls within the 80–100% range and is classified as “highly effective.” This outcome indicates that the e-module has very high student acceptance and can optimally support the learning process. This high percentage indicates that the aspects of ease of understanding the material, visual appeal, clarity of step-by-step instructions, and the usefulness of the media have been well met and align with the learning needs within the context of vocational education.

The effectiveness reported in this study primarily reflects students’ perceptions of the e-module’s use, particularly regarding improved conceptual understanding and the quality of the learning experience. The e-module has proven effective in helping students understand the material on drawing body proportions to scale through a systematic, visual, and step-by-step presentation. The material’s coherent structure, supported by clear illustrations and targeted exercises, enables students to follow the learning process more easily, understand the relationships between body parts, and internalize the drawing steps more deeply. Furthermore, these effectiveness outcomes also indicate a positive potential

for improving drawing skills. This is supported by features such as self-guided practice, material review, and step-by-step presentation of procedures, allowing students to practice at their own pace.

When considered in light of previous research, these findings align with those of Pratiwi & Widyaningrum (2021), who state that the effectiveness of instructional media is characterized by increased student engagement and understanding. More specifically, the results of this study indicate that high effectiveness is influenced by the alignment of the e-module's instructional design with the procedural and visual nature of the material. The use of e-modules makes a tangible contribution to helping students understand the material in a more structured and systematic manner, as well as supporting a more independent learning process. This condition simultaneously serves as a strong foundation for fostering the development of body proportion drawing skills in a more focused and sustainable manner.

3.2 Discussion

The findings of this study indicate that the developed e-module has strong potential as a digital learning medium for supporting body proportion drawing in vocational fashion design education. The significance of the findings does not lie merely in the high percentages obtained from expert validation and student responses, but in how the e-module responds to the instructional problems identified during the preliminary analysis. Students' difficulties in drawing body proportions were not only related to limited drawing ability, but also to the lack of systematic procedural guidance, limited availability of detailed learning resources, and the dominance of teacher-centered explanations. In vocational learning, especially in skill-based subjects, instructional media must help students understand both the concept and the process of applying it in practical tasks (Munthe & Mataputun, 2021). Therefore, the e-module serves as a pedagogical bridge between abstract proportional concepts and concrete drawing procedures.

The positive response to the e-module can be explained by the alignment between the characteristics of the learning material and the features of the developed product. Drawing body proportions according to the $7\frac{1}{2}$ -head-height ratio requires students to understand measurement relationships, construct guidelines, and follow drawing steps sequentially. Previous studies have emphasized that errors in drawing body proportions may affect students' ability to produce balanced fashion illustrations and accurate design sketches (Kusuma & Wening, 2014; Nurjanah et al., 2020). Conventional learning materials, such as brief handouts or final drawing examples, often do not sufficiently explain how proportional figures are constructed. The e-module addresses this gap by organizing content into structured learning activities, providing visual illustrations, presenting step-by-step procedures, and allowing students to review the material independently.

The use of digital and visual learning media is also relevant to the characteristics of current vocational students, who are familiar with technology-based learning resources. Digital learning materials can present information more clearly through combinations of text, images, video, and interactive activities, thereby supporting students' understanding of procedural content (Wulandari et al., 2021). In this study, the integration of Canva-based design and Flipbook presentation made the material more accessible, attractive, and easier to navigate. This is particularly important in fashion design education because students need clear visual references to understand proportion, body structure, balance, and line placement. The availability of instructional videos, exercises, and formative assessments may reduce students' dependence on direct teacher demonstrations and encourage more autonomous learning.

The expert validation results indicate that the e-module met the expected criteria in terms of content, media presentation, and learning evaluation. However, the high feasibility result should be interpreted carefully. A score of 100% does not necessarily mean that the product is perfect; rather, it indicates that the product met the feasibility criteria after going through expert review and revision. In development research, validation is a formative process intended to improve the quality of the product before it is implemented more broadly. The validators' suggestions, including simplifying the material,

improving the cover and layout, reorganizing the content into chapters, revising evaluation questions, and completing the bibliography, contributed to improving the pedagogical and technical quality of the e-module. This iterative process is consistent with the logic of research and development, in which product quality is strengthened through repeated evaluation and revision.

The increase in student responses from the limited field trial to the operational field trial suggests that the revisions made after the initial trial improved the usability and clarity of the e-module. The limited field trial provided early information about students' experiences in using the product, while the operational field trial tested the product in a broader context involving students from several vocational schools. This process shows that field testing is not merely a procedure for collecting numerical data, but an important stage for identifying weaknesses in product design and improving its suitability for real classroom conditions. E-modules that are systematic, visually clear, and easy to use can support independent learning and improve students' engagement with learning materials (Erdi & Padwa, 2021; Hadawang et al., 2025).

From a pedagogical perspective, the e-module contributes to vocational education by integrating conceptual understanding, procedural knowledge, and self-directed practice. In fashion design learning, students are expected not only to understand the concept of body proportion but also to apply it accurately in drawing activities. The e-module helps students connect the 7½-head-height ratio with practical drawing steps, such as determining measurements, constructing body guidelines, and completing proportional figures. This type of structured learning is essential because body proportion drawing is a foundational competence for subsequent learning, including fashion illustration, garment visualization, and design communication (Nurjanah et al., 2020; Palupi et al., 2020). Thus, the e-module has pedagogical relevance beyond the immediate topic being taught.

The implications of this study are important for vocational education. First, digital modules can strengthen competency-based learning by providing systematic and repeatable practice materials. Second, e-modules can support a shift in the teacher's role from the main source of information to a facilitator who guides students during practice. Third, the product supports differentiated learning because students can revisit materials according to their individual needs and learning pace. Fourth, the use of digital media may improve learning efficiency in subjects that require visual demonstration and procedural mastery. These implications support the view that interactive e-modules can function not only as supplementary materials but also as instructional tools that promote independent learning, motivation, and practical competence (Wulandari et al., 2021).

Nevertheless, several limitations must be acknowledged. The effectiveness data in this study were primarily based on student perception questionnaires. Therefore, the reported effectiveness should be interpreted as perceived effectiveness or student acceptance of the learning medium, rather than direct evidence of improved drawing performance. The study did not include a control group, so it cannot establish a causal relationship between the use of the e-module and improvement in students' drawing skills. In addition, the study did not report objective performance assessments, such as pretest-posttest scores, rubric-based drawing evaluation, or inter-rater reliability. Future studies should employ stronger experimental or quasi-experimental designs, include comparison groups, and use standardized performance rubrics to measure actual improvements in students' drawing competence. Further research may also examine the long-term effects of e-module use on skill retention, student motivation, and teacher implementation practices in different vocational school contexts, process, and alignment with student characteristics.

The practical results further reinforce the pedagogical value of the e-module that was developed. The limited field trial yielded a score of 80.69%, which falls within the "acceptable" category. This result indicates that the e-module has been deemed practical and suitable for students to use in supporting the systematic learning of drawing body proportions to scale. This percentage indicates that the e-module is capable of meeting learning needs through the presentation of structured material, supportive visuals, and assessments appropriate for vocational students. These results also indicate that students can effectively use the e-module as a self-learning tool that supports procedural and visual

understanding. Thus, the developed e-module has met the initial criteria for practicality and feasibility, making it suitable to proceed to the next stage: an operational field trial to test the product's quality on a larger scale.

The operational field trial revealed a practicality rate of 93.71% for the e-module, placing it in the "highly feasible" category. This indicates that the e-module was very well received by students, particularly regarding ease of use, visual presentation, comprehensibility of the material, and alignment between the material and learning assessments. This high percentage confirms that the e-module has optimally supported students' self-directed learning by presenting clear, systematic, and easy-to-follow work steps. Students not only understand the basic concepts of body proportions at different scales but also follow each drawing stage step by step using the correct procedures. In the context of vocational education, these results indicate that the e-module successfully integrates visual, procedural, and self-directed practice learning effectively to meet students' needs. These findings reinforce Hadawang et al.'s (2025) view that a clear, systematic material structure, supported by appropriate feedback, can significantly enhance students' learning autonomy.

An effectiveness rate of 92% indicates that the e-module provides a highly positive learning experience, as reflected in student perceptions. This score falls into the "highly effective" category and reflects that the e-module offers high levels of acceptance, comprehension, ease of use, and excellent benefits in supporting learning. Clear visual presentation, systematic work steps, and repeated self-guided exercises contribute significantly to students' deeper understanding of the material. The e-module enables students to learn the concept of drawing body proportions to scale through a step-by-step approach that reinforces conceptual understanding while supporting self-guided practice. However, the effectiveness findings in this study should be interpreted with caution, as the measurements focused primarily on students' perceptions through questionnaires rather than on direct experimental assessments of improvements in practical skills. The effectiveness results primarily reflect the quality of the learning experience, students' understanding, and their acceptance of the learning medium.

The results of this study are consistent with those of Pratiwi and Widyaningrum (2021), who found that effective learning media are characterized by increased student engagement and understanding. Analytically, this study shows that the effectiveness of e-modules is influenced not only by the level of media interactivity but also by the alignment of the instructional design with the characteristics of vocational content, which demands strong visualizations, clear procedures, and repetitive practice. The strength of the e-module in this study lies in its ability to provide a flexible, visual, systematic, and practical learning experience, making it more effective in supporting students' competency mastery. Although the research results indicate high achievement, several limitations should be noted. First, this study did not include a control group, so the causal relationship between e-module use and skill improvement cannot yet be established. Second, data on practicality and effectiveness were largely collected through student perception questionnaires, so the potential for subjectivity in responses remains. Third, this study has not directly measured improvements in drawing skills through standardized practical performance assessments. Therefore, further research with a stronger experimental design, the use of a control group, and more objective skill assessment instruments is essential to strengthen the empirical evidence regarding the impact of e-modules on students' practical competencies.

This study demonstrates that an e-module on drawing body proportions to scale makes a significant contribution to vocational pedagogy, particularly in fashion design education. This e-module integrates visual, procedural, and self-directed learning into a single, systematic, and interactive medium, making it relevant to modern learning needs in vocational high schools. The developed product has proven to be feasible, practical, and effective as an innovative learning medium that supports students' technical competencies, visual understanding, and independent learning.

4. CONCLUSION

This study developed an e-module for drawing body proportions based on the $7\frac{1}{2}$ -head-height ratio for Grade 10 Fashion Design vocational students and found that the product was highly feasible, practical, and positively received as a learning medium. Expert validation showed that the e-module met the expected criteria in terms of content, media design, and learning evaluation, while student responses in both limited and operational field trials indicated that the e-module was easy to use, visually clear, systematically organized, and helpful in supporting students' understanding of procedural drawing steps. The findings suggest that the e-module can support vocational learning by providing structured visual guidance, encouraging independent practice, and helping students connect proportional concepts with practical drawing procedures. However, this study has several limitations: the effectiveness measurement was based mainly on students' perceptions through questionnaires, the study did not include a control group, and it did not directly measure improvement in students' drawing performance through objective, practical assessments. Therefore, future research is recommended to employ experimental or quasi-experimental designs, involve comparison groups, use standardized performance rubrics or pretest-posttest assessments, and examine the long-term impact of e-module use on students' drawing competence, learning motivation, and independent learning skills in broader vocational education contexts.

Acknowledgments: The author would like to express their sincere gratitude to Universitas Negeri Yogyakarta for the academic support provided during this Research. Appreciation is also extended to the principals, teachers, and students of SMK Negeri 4 Yogyakarta, SMK Negeri 6 Yogyakarta, and SMK Negeri 1 Depok for their cooperation and active participation throughout the Research process. Special thanks go to the expert validators and respondents who provided valuable feedback on the development and refinement of the e-module, as well as to all parties who supported the successful completion of this study.

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