

Development of Learning Media for Burci Embroidery E-Module (Sequins) Optional Subjects for Class XI Fashion Design at SMK Muhammadiyah Imogiri

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Abstract

Burci (sequin) embroidery requires both conceptual understanding and precise, step-by-step practical skills. Existing e-modules in fashion education mostly address pattern making, garment design, and design software, while decorative embroidery techniques such as burci receive little attention. At SMK Muhammadiyah Imogiri, burci embroidery is still taught with printed books and teacher explanations, and no digital media is available. This study developed a flipbook-based e-module specifically for burci embroidery in the Class XI Fashion Design optional subject. Its novelty lies in integrating step-by-step video tutorials of sequin techniques with images, practice questions, and evaluations in a single medium that students can reuse independently. The study used a Research and Development (R&D) method with the Four-D model (define, design, develop, and disseminate). Data were collected through observation, questionnaires, and documentation, and analyzed using descriptive percentages. Validation by three material experts and three media experts produced feasibility scores of 100% and 95%, respectively. A small-scale trial ($n = 10$) and a limited-scale trial ($n = 33$) yielded student response scores of 88.25% and 88.50%, both in the strongly agree category. These findings indicate that the e-module is feasible and well received as a learning medium for burci embroidery in vocational high schools. Further research is needed to test its effect on learning outcomes.

Keywords: e-module; burci embroidery; sequins; flipbook; Four-D model; vocational education

1. INTRODUCTION

Learning media is one of the important components in the learning process because it plays a role in helping the delivery of material so that it is easier for students to understand. In the learning process, the existence of media not only functions as a tool to convey information, but also as a means that can help students obtain a more targeted learning experience. The choice of media needs to be adjusted to the characteristics of the material being studied, especially when the learning material not only requires mastery of knowledge but also certain skills. Media that is able to present information systematically and provide an overview of the learning process can help students understand the material gradually and reduce difficulties when applying this knowledge in practical activities. One of the media that can be used is e-module, which is a digital learning media that presents material systematically and is equipped with pictures, videos, exercises, and evaluations to support independent learning. According to Wulandari et al. (2023), learning media can clarify the delivery of material, increase student attention, and create more effective learning.

E-modules are very suitable for practical learning, especially burci (sequin) embroidery materials that require understanding of concepts and mastering embroidery techniques gradually. Learning characteristics that combine concept understanding with practical skills require media that is able to present material in a sequential manner and provide a clear picture of each stage of the activity. In learning burci embroidery (sequins), students are not only required to understand the type, function, and characteristics of the materials used, but also need to know the order of work, sequencing techniques, and precision needed to produce embroidery according to the planned design. Therefore, the presentation of material through digital media that combines written explanations with visualizations can provide opportunities for students to learn the material more flexibly and repeat certain parts that have not been understood according to their learning needs.

E-modules can be used as electronic teaching materials that not only present knowledge, but also skills materials needed in learning fashion practices (Ramadhani & Kharnolis, 2022). The use of technology in learning can support the increase of students' interest in reading and learning independence through the use of digital learning media such as e-modules (Mahrani et al., 2022). The results of observations at SMK Muhammadiyah Imogiri show that learning still uses printed books and teachers' explanations, while digital learning media is not yet available. The use of printed books still has a function as a source of information, but in procedural materials, there are limitations in providing an overview of the process dynamically.

Students can read the steps that must be done, but do not always get enough visualization to imagine how a technique is applied directly. This condition becomes increasingly important in burci embroidery materials because small differences in position, direction, and how to insert the needle can affect the final result of embroidery. Therefore, a media that can complement written information with a visual presentation is needed so that students get a clearer picture of the process being studied. This condition causes students to have difficulty learning the material independently, so a more interactive and accessible learning media is needed. The use of video tutorials in e-modules can be one of the elements that support the delivery of skill materials because students can see examples of the process of working directly. Videos allow a stage of practice to be displayed sequentially, starting from the preparation of tools and materials, the process of workmanship, to completion, so that students not only get information in the form of text but also get an overview of the application of the procedure. In addition, the material presented through video can be played back when students have difficulties in certain parts, so that the learning process can take place more flexibly.

The limitation of learning media is one of the conditions that can affect the learning process of students, especially when the material studied has practical stages that need to be understood sequentially. The dependence on teachers' explanations and the use of printed books makes students' opportunities to relearn material outside the learning process more limited. In skill learning, students need learning resources that can be used repeatedly so that they can adjust the learning speed to their respective abilities. The presence of digital learning media in the form of e-modules can be an alternative to overcome this condition because the material can be arranged systematically and equipped with visual elements that help students understand the learning stages more concretely. The development of learning media in this context is not only directed to replace the use of printed teaching materials with digital forms, but also to produce learning resources that are in accordance with the characteristics of the material and the needs of students. The developed e-modules need to provide a learning experience that allows students to understand the material gradually, see examples of work, follow practical instructions, and evaluate their understanding. Thus, the developed media is expected to provide a more structured learning experience while providing space for students to learn independently according to their abilities and needs.

The use of e-modules also provides opportunities for students to develop a more independent learning pattern. Students do not always have to wait for a re-explanation from the teacher when experiencing difficulties because the material can be accessed again according to learning needs. The opportunity to reread the material, see illustrations, watch tutorials, and do exercises repeatedly can help students manage their learning process more flexibly. Thus, e-modules can function as a learning resource that accompanies the learning process in the classroom while providing opportunities for students to deepen the material outside of learning time. Based on these conditions, this study developed an e-module for burci embroidery (sequin) in the selected subject of class XI Fashion Design. The research aims to determine the feasibility of e-modules based on the assessments of subject matter experts and media experts and to determine students' responses to the use of e-modules as learning media.

2. METHOD

This research uses the Research and Development (R&D) method with the Four-D (4D) development model proposed by Thiagarajan. This development model includes four stages, namely define, design, develop, and disseminate. The research was carried out at SMK Muhammadiyah Imogiri in the 2025/2026 Academic Year. The research subjects consisted of three material experts, three media experts, class XI students of Fashion Design in a small-scale trial of 10 students, and a limited-scale trial of 33 students. The material experts consisted of lecturers of the Family Welfare Vocational Education Study Program, Sarjanawiyata Tamansiswa University and teachers of the optional subject of Fashion Design, while the media experts consisted of lecturers of the Family Welfare Vocational Education Study Program, lecturers of the Mechanical Engineering Vocational Education Study Program, Sarjanawiyata Tamansiswa University, and Fashion teachers.

Research data was collected through observation, questionnaires, and documentation. Observation was carried out at the definition stage to identify learning needs and problems faced by students in burci embroidery materials. The questionnaire was used to obtain e-module feasibility data based on the assessment of material experts, media experts, and student responses to the developed media. The research instruments included observation sheets, material expert validation sheets, media expert validation sheets, and student response questionnaires. Expert assessments used the guttman scale, while student responses used a four-level likert scale. Data was analyzed using descriptive statistical techniques in the form of percentages to determine the level of media feasibility and student response.

3. RESULTS AND DISCUSSION

This research produces learning media in the form of burci embroidery e-modules (sequins) in the selected subjects of class XI Fashion, which were developed using the Four-D (4D) model, including the Define, Design, Develop, and Disseminate stages. The product produced is in the form of a flipbook-based e-module that contains burci (sequin) embroidery material, learning objectives, pictures, video tutorials, practice questions, and evaluations so that it can be used as learning media independently or in the classroom. The completeness of these components shows that the developed e-module not only functions as a place to store material in digital form, but is designed as a unit of learning resources that has a learning flow. The learning objectives provide direction regarding the competencies that need to be achieved, the material provides the necessary knowledge base, while pictures and video tutorials help clarify the stages of practice. Exercises and evaluations then provide opportunities for students to find out the extent of the understanding that has been gained. The integration of these various components makes the e-module more functional because students can obtain material, learn examples, conduct exercises, and evaluate their understanding in one learning medium.

The results of the validation of the material by three material experts obtained a feasibility percentage of 100% in the feasible category. The acquisition of this percentage shows that the material in the e-module has met the necessary aspects to support the learning process. The suitability between the material and the learning objectives is important so that the information provided is not only informative, but really leads to the competencies that students need to achieve. The systematic preparation of the material also helps students follow the learning from the basic concept to the practical stage gradually. Thus, the results of the validation by material experts provide an idea that the content of the e-module has a clear enough structure to be used as learning material on burci embroidery materials (sequins). The results of the validation of the media experts involving three validators obtained a percentage of 95% in the feasible category. The results show that the technical and visual aspects in the e-module have supported the purpose of its use as a digital learning medium. The quality of the display is important because students interact with the e-module through digital devices, so the information needs to be arranged in a layout that is easy to follow. The use of proportional visual elements can also help students focus on information related to the material and practical steps. In addition, the structured presentation allows students to move from one part of the material to another

more easily so that the use of e-modules does not cause difficulties in terms of navigation and understanding of information. This shows that the e-modules developed have met the feasibility aspects of content, presentation, language, display, graphic design, and linguistics so that they are suitable for use in the learning process.

The following is a bar chart of the validation results of material experts and media experts. The percentage difference between the validation results of material experts and media experts shows that the content aspect receives a higher assessment than the media aspect, even though both remain in the feasible category. This difference can show that the suitability of the material with the learning objectives has been optimally met, while in the media aspect there is still room for improvement in the elements of display, design, or presentation. This condition is a natural part of the development process because learning media is not only assessed based on the truth of the material, but also based on how the material is packaged so that it can be used easily and attractively by students.



Figure 1. Validation Results of Material Experts and Media Experts

The results of the small-scale trial involving 10 students obtained a percentage of 88.25% with the category of strongly agreed. The results of the small-scale trial provided an initial idea that students could accept the use of e-modules as a learning medium. The percentages obtained showed that most of the aspects assessed by students were in accordance with the expectations of media use, both in terms of convenience and presentation of the material. At this stage, students' responses can also be preliminary information to see how the media is received before being used in a wider group. These responses are an important basis for seeing that the e-modules developed have the potential to be used in the burci (sequin) embroidery learning process.

Meanwhile, the limited-scale trial involving 33 students obtained a percentage of 88.50% with the category of strongly agree. The results show that students responded very positively to the e-module developed. The following is a bar chart of the results of the small-scale trial and the limited-scale trial. The percentage increase in the limited-scale trial compared to the small-scale trial shows that there is still high acceptance when the e-module is used by a larger number of students. These results show that the characteristics of the e-module can be accepted by students in the context of wider use, especially related to the ease of understanding the material and using the available media components. The consistency of positive responses in both stages of the trial strengthens the finding that the developed e-module has met the basic needs of students for learning media that is easy to use, interesting, and can support the learning process independently.

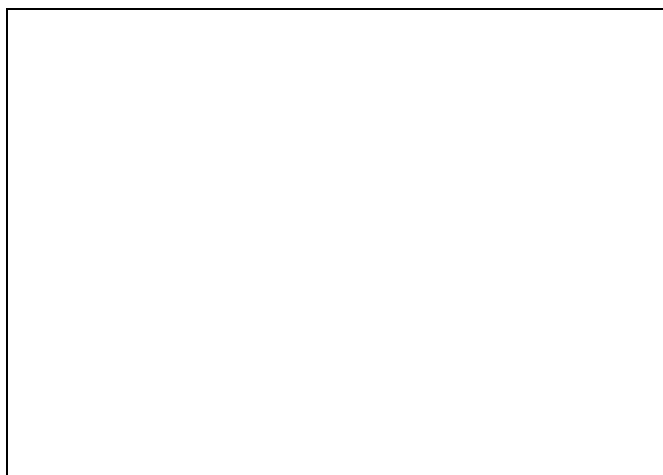


Figure 1. Results of Small-Scale Trials and Limited-Scale Trials

The results of the students' responses can be seen from the aspects of ease of use, an attractive e-module appearance, the clarity of the presentation of the material, and the existence of video tutorials that help understand the steps to make burci embroidery (sequin). The results of the study show that e-modules are not only suitable for use based on expert assessment, but can also support independent learning and increase students' interest in learning burci (sequin) embroidery materials. This finding is in line with previous research that stated that digital-based e-modules are able to increase the effectiveness of learning through the presentation of interactive, systematic, and easily accessible materials.

In the initial stage of the research, observations were carried out at SMK Muhammadiyah Imogiri to identify learning conditions, student characteristics, and learning media needs for burci embroidery materials. The results of the observation showed that learning still uses printed books and teachers' explanations, while digital learning media is not yet available. This condition causes students to have difficulty learning the stages of burci embroidery (sequins) independently. Based on the results of the needs analysis, the researcher developed a flipbook-based e-module that contains materials, pictures, video tutorials, exercises, and evaluations so that it can be used as a learning medium that is more interactive and in accordance with the characteristics of students.

The results of the material expert's validation showed that the e-module obtained a feasibility percentage of 100% with a feasible category. The assessment showed that the material presented was in accordance with learning outcomes, was arranged systematically, used easy-to-understand language, and was supported by a presentation that suits the needs of students. This result is in line with the research of Saski & Sudarwanto (2021) that learning media is declared feasible if the material presented is in accordance with the learning objectives, student characteristics, and competencies to be achieved. This finding is also supported by Mukarramah et al. (2026) that the feasibility of the material is influenced by the suitability of the content, the systematics of presentation, and the clarity of the language so that the media can be used optimally in the learning process. The high results of the assessment of material experts show that the material prepared in the e-module has a clear relationship between the learning objectives, the content of the material, and the competencies that students need to master. The gradual preparation of the material is also an important aspect because burci embroidery is a skill that requires precision in following each work procedure. The material presented systematically can help students understand the relationship between knowledge about burci embroidery and its application in practical activities. Thus, the feasibility of the material aspect is not only related to the completeness of the content, but also to the ability of the material to provide learning directions that students can follow in a structured manner.

The results of the validation by media experts obtained a percentage of 95% with a feasible category. The assessment shows that the e-module has met the aspects of display, graphic design, and language. The display aspect is an important part of the e-module because the presentation of practical materials is not enough to rely only on text descriptions. The use of images and tutorial videos provides a visual overview of the process being studied so that students can get more concrete examples before practicing directly. A structured display also helps students find the parts of the material needed without having to read the entire content of the e-module every time they repeat learning. Thus, visual design, regularity of presentation, and ease of navigation are related to the function of the e-module as a medium that can be used both in classroom learning and as a source of learning independently. The presentation of material in the form of flipbooks combined with images and video tutorials provides a more interesting learning experience than conventional media. The results of this study are in line with E. Saputra et al., (2026) that learning media with a good visual appearance and easy navigation will improve the quality of learning. Sugiharni (2018) also explained that learning media that meets the aspects of interface design, graphics, language, and ease of use has a high level of feasibility to be applied in learning.

The results of the trial showed a very positive response to the e-module developed. In the small-scale trial, the percentage was 88.25%, while in the limited-scale trial it was 88.50%, both of which were in the category of strongly agree. Students assessed that the e-module has an attractive appearance, the material is easy to understand, the video tutorial helps to understand the steps of embroidery burci (sequin), and it is easily accessible for independent learning. The results show that the e-module is not only feasible based on expert assessment, but also well received by students as a learning medium. These findings are in line with Khaerul et al. (2025) that the development of e-modules in the Fashion Skills program can be directed not only to produce valid and practical teaching materials, but also to support students' independence and learning outcomes. The positive responses given by students show that e-modules can be accepted as a medium that suits learning needs. Ease of use allows students to access the material without always having to rely on the teacher's explanation, while the presentation of images and videos provides visual assistance when students have difficulty understanding the practical steps. This condition is important in learning embroidery because each stage of the work requires precision and understanding of the procedures that must be carried out. Students can also repeat certain material if they do not understand a stage, so that the learning process does not only take place during learning with the teacher, but can be continued independently according to the needs of each student.

The positive response of students also showed that the use of e-modules was able to help learn procedural material because students could learn each stage of embroidery through a combination of text, images, and video tutorials. The use of combinations of various forms of media in the e-module was also supported by Kurnia Yunita et al. (2022) that the Fashion Learning e-module can integrate videos, animations, and images as part of the presentation of learning materials. The systematic presentation of the material allows students to repeat learning as needed, thus supporting independent learning. Independent learning in the use of e-modules does not mean that students are fully learning without direction, but it provides opportunities for students to reorganize their learning process based on parts of the material that have not been mastered. Students can determine the parts that need to be relearned, pay attention to the available examples or tutorials, and then try to apply these steps in practical activities. This kind of learning pattern provides space for students to have greater control over their learning process while helping to accommodate differences in ability to understand practical materials. With the opportunity to repeat the material flexibly, e-modules can function as companion learning resources that complement the learning process that has been carried out with teachers. This is in line with Firdaus Damayanti & Prihatina (2022) that interactive e-modules can combine materials, video simulations, evaluations, and supporting features to facilitate students in learning independently. This finding is in line with Saputra (2026), who stated that multimedia-based learning media can improve students' understanding of procedural materials through systematic information presentation.

Cahyaningsih & Sofyan (2021) also explained that digital learning media is able to create a more meaningful learning experience and increase student involvement during the learning process.

Based on the overall development results, the success of the e-module is not only seen from the high results of expert validation, but also from the students' acceptance of the media used. The suitability of the material, the quality of the display, the ease of use, and the existence of images and video tutorials complement each other in forming a more structured learning experience. This shows that the development of learning media needs to consider the relationship between the content of the material and the way the material is delivered to students. In skill materials such as burci embroidery, media that is able to provide information while showing the process of working is important because students need to understand concepts and procedures simultaneously before being able to apply them in practice. The results of the study show that the e-module embroidery burci (sequin) developed meets the criteria for feasibility based on the assessment of material experts and media experts and obtains a very good response from students. The e-module developed is suitable for use as an alternative learning media for the selected subject of class XI Fashion Etiquette at SMK Muhammadiyah Imogiri to support more effective, interactive, and independent learning.

4. CONCLUSION

This research succeeded in developing an e-module of burci embroidery (sequin) in the selected subject of class XI Fashion Planning using the Four-D (4D) development model. The e-module developed was declared very feasible based on the results of validation by material experts and media experts, and received a very good response from students. The findings of the study show that the presentation of material combined with pictures, video tutorials, exercises, and evaluations in the form of flipbooks is able to support more interactive, easy-to-understand, and encourage student learning independence. The burci embroidery e-module can be used as an alternative learning media for selected subjects in Vocational High Schools and has the potential to support the development of digital learning media in other practical materials.

AI USAGE STATEMENT

During the preparation of this manuscript, the authors used ChatGPT to assist with language editing, improving sentence clarity, and refining the academic presentation of the manuscript. All AI-assisted content was reviewed, verified, and revised by the authors. The authors take full responsibility for the accuracy, interpretation, originality, and final content of the manuscript.

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