



Development of Plain Weaving Module with Non-Machine Loom Based on Sigil Application for Vocational Schools

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ABSTRACT

This research is motivated by the rapid development of Information and Communication Technology (ICT) which encourages innovation in the development of plain weaving teaching materials with Non-Machine Looms (ATBM) in SMK. ICT allows the presentation of teaching materials in the form of e-modules that are interactive through images, videos, and animations, and can be accessed through computers, laptops, or cell phones. The purpose of this study was to develop a Sigil application-based plain weaving module for vocational students. The method used is Research and Development (R&D) with the planning, production, and evaluation (PPE) model. Data collection techniques included interviews, documentation studies, expert assessments by two material experts and two media experts, as well as limited trials by five students of the Batik and Textile Creative Craft Expertise Competency. The results showed that this Sigil-based module is very feasible to use as teaching material because it is systematic, equipped with supporting media, easy to understand, and flexible to access.

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1. INTRODUCTION

Currently the world has entered the era of the industrial revolution 4.0 which is characterized by the development of Technology and Communication (ICT). The development of ICT has given birth to a new concept that has caused significant changes in several fields, one of which is renewal in the field of education towards various aspects of learning. The form of renewal carried out in the context of optimizing education to welcome the era of the industrial revolution 4.0 is the establishment of an education digitization program or better known as a networked learning system (Anggraini & Sukardi, 2016).

Vocational High School (SMK) is a level of education that has an important role in efforts to improve human resources (HR) who have expertise, abilities, and skills so that graduates can develop performance while in the world of work. The learning process in SMK adheres to a dual system, namely theory and practice learning (Irwanto, 2020). Plain weaving with ATBM is the subject matter of weaving subjects studied at the Vocational Program of Creative Crafts Batik and Textile Vocational School. Learning plain weaving with ATBM in SMK requires teaching materials that are closer to the real situation and can be used in the network learning system independently by students so that students can easily master the knowledge and skills about plain weaving with ATBM.

The utilization of ICT in learning provides innovation in the presentation of teaching materials. One form of teaching material that can be used and contains material about plain weaving with ATBM is an electronic module based on Sigil application. The development of Sigil application-based modules produces modules in electronic form that contain material accompanied by media such as audio, video, and animation that allows students to learn independently without having to depend on teachers because they can be accessed using media such as computers, laptops, cellphones, and others (Putri & Purmadi, 2020). The use of digital modules as teaching materials is considered interesting, easy to use, and useful for students (Wijayanti et al., 2016).

2. METHODS

This research uses the Research and Development method and uses the PPE model which consists of two stages, namely Planning, Production, Evaluation. The PPE implementation stage is in accordance with the objectives of developing a plain weaving module with Sigil application-based ATBM for SMK.

The participants involved in this study were ten people. One person as a resource person during the interview, two media validators, two material validators, and five students as limited trial participants.

2.1. Research Instruments

The instruments in this study used interview guidelines, documentation study sheets, expert judgment validation sheets, and limited trial sheets. Interview guidelines contain guidelines for conducting interviews with weaving subject teachers in SMK to obtain information related to the availability of teaching materials on the subject matter of plain weaving with ATBM in schools.

Documentation study is a data collection tool used in studying documents related to research. The documents studied were in the form of syllabus and teaching materials for weaving subjects. The expert judgment validation sheet was given to material experts and media experts as a data collection tool related to the feasibility of the module. The limited

trial sheet was given to students to find out the students' response to the module made by the researcher.

2.2. Data Analysis Techniques

Data analysis techniques carried out in this study are data reduction, data display, data validation, revision, and data presentation (Oksa & Soenarto, 2020). Data reduction is done to summarize all data generated in the research to provide a clearer picture and focus on research needs. Data display is done to describe in general the data obtained in the field. The data is then described to make it more systematic and easy to understand. The data validation stage is the stage of assessing the product carried out by material and media validators. Validators will provide input on product deficiencies for enrichment so that the expected product service is obtained. The revision stage is a stage carried out after obtaining validation results if the validation results do not reach the standard. Revisions are made to improve the product according to the suggestions and input given by the validator.

The percentage of data in this study is to calculate the results of expert judgment and limited trials by calculating the percentage of answers in the validation sheet and limited trials to see the frequency value of answers. The formula used to calculate the percentage of data is as follows:

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

Description:

P : Percentage
 $\sum x$: Number of scores obtained
 $\sum xi$: Total ideal score
 100% : Absolute number

The following is the interpretation of the data used in this study referring to the research criteria which can be seen in **Table 1**.

Table 1. Assessment Qualification Criteria

No	Validation	Level Criteria
1.	81%-100%	Very Feasible
2.	61%-80%	Feasible
3.	41%-60%	Fairly Feasible
4.	21%-40%	Inappropriate
5.	0%-20%	Very Inappropriate

The assessment qualification criteria are adjusted to the research that researchers will carry out as follows:

- 81%-100%: Plain weaving module with ATBM based on Sigil application is very feasible to use
- 61%-80%: Plain weaving module with ATBM based on Sigil application is feasible to use
- 41%-60%: Plain weaving module with Sigil application-based ATBM is quite feasible to use
- 21%-40%: Plain weaving module with Sigil application-based ATBM is not feasible to use
- 0%-20%: Plain weaving module with Sigil application-based ATBM is not feasible to use.

3. RESULTS AND DISCUSSION

The findings in this study refer to data obtained through several stages in the study, namely the needs analysis stage, module development, expert judgment, and limited trials. the discussion that will be described in this study consists of data on the results of needs analysis, the development of plain weaving modules with Sigil application-based ATBM, expert judgment results, and limited trial results. the findings are described as follows:

3.1. Results of Needs Analysis of Development of Plain Weaving Module with Sigil Application-Based ATBM for Vocational Schools

Data related to the needs analysis of the development of plain weaving modules with Sigil application-based ATBMs were obtained by researchers based on needs analysis through interviews and documentation studies. The interview was conducted with one of the weaving subject teachers at SMK Negeri 14 Bandung. The results of the needs analysis showed that plain weaving learning with ATBM at SMK Negeri 14 had been carried out on a scheduled basis in accordance with the weaving subject syllabus. The discussion studied on the subject matter of plain weaving with ATBM is in accordance with the basic competencies of weaving subjects in the 2013 curriculum.

Teaching materials used in learning plain ikat weaving with ATBM in the form of printed books that are only used by subject teachers so that the learning process is still teacher-centered, this is not in line with the opinion of (Baun et al., 2024) who argues that learning is currently developed to be student centered or student-centered which involves student activeness and directs students to explore the potential that exists in themselves. The available teaching materials also still discuss learning materials in general. The content of this teaching material discusses the theory of textile crafts in general such as weaving, printing, sewing and batik. Teaching materials have used communicative and consistent language and have contained knowledge concepts accompanied by pictures and steps for making products but have not kept up with ICT advances and the demands of digitizing education. Existing teaching materials are not yet in electronic form and have not been able to insert video and audio that can clarify and strengthen the content of the material, especially in the discussion of techniques and stages of making plain weaving with ATBM. In addition, teaching materials do not contain final objectives, summaries, and exercises in accordance with basic competencies.

A complete and specialized module of plain weaving with ATBM is not yet available in SMK. The information provided by Mr. Drs. Anang Bisawarno shows that module development is needed in the learning process of plain weaving with ATBM in SMK. In line with the opinion (Salsabilla et al., 2023) which states that teaching materials in the form of modules are designed to assist teachers in providing learning experiences that involve mental and physical processes through interactions between students, students with teachers, the environment, and other learning resources in order to achieve the expected competencies.

Modules can be developed into electronic form using the Sigil application. The development of Sigil application-based modules can be used as an independent learning resource on the subject of plain weaving with ATBM because it combines the 2013 curriculum with a student centered approach and applies ICT developments and digitization of education in accordance with the opinion (Putri & Purmadi, 2020) which suggests that the development of Sigil application-based modules can produce modules that contain text, images, audio, and video that can be read on a computer, laptop, tablet, or smartphone.

3.2. Development of Plain Weaving Module with Sigil Application-Based ATBM for Vocational Schools

The development of plain weaving modules with ATBM based on Sigil applications aims to add references to teaching materials that are attractive, effective, and efficient and can support the advancement of ICT and the era of digitalization of education in weaving learning in SMK. in line with the opinion of (Sujaya *et al.*, 2023) which states that digital modules are durable, not weathered by time, cheaper production costs, equipped with video and audio, and can be accessed anywhere and anytime so as to make it easier for students to learn material concepts independently.

The development of plain weaving modules with ATBM based on Sigil applications begins with determining the material and compiling a module framework in Microsoft Word applications, making flowcharts, making videos, and making modules in Sigil applications. The material to be developed in the module is in accordance with the basic competencies of weaving subjects on the subject of plain weaving with ATBM curriculum 2013. The module framework used refers to the module preparation guidelines according to the Directorate of High School Development (2017), namely the module cover, preface, table of contents, module position map, glossary, introduction which contains (basic competencies and indicators of competency achievement, description, time, and instructions for using the module), learning which contains learning activities (objectives, material descriptions, summaries, assignments, daily assessments, and self-assessments), evaluation which contains (final assessment, attitude, knowledge, and skills assessment sheets, and final assessment answer keys), cover which contains (bibliography, appendix list of images and table list).

The flowchart was made to facilitate researchers when compiling the module, it refers to (Kusumawati *et al.*, 2024) which states that the flowchart is a graphic depiction of the steps and sequences of module preparation described in the form of a chart so that the explanation of the preparation steps is more understandable. The video inserted in the module aims to provide reinforcement of the material presented. The videos made in this study are 1) video introduction to non-machine looms, 2) video of the process of making plain weaving with non-machine looms, 3) video tutorial of basic macrame knots, and 4) video of finishing plain weaving with macrame technique.

The video making step begins with making a script which will then be described in the form of a storyboard. Storyboard is a series of image sketches arranged sequentially according to the script. The next stage is the video production stage in the form of shooting, then the results of the shooting will be edited in the form of combining images with sound and music (mixing) and dubbing activities in accordance with the script and storyboard that has been made before (Lestari *et al.*, 2019). The module development stage into digital form with the .epub extension was carried out using the Sigil application. The Sigil application was chosen as an application for making plain weaving modules with ATBMs because it can insert images, videos, and audio and can save module files with the .epub extension that can be read with several reader applications. Features available in the Sigil application can be used to add module covers, editor metadata identity, table of content, add images, add backgrounds, links, quizzes, and add videos and save the final file in .epub format. Another opinion expressed by (Fradila *et al.*, 2021) states that the Sigil application has many advantages, namely practical and easy to use for developing teaching materials.

The results of the development of plain weaving modules with Sigil application-based ATBMs are in the form of files with an .epub extension that can be stored on Google Drive and can be published on Google Chrome. File links can be copied and shared with teachers and students so they can be easily downloaded and stored on laptops, computers or cell phones. In line with the statement put forward by the Ministry of Education and Culture

(2017) that the Sigil application is an editor software for e PUB which is opensource that can support the import of video and audio files. The .epub extension file reader application that supports video and audio operations on modules includes Radium on Google Chrome, Supreader and Lithium on Android, iBooks on iOS and various other devices. The plain weaving module with the Sigil application-based ATBM is equipped with a manual book that can be used as a manual for using the module. The manual book contains how to operate the plain weaving module with Sigil application-based ATBM with several reader applications namely Radium, Lithium, and Supreader starting from how to install the reader application, add module files, and how to use the module.

3.3. Results of Expert Judgement and Limited Trial of Plain Weaving Module with Sigil Application-Based ATBM for Vocational Schools

Expert judgment is carried out by academics in the field of material and academics in the field of media in that product validation can be done by asking experienced experts to assess the new product designed.

Overall, the total average of the module assessment by academics in the field of material has a percentage of 97% with very feasible criteria. The module is declared very feasible to use because the module is arranged systematically, the material in the module is in accordance with the basic competencies to be achieved, has the breadth and depth of material, image and video illustrations in accordance with the material. The assessment is which states that one of the principles that must be considered in choosing teaching materials is the principle of relevance, namely teaching materials must be relevant or related to competency standards and basic competencies, besides that teaching materials must also be sufficient or adequate, meaning that teaching materials should not be too little or too much because if too little will make it difficult for students to understand the objectives of the learning, while if too much will only result in inefficiency of time and energy.

Assessment of plain weaving modules with ATBM in terms of media is seen from two aspects, namely aspects of module components and module presentation. The validation results of the module components get an average percentage of 100% and the results of module validation in the presentation aspect get an average percentage of 84.37% with very feasible criteria. Assessment of plain weaving modules with ATBM based on the aspects of the components and presentation get very feasible criteria from media validators because the module is arranged systematically in accordance with the constituent components, the appearance is attractive, the text or writing on the module can be read clearly, the display of images and videos is clear, the video contained in the module is easy to operate, and the module is easy to use that the module must be made in an attractive package in order to arouse the reader's interest to see and explore further the contents of the module.

Module assessment based on the results of limited trials by students as a whole get an average percentage of 100% with very feasible criteria because the plain weaving module with ATBM developed contains complete material in accordance with the competencies to be achieved, easy to understand, attractive and not boring module display. The form of the module that can be stored in a cellphone or laptop makes it easy for students to access it anywhere and anytime so that the learning process can be done efficiently. The module is also equipped with images, videos, and audio so that it can provide reinforcement of the material presented.

4. CONCLUSION

Teaching materials used in plain weaving learning with ATBM are still limited and do not contain complete material, so it is very necessary to develop plain weaving modules with ATBM Sigil application for SMK as teaching materials that can be used by teachers and students. The development of information and communication technology and the era of digitalization of education provide alternatives to the use of learning tools in digital form to become the basis for developing plain weaving modules with ATBM based on Sigil applications.

The development of plain weaving modules with ATBM based on Sigil applications begins with determining the material, compiling draft modules, making videos, entering draft modules in Sigil applications, inserting videos, and saving modules with the extension.epub. The material determination stage was carried out by looking at and identifying the weaving subject syllabus and some teaching materials used in weaving learning, then the researcher compiled a draft module using the Microsoft Word application. The next stage is to make a video that will be inserted in the module. The last stage of developing a plain weaving module with the Sigil application-based ATBM is converting the draft material from the microsoft word application into the Sigil application with the .xhtml extension, adding image illustrations, inserting videos, adding links, giving background colors, adding covers, adding metadata in the form of editor identities, then saving the finished module with the .epub extension.

The feasibility test was carried out through expert judgment to four experts consisting of two academics in the field of material and two academics in the field of media and limited trials by five students. The results of expert judgment and limited trials showed that the plain weaving module with ATBM based on Sigil application was in the criteria very feasible to be used in learning in SMK both in terms of material, language, components and presentation.

AUTHORS' NOTE

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

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