



Xelf-Based Distance Interactive Practice Learning Media to Improve Mechanical Ability of Vocational School Students

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Abstract. This study aims to: (1) develop XELF-based interactive learning media for basic competencies of starter system improvement practicum. (2) develop and test the feasibility of XELF-based interactive learning media for basic competencies of starter system improvement practicum. This study uses a research and development strategy. Thiagarajan developed the 4D research and development method, which was used in this procedure. There are four stages of research procedures used in this study: (1) the definition phase, (2) the design phase, (3) the development phase, and (4) the dissemination phase. Questionnaires were distributed to material experts, media experts, limited field trial participants as many as 10 students, and wide field trial participants up to 52 students. The results of the questionnaire were then analyzed to uncover the feasibility level of the learning media. Added to this, the experiment took place at SMKN 2 Pamekasan. The XELF application-based starter system was assessed by the material expert and it attained an average score of 3.58 with a very good category. The assessment by the media experts resulted in an average score of 3.30 with a very good category. Meanwhile, the assessment from the limited field trial resulted in an average score of 2.93. Lastly, the assessment from the wider field trial resulted in an average score of 3.43 with a very good category.

Keywords: XELF-based · media · mechanical ability

1 Introduction

The State of Indonesia has several goals stated in the 1945 Constitution, one of which is to educate the nation's life, by improving the quality of education for the better so that it can produce high-quality human resources [1]. Efforts to educate the nation's life can be pursued through formal education. Vocational High School (SMK) is a formal education that prepares students to work in a particular field [2]. SMKN 2 Pamekasan is a vocational education which has nine expertise competencies, one of which is Light Vehicle Engineering. One of the basic competencies that have high difficulty and must be mastered by students is improving the starter system.

Based on observations, many students have difficulty understanding the material presented by the teacher. Student evaluation data in 2020 describes the average student score of 66.5 while the Minimum Graduation Criteria for students is 75. Students who get scores above the KKM are only 14 students, the remaining 30 students get scores less than the KKM. The low score is because students do not focus when learning and teaching activities take place as in the example.

- 1) students often do their own activities so that learning is not conducive;
- 2) the learning process is still centered on the teacher;
- 3) learning media that do not attract students' interest to focus on learning activities [3].

The limitation of this research only includes the problem of not attracting the learning media used by the teacher, so that students cannot focus on the substance of the learning delivered by the teacher. The current study focuses on the development of interactive learning media based on XELF on the basic competencies of starter system maintenance practice. With the developed XELF interactive learning media, it is hoped that it will facilitate the focus of students in learning and increase the value of students' evaluations on the basic competencies of starter system improvement practices. XELF is a program developed from Adobe Flash which is useful for making it easier for someone to develop a program [4]. The development of interactive learning media is considered very important because distance learning is still in effect at SMKN 2 Pamekasan considering the high number of Covid-19 spreads. From the previous studies on the development of electronic-based learning media, XELF-based media is very appropriate to be implemented in learning, [5]-[7].

As explained above, the problems to be discussed are formulated as follows: 1) how is the process of developing interactive learning media based on XELF to increase the practical value of students' basic competence in maintaining the starter system at SMKN 2 Pamekasan. 2) What are the results of the development and feasibility of XELF-based interactive learning media? Flash to improve the practical value of students' basic competence in the practice of maintaining the starter system at SMKN 2 Pamekasan?

2 Method

This study employs the Research and Development (R&D) design with a 4D development model consisting of 1) Defining, 2) Designing, 3) Developing and 4) Disseminating [8], [9]. The 4D development model has a systematic procedure according to the problem that is the background of this research. The process of developing XELF-based interactive learning media is presented as follows Fig. 1.

The define stage aims to determine and identify the need for developing the context of teaching materials such as, 1) curriculum analysis, 2) students' need analysis and 3) material analysis. At the design stage, the researcher designs a prototype in the form of a storyboard, so that a research design framework can be developed. Researchers have provided teaching tools in the form of teaching materials that will be input into the media, media evaluation instruments, software and hardware used in making XELF-based interactive learning media. The design stage includes: 1) preparation of assessment

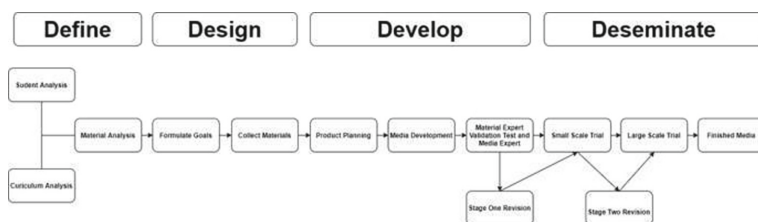


Fig. 1. Development Procedure Chart with 4D model.

parameters, 2) format selection, 3) media selection, and 4) product planning. The next stage is the development stage with the process, 1) media development, 2) validation test of material experts and media experts, 3) revision of stage I, 4) small-scale trial, 5) revision of stage II, and 6) large-scale trial. The last stage is dissemination, this stage the product will be implemented directly on the actual target.

The research took place at SMKN 2 Pamekasan in the odd semester of the 2020/2021 academic year. The research participants are fifty students of Grade XII in Motorcycle Engineering and Business (TBSM) expertise competence. Ten students will be tested on a limited scale while the other forty students will be tested on a wide scale. This study uses several data collection techniques, namely observation, interviews, and questionnaires [10]. The instruments are divided into three types, namely, 1) media expert instruments, which have a role to measure: a) media operation, b) media display, and c) writing; 2) Material expert instrument as a measure of: a) material suitability and b) material quality; 3) student instruments, which function to assess interactive learning media through aspects: a) benefits, b) convenience, c) appearance and d) writing [11]. This study uses a construction validity test by asking experts to provide opinions about the instrument made.

3 Findings and Discussion

3.1 Findings

The development of the interactive learning media follows the steps of the 4D development model: 1) Defining, 2) Designing, 3) Developing, and 4) Disseminating. In the define process, some information was presented, that: 1) curriculum analysis: the curriculum used by TBSM SMKN 2 Pamekasan is k-13; 2) student analysis: students of SMKN 2 Pamekasan are able to develop individual thinking concepts; 3) material analysis: basic competence of starter system repair practicum has several sub-materials such as: a) starter system components, b) starter system working, c) starter system malfunction diagnosis, and d) starter system troubleshooting. The sub-materials have been inputted into the XELF-based interactive learning media that the author has developed; 4) analysis of learning objectives.

The design process presents information: 1) preparation of assessment parameters: material expert evaluation questionnaires, media expert evaluations and student response questionnaires; 2) format selection: the instructional media format is designed according to the media needs that have been applied in the define stage by taking into account



Fig. 2. Interactive Learning Media Menu Page Display

Table 1. Material Expert Assessment Data.

Aspect	Score	Category
Material suitability	3.5	Very Worthy
Material quality	3.7	Very Worthy
Average	3.6	Very Worthy

Table 2. Media Expert Assessment Data.

Aspect	Score	Category
Media operations	3.6	Very Worthy
Appearance	3.8	Very Worthy
Write	3.34	Very Worthy
Average	3.58	Very Worthy

theoretical studies; 3) media selection: this interactive learning media contains images, videos and animations, in its manufacture it is supported by using software such as Corel Draw X7 for image creation, while windows movie maker for making animated videos uses video synfig software; 4) Storyboard: contains material options with the appropriate amount according to the basic competence of starter system repair; 5) Product planning: In making interactive learning media, there are several steps in the development of some of these steps to produce prototypes, including: a) making screen displays, b) coding, c) film trials, and d) publishing. Interactive learning media has several pages according to the material, one display of the material is as follows (Fig. 2).

The development process provides the following information (Tables 1, 2, 3 and 4):

The information provided by the dissemination process is that the dissemination stage is the final stage in the creation of interactive learning media. After it is ready, the packaging process is completed by creating a Compact Disc (CD) and uploading it to the SMKN 2 Pamekasan website.

Table 3. Limited Field Trial Data.

Aspect	Score	Category
Profit	2.85	Worthy
Convenience	3.20	Worthy
Appearance	2.90	Worthy
Text	2.80	Worthy
Average	2.93	Worthy

Table 4. Field Trial Data Area.

Aspect	Score	Category
Profit	3.40	Very Worthy
Convenience	3.30	Very Worthy
Appearance	3.45	Very Worthy
Text	3.50	Very Worthy
Average	3.41	Very Worthy

3.2 Discussion

The purpose of the current study is to create interactive learning materials and assess their feasibility for starting system repair practicum's fundamental competencies. The 4D paradigm of defining, designing, developing, and disseminating was used in the product development process for the interactive learning medium. The first step in the development process is to identify potential problems at TBSM SMKN 2 Pamekasan. The collected problems are then analyzed, and research findings are used to create solutions, such as the need to create learning media based on starter system materials. The first step in creating learning media is the defining stage, which involves initial analysis, curriculum analysis, student analysis, material analysis, and goal development.

The design stage begins after all stages in the define stage are completed. At this stage, the evaluation criteria are prepared, the format is chosen, the media (program/software) that will be utilized is chosen, and the basic design of the learning media is made. Assessment parameters include making evaluation questionnaires for material and media experts, as well as response questionnaires to determine student responses to learning media. The assessment parameters include curriculum analysis, student analysis, material analysis, and goal formulation. The design stage begins after all stages in the define stage have been completed. The preparation of the assessment parameters, the format selection, the selection of the media (program/software) that will be used, and the making of the initial design of the learning media are all done at this stage. Assessment parameters entails making an evaluation questionnaire of material and media experts, as well as questionnaire responses to determine student responses to learning media. Selecting format or style of learning media presentation follows the creation of the assessment parameters, and is based on the information gathered at the defining stage. From the data in the defining stage, the most suitable format for learning media is tutorial. The tutorial format was selected as the material is delivered in stages so that it is hoped that students can find it easier to understand the material. Text, graphics, animation, video, and audio are the different learning media content formats that are used. In the evaluation

question format, a multiple-choice format was chosen with two types of questions with assessment feedback at the end of the session and matchmaking questions.

The next activity is the selection of media in the form of programs/software that will be used to create learning media, where in this activity the XELF program/software is chosen as the medium. The reason for choosing XELF is that this program can combine text, images, animation, video, and audio, besides that the output of this application can be in the form of “.exe” so that it can be run on a computer with a flash player in it. The next activity after the selection of the initial design of interactive learning media. This design begins with making flowcharts and storyboards, which is then followed by making learning media. Making learning media starts with making interfaces, coding, and publishing. The results of this initial design stage are learning media for starter system materials which have five main materials, namely (1) The user manual menu contains instructions for using learning media through the description of the functions of each button. (2) The learning material menu contains learning materials presented in forms of texts, images, animation, video, and audio. (3) The menu of evaluation questions contains evaluation questions for all materials in the form of multiple choice.

The finished learning media is an interactive learning media with prototype status as the result of the original design. In addition, the learning mediums go into the final stages of development. At this point, material specialists and media experts will validate or evaluate the learning media for starter system material that is still in prototype status. The data from the validation outcomes are then utilized as a guide for developing educational media. The learning medium that has been improved enters the dissemination stage after going through the improvement procedure. At this stage, the finished learning media application is packaged into a Compact Disc (CD). The results of the packaging will be distributed in a limited way to schools, namely at SMKN 2 Pamekasan. The XELF-based learning media that the author made has advantages compared to other learning media. The advantages of learning media that the author makes are as follows: learning media contains material in the form of descriptions, simulations, and videos; choose evaluation questions in multiple choice and simulation questions; the size of the learning media file created by the author is small and does not require a large storage location; can be used by all types of computers; and this learning media is a portable application that does not need to be installed. Drawbacks of XELF-based learning medium It is still in separate form between one.swf file and another, not yet integrated; and it is new media that has not been tested, therefore more research is needed to identify the effectiveness of learning. The author’s learning medium contains flaws due to budget and timing constraints.

4 Conclusion

The technique of making practical learning materials for basic competence in improving the starter system at SMKN 2 Pamekasan is designed using a four-stage adaptation 4D development model: (1) defining phase, (2) the designing phase, (3) developing phase, and (4) the distribution phase are four stages. XELF application-based learning media development product with a capacity of 91.6 MB and “.exe” format. The expert assessment of learning media sources to increase the basic competence of the starter system practicum resulted in an average score of 3.58 with a very good category. In

the very feasible category, the findings of the expert assessment for learning media to improve the practice of basic competence in the starter system got an average score of 3.30. In the eligibility category, the findings of the limited field trial assessment of basic competence learning media for improving the starter system practicum got an average score of 2.93. The results of the evaluation of a larger field trial for learning media to improve the basic competence of the starter system practicum gained an average score of 3.41 with a very good category. This study really important because teacher can be easily to teach practicum material with distance study, With the existence of this interactive learning media, students can be more assisted and focused in learning so that it can be ascertained that the value of students will increase in the starter system improvement practicum.

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