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DEVELOPMENT OF LEARNING MEDIA FOR MOTORCYCLE ELECTRONIC FUEL INJECTION SYSTEM BASED ON FLIP HTML5 AT THE DEPARTMENT OF MOTORCYCLE ENGINEERING AT SMK SUMBER DAYA BEKASI

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Abstract

The development of technology and information is very rapidly growing and influential in the world of education. Technology and information in learning are very helpful for educators in utilizing technology facilities to prepare for the learning process or when the learning process takes place. This study aims to develop Flip Html5-based e-book learning media for motorcycle Electronic Fuel Injection system material. This research uses the Research and Development (R&D) method using the 4D development model in its development, which must go through an expert assessment as a successful process of testing the feasibility of the developed product before it is later tested and used. The results of the feasibility test of Flip Html5-based e-book learning media get a percentage of 96.36% from material expert validators, 94.54% from media expert validators, and 89.23% from the results of the media feasibility test of 35 students. So, the results that have been carried out can be concluded that the Flip Html5-based e-book learning media for Motorcycle Electronic Fuel Injection system material developed in this study are "Very Feasible" to be used as a learning resource for students in learning.

Key words: Learning Media, Motorcycle Electronic Fuel Injection System, Flip Html5, Motorcycle Engineering.

INTRODUCTION

The curriculum in education has a very large role in determining the progress of an education, the curriculum is a lesson plan, teaching materials, learning experiences that have been programmed in advance. The curriculum is a reference for every educator in implementing the learning process (Ariga, 2023). Education has a very important role in life, because an advanced education system has a major positive impact. In the context of education, there are aspects that are inseparable and very important. One of them is the existence of a curriculum (Pahmi & Sukatin, 2020). Curriculum changes cannot be separated from its nature which must always be dynamic. The curriculum will always change and adapt to the demands of the times (Santika et al., 2022). Curriculum development and improvement must continue to be carried out in order to adapt to the progress of science, technology, and the ongoing development of society (Khoirurrijal et al., 2022).

The development of technology and information is very rapidly growing and influential in the world of education. Technology and information in learning are very helpful for teachers in utilizing technological facilities to prepare for the learning process or when the learning process takes place (Anggraeni et al., 2023). In the field of education, technology makes the learning process easier. Along with the development of science and technology, the development of education is also progressing (Dewantara & Sulistyarini, 2023).

In this fast-paced era, educators must have creativity in motivating students so that the learning process becomes fun and not boring. In addition, educators are also expected to help students understand learning materials more easily (Muhammad Ikhsan et al., 2021). In addition to motivation and interest in achieving learning success, one important aspect is the use of appropriate and interesting media. The existence of interesting learning media can create a pleasant learning atmosphere, arouse enthusiasm, and motivate students to learn more actively. Learning media has an important role in clarifying material information conveyed in learning, which in turn can create a conducive learning environment and improve student achievement (Fajri et al., 2022). Therefore, learning media is one of the factors that play an important role in the learning process. In learning, teachers usually use learning media as an intermediary in delivering material so that it can be understood by students (Wulandari et al., 2023).

One of the software that can be used to create learning media is using Flip Html5 software, e-modules can be opened via the internet online. With technology, educators can apply new innovations in a program, namely by creating e-modules through Flip Html5 software which can include images, text, videos, and other information

media (Saputra et al., 2022). To make teaching materials that are more attractive to students and in digital form, educators can use the Flip Html5 application (Vikiyanto et al., 2023). Digital modules that include video, audio, slide shows, links and animations, can be easily created by educators with a flipbook software called Flip Html5 (Mardasari et al., 2021). So it can be concluded that the Flip Html5 application is an application that can make learning media more interactive. In it, not only text is presented but can be added in the form of video, audio, and even animation which can make learning media more lively and active.

Research researched by Reztanty et al. (2022) with the research title "development of e-modules for making kebaya in class XII Fashion 2 SMK Negeri 2 Jombang". The results of the study show that the use of e-modules in the learning process can increase the presentation of the level of completeness of students in learning outcomes by 97%, with a presentation of the product feasibility level of 95%. It can be concluded that the development of e-modules can generate interest in learning and obtain an increase in student learning outcomes by using digital e-module-based media.

The learning development model will be used to create and evaluate products that will be used in education. This model is used for the development of define, design, develop disseminate (Four -D). Due to the easy-to-understand and detailed presentation, the use of the 4D model is widely used, because the description is explained in detail at each step, making it easier for developers to understand the development procedure (Rahmawati et al., 2023).

Based on the results that have been observed by researchers on educators of the Motorcycle Engineering productive expertise program at SMK Sumber Daya Bekasi, information is obtained that in the learning process activities, educators mostly use the lecture method and are assisted by the use of power points as a tool in the learning process. This method causes students to get bored more easily in participating in learning, based on the results of observations that have been made, the number of students who feel bored is 70%. coupled with the existing teaching modules that are still monotonous because they still use printed media as a teaching resource and there are still limited learning media that explain in detail about troubleshooting material, reading damage codes, handling damage codes and troubleshooting handlers. So that the learning delivered by educators is still limited and makes educators not master the material that has developed at this time. For the development of learning media as a support for the learning process, the author targets every student to feel it, so not only those who need it but for all students who are studying in the class Thus, it is necessary to develop learning media for teaching materials that are more complete, interactive, and interesting. By developing in the form of Flip Html5-based digital media in accordance with field needs. Researchers chose to use Flip Html5 because of the many interesting features in it, and in addition to using the Flip Html5 application, this learning media can be installed on every student's cellphone to make it easier to use it to make it more practical and interesting, in it is added video animations and images to support the learning process. In line with the research of (Suharsono, E., & Aryadi, W., 2018) The results of the study show that the results of learning with Flip Book Flash media to class XI TP A (experiment) are included in both categories, without Flip Book Flash media to class XI TP B (control) are included in the sufficient category and there is a significant difference between class XI TP A and class XI TP B, Therefore, the researcher uses Flip Html5 learning media with the aim of making the material presented more interesting so as to make improvements in student learning outcomes. In order to be able to increase knowledge of current technological developments in the automotive field, namely the Electronic Fuel Injection (EFI) system which can support the smooth learning process that is effective, efficient, and in accordance with what will be achieved by achievement indicators that have met the requirements of the Flow of Learning Objectives (ATP) which can support the process of learning activities carried out by educators.

METHODS

The concept in developing Flip Html5-based digital learning media on motorcycle Electronic Fuel Injection systems in productive subjects in the Motorcycle Engineering competency at SMK Sumber Daya Bekasi uses the Research and Development (R&D) research method. According to (Sugiyono, 2019) the Research and Development (R&D) research and development method is a research method used to produce certain products, and test the effectiveness of these products.

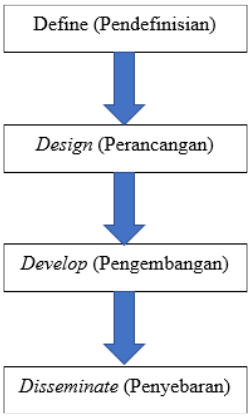

Figure 1. 4D Development Models

The 4D development model is a general development model for various types of learning media, which can be used to develop various types of learning media (Arkadiantika et al., 2020). The product development method used in this Flip Html5-based motorcycle Electronic Fuel Injection system learning media development research uses the Research and Development (R&D) research method which refers to the 4D development model. According to Sugiyono (2019) the 4D development model consists of 4 development stages, namely: Define, Design, Development, and Disseminate.

RESULTS AND DISCUSSION

This research was conducted on grade XI students on Motorcycle Engineering Expertise Competencies in productive subjects, namely the Motorcycle Electronic Fuel Injection System using the Research and Development (R&D) method which refers to the 4D development model. According to Sugiyono (2019) the 4D development model consists of 4 stages of development, namely:

1. Define,
2. Design,
3. Development,
4. Disseminate.

Define results

This stage is to determine and define the needs in the learning process and collect various information related to the learning method to be developed, in this defining stage includes three steps, namely:

The results of the initial analysis that researchers found through observations and interviews with one of the educators majoring in Motorcycle Engineering obtained the results of the need for learning media that can attract students' interest in learning and make it easier for students to understand the material during the learning process. After obtaining data from the initial analysis, the next step is to identify the problems that exist during the learning process. Based on the results of interviews with educators at SMK Sumber Daya Bekasi, information was obtained that during the learning process the class management still used the lecture method. The media used in the learning process is still limited, namely conventional media or power point, there is no e-book learning media that can be used in the learning process. support the learning process in productive motorcycle engineering subjects. So that during the learning process it makes it difficult for students to master the material. Thus, digital learning media is needed in accordance with the needs of the field that can increase students' interest in learning and make it easier for students to master the material being taught. So, it is necessary to have learning media in the form of e-books in productive Motorcycle Engineering subjects that will support learning by students and facilitate the learning process.

The results obtained from this concept analysis are emphasized by adjusting the submatter that refers to the ATP of productive Motorcycle Engineering subjects, so as to get the results of the outline of the material that will be presented on the learning media to be developed.

The results of the learning objectives analysis have been formulated based on the identification of the expected objectives of the learning materials to be developed.

Design results

At this stage, the design of the learning media to be developed will be carried out. The following are the results of the design:

At this stage, identification of the material to be presented in the e-book is carried out, namely Motorcycle Electronic Fuel Injection System material in Motorcycle Engineering subjects, as well as determining the order of the material to be presented.

At this stage, the collection of existing teaching materials is carried out. Making an e-book design requires the use of a computer as the main tool. Researchers use the Canva application to write and design e-books which are then converted to the Flip Html5 online website. After the media is finished, it will be converted back into the 2-builder application.

Development results

After carrying out the stages of designing the development of learning media, the researcher conducted a product validation test on material experts, media experts, and student feasibility tests. The validation measuring tool is in the form of a non-test instrument using a Likert scale.

1. Validation results of material experts.

   The results of the validation of the subject matter expert get a total score of 53 and the expected total of the validation of the subject matter expert is 55, with this the eligibility percentage can be calculated as follows:

$$Eligibility\ percentage\ (\%) = \frac{53}{55} x\ 100\% = 96{,}36\%$$

2. Results of media expert validation.

   The results of the validation of media experts get a total score of 52 and the expected total of 55 media expert validation, with this the eligibility percentage can be calculated as follows:

$$Eligibility\ percentage\ (\%) = \frac{52}{55} x\ 100\% = 94{,}54\%$$

3. Media feasibility test results.

The results of the media feasibility test get a total score of 1874 and the expected total in the media feasibility test is 2100, with this the feasibility percentage can be calculated as follows:

$$Eligibility\ percentage\ (\%) = \frac{1874}{2100} x100\% = 89{,}23\%$$

Dissemination Results

This last stage has the goal of dissecuting research products for the learning process in productive subjects of Motorcycle Engineering. This will be done by uploading this product to google drive sugiar-to171810100@gmail.com and providing a barcode scan. E-book learning media can be accessed using applications on mobile phones and laptops using the following link:

https://simplebooklet.com/tekniksepedamotor.

Furthermore, this product will be distributed to class XI students of Motorcycle Engineering.

Figure 2. Link Barcode Media Pembelajaran

CONCLUSIONS

Based on the results of research on the development of e-book-based learning media in productive subjects of motorcycle Electronic Fuel Injection systems, it can be concluded as follows:

1. The results of the developed learning media are loaded in the form of Flip Html5-based e-books containing text, videos, images, and question links and this e-book learning media can be accessed online using cellphones and laptops. The development of this e-book learning media has passed the validation process of material experts and media experts. The results of the material validation test of e-book-based learning media get a percentage of feasibility of 96.36% with a very feasible category, and get a percentage of feasibility of 94.54% from media experts where it gets a very feasible category. So, it can be concluded that material experts and media experts state that e-book-based learning media in productive subjects are declared feasible for use in the learning process.
2. The development of Flip Html5-based e-book learning media in the productive subject of Motorcycle Engineering has been tested for feasibility to class XI Motorcycle Engineering students at SMK Sumber Daya Bekasi by getting a feasibility percentage of 89.23% with a very feasible category. So, it can be concluded that students stated that the Flip Html5-based e-book learning media in the productive subject of Motorcycle Engineering was declared very feasible to use in the learning process.

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