Development of E-Interactive Module Starter System Maintenance with Discovery Learning Model

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ABSTRACT: The development of ICT has influenced the development of learning media that are increasingly interesting and interactive. But there are still many students who have a low enthusiasm for learning, this can be seen with the number of students who rarely attend, do not focus on learning, lack of motivation to learn. Based on the results of observations and interviews, it was found that the learning of starter system maintenance for some students is difficult to understand learning, stammering time and study space, learning is only in the form of job sheet handouts and power point slides from the teacher, students only take notes and are confused when repeating lessons at home, lack of reference sources when making assignments, low interest and motivation in learning, teacher-centered learning, students are less active and cannot measure their learning outcomes independently so that it is indispensable learning by using e-modules. This study aims to develop learning media in the form of interactive e-modules for Starter System Care with a discovery learning model that meets the validity aspects of the media. The research method used is the development (R&D) of the 4-D model, including the Define, Design, Develop and Disseminate stages, but the Disseminate stage is not carried out. The results showed validity in the validation of learning media with Validator 1 of 91%, Validator 2 of 96% and Validator 3 of 83% with an average of 90% of very valid categories. In the validation of material in the e-module, the results on Validator 1 were 93%, Validator 2 96% and Validator 3 96% with an average of 95% very valid categories. Based on the results obtained, it shows that the learning media of the Starter System Care interactive e-module with the discovery learning model is feasible for students in learning.

Keywords: Development, E-Module, Interactive, Starter System Maintenance, Discovery Learning
INTRODUCTION

Technological developments and advances occur in almost all areas of Indonesian people’s lives. There is a field of education seen with the use of information technology in the learning process which is used to help students develop their abilities in the IT field, make it easier for teachers and create a learning atmosphere that is interactive, interesting, not boring, critical, and more efficient (Eiji & Gin, 2021).

Other uses of ICT (Information and Communication Technology) in the world of education such as for school administration, educators who use Information and Communication Technology (ICT) creatively and innovatively will make learning interesting and fun (Dubey, 2016). Pramunando & Yerimadesi (2019) stated that learning patterns and processes must make changes so that innovations occur in accordance with the times and technological advances. In the field of education, technology is used to improve the quality of education with a touch of information technology. Abiyoga & Rahmiati (2021) stated that the use of technology has advantages, namely making it easier for students to learn, feeling the benefits of technology, providing comfort and curiosity for students to achieve learning effectiveness.

The ability of students to capture the material provided by the teacher is an indicator of the success of the learning process (Yuliani & Saragih, 2015). The attention of the learner to the material is entirely the task of the educator. In general, students can interact directly with the teacher through teaching and learning activities, so that teachers are more flexible in providing material according to student characteristics (Day et al., 2018). Educators can instantly understand what is being taught. Good learning activities are created through direct interaction between teachers and students, so as to achieve the objectives of the learning process. There are many ways to achieve learning goals, one of which is the development of technology (Purwani et al., 2017). The development of increasingly sophisticated technology creates fun and interesting learning without having to meet face to face (Nugraha & Subarkah, 2015).

The use of technology in learning is expected to attract interest, increase activeness, and motivation for student learning. The existence of learning resources that can be accessed anywhere, anytime, with teachers or without teachers will make students easier and become independent in learning (Farenta et al., 2016). In addition to increasing learning motivation, to support students to learn, e-modules can be used (Abidin, 2017). Teachers can create modules with flipbooks, podcasts, e-modules with google forms, youtube channels, or Instagram. In the age of digitalization like today’s technological advantages, communication interaction can increase productivity and creativity (Karino, 2020). The development of interactive e-modules will make learning more interesting, student independence will increase because students can learn anywhere, anytime both with
teachers and without teachers, this is in line with the discovery learning method (Rama et al, 2022).

**METHOD**

This type of research is development or Research and Development (R & D) which basically aims to develop valid, practical and effective e-modules. This development model will be implemented using the 4-D development model, namely defining (define), designer (design), development (develop), and deployment (disseminate) (Trianto & Pd, 2009). The last stage, namely the disseminate stage, was not carried out because considering the various limitations of researchers. E-Module which was developed as a learning resource used as learning material, in the form of electronic modules with discussion of starter system maintenance materials.

![Development Phase of Starter System Care Learning E-Module](image)

**Figure 1. Development Phase of Starter System Care Learning E-Module**
RESULTS AND DISCUSSION

Define Stage

This stage aims to identify and solve fundamental problems that arise in learning, this defining stage requires the creation of teaching materials. The decision or selection of material to develop is made easier thanks to this analysis, which provides an overview of the facts, superimposition and alternative solutions to the underlying problem.

This phase is a needs analysis, and it includes an examination of existing learning conditions prior to development. In order to learn the starter system, find solutions, and develop the right strategy, utilizing the discovery learning model for SMK Class XI students as a basis for making interactive e-modules. This phase is designed with three steps of activity. observing, analyzing the curriculum, and analyzing students.

Design Phase

The design stage aims to produce an initial product development in the form of a starter system maintenance e-module. The results of the defining stage analysis (define) will be used for the design stage. The steps taken are

a. Media selection
E-development application module interactive maintenance starter system Model Discovery Learning For Students Class XI SMK using the Flipbook application. The software capabilities in this application, namely being able to display animations, create buttons, and combine text, images, videos, and sounds into learning media are the reasons for choosing these media. Learning using e-module interactive starter system maintenance With Model Discovery Learning can hone its skills and agility using the devices that have been provided.

b. Designing a prototype
Make a preliminary design (prototype) or design framework to display learning media e-module interactive maintenance starter system with model discovery learning for student of XI SMK. The main components of the interactive e-module developed are containing covers, openings, texts containing theories, evaluations, quizzes and closings.

c. Media creation
Making e-module interactive maintenance starter system with model discovery learning for student of XI SMK after the initial design (prototype) is carried out. Media creation follows the existing prototype design. The media displayed is in the form of images (visual), text, voice (audio) introduction guided by the SMK module.
Figure 2. Starter System Maintenance E-Module Cover

Figure 3. Contents of Starter System Care E-Module
Development Phase

The development phase follows the refinement of the previous phase. Developing reliable, useful, and efficient learning materials is the main goal of this stage. The developer uses six validators, three of whom are media experts and three of them are material experts to verify the interactive e-modules developed.
Development, the results of the development stage are: 1) hygiene and sanitation e-module consisting of a preface, instructions for using the module, basic competencies, core competencies and activity sheets 2) Media validation scores.

Table 1. Learning Media Expert Validation Results

<table>
<thead>
<tr>
<th>No</th>
<th>Validator</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Validator 1</td>
<td>91 %</td>
</tr>
<tr>
<td>2.</td>
<td>Validator 2</td>
<td>96 %</td>
</tr>
<tr>
<td>3.</td>
<td>Validator 3</td>
<td>83 %</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>90 %</td>
</tr>
</tbody>
</table>

Based on the results of the validation analysis of learning media experts on the interactive e-module, the Starter System Maintenance learning developed resulted in a percentage of 90%. Things that are assessed include Didactic, Construction and Technical aspects. The validator's suggestion is that this e-module medium is good, but the image size needs to be enlarged to make it more obvious.

Table 2. Learning Material Expert Validation Results

<table>
<thead>
<tr>
<th>No</th>
<th>Aspects</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Validator 1</td>
<td>93 %</td>
</tr>
<tr>
<td>2.</td>
<td>Validator 2</td>
<td>96 %</td>
</tr>
<tr>
<td>3.</td>
<td>Validator 3</td>
<td>96 %</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>95 %</td>
</tr>
</tbody>
</table>

Based on the results of the material expert validation analysis on the interactive e-module, the Starter System Maintenance learning developed resulted in a percentage of 95%. Things that are assessed include aspects of Material, Language and Presentation. The suggestion from validators is that the material in this module needs to be added material to make it more complete.

CONCLUSION

From the results of the research conducted, it can be concluded that the Starter System Maintenance e-module media is valid for use in learning at SMK majoring in Automotive Light Vehicle Engineering. This learning e-m is included in the excellent category as a learning medium according to the tests carried out. Based on the collection of validation data that has been carried out by the assessor (validator) obtained an average percentage value of 92.5% with a very valid category.
`REFERENCE