Developing E-module based on mobile learning as a preparation media

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Abstract. The purpose of this study was to: (1) Developing an electronic module based on mobile learning; (2) Describe the validity of mobile learning application as an alternative media competency exam preparation (UKK); (3) Determine students' response to the application of mobile learning. This software development process uses the Borg and Gall. Subject trial involving two media experts, one subject matter expert and students on vocational education. The instrument used to collect data was a questionnaire product validation. Data collection was carried out from February 2020 to March 2020 at SMKN 3 Sorong, West Papua. The results showed (1) E-module based mobile learning was obtained that could be used by student in preparation for UKK; (2) The Functionality test of the media expert obtained a percentage score of 80.55%, and the material expert obtained a score of 95% which indicated the e-module was feasible to use; (3) Testing by student obtains a score of 90% which shows that e-module based on mobile learning are effectively used by students.

1. Introduction

Advances in technology and information so quickly affect the world of education, one of which is the emergence of the term e-learning. E-learning is one of the electronic-based learning and e-module are the most important part of electronic learning. e-module is the development of a print module in digital form which adapts a lot from the print module.

The results of a survey conducted at SMKN 3 Sorong, West Papua show that almost all students of class XII already has a device mobile. Of the 28 students of class XII TKJ, the average student access whatsapp 75% of social media, facebook 15%, 15% of Instagram, Twitter 5% and 0% educational applications. From these data, it can be illustrated that the average users smartphone (students) in the class XII TKJ only used as a medium in the form communication and message instant messaging and social media (facebook, whatsapp and Instagram).

Furthermore, the initial survey conducted at SMKN 3 Sorong, West Papua also identifies the level of preparedness of students in a competency exam skills program expertise Computer Engineering and Networks in vocational education. From the survey, 55.6% of students not yet ready, 33.3% were prepared and 18.5% are still undecided. While the students are ready for vocational theory test only 25.9%, while 51.8% were still undecided and 22.2% are not ready. The data show the level of preparedness of students in the exam competency skills are still low. It caused because students do not yet have a handle module as a guide in competency exam preparation skills Program of Computer Engineering and Networks. On the other hand, provided a laboratory module is limited to teachers, and
cannot be accessed by students independently. This is consistent with the results of an initial survey shows that the availability of teaching materials and laboratory class was still predominantly use printed books and printing modules for teachers. While the use of the textbook is not very practical in supporting competency exam preparation skills and the limitations of the print module forcing students to write all the rare-step lab. These problems lead to learning and practicum laboratory to be slow and ineffective so the effect on students’ knowledge and skill low.

To improve the preparedness of students in a competency exam skills competency program TKJ then required quality of teaching modules, practical, can be accessed independently by the student, anytime and anywhere. Therefore Module that meets these criteria is the electronic module. Electronic module are learning materials that are designed to systematically based on specific curriculum and is packaged in a unit of time, which is displayed using electronic devices such as a computer or android [1].

Electronic module based mobile learning is one potential alternative to development today. electronic module does not require expensive printing costs, easily accessible wherever and whenever, efficient and environmentally friendly. In addition, the electronic module can be integrated with video content, images, quiz and answer forum which will enable the student to overcome the problem of lack of knowledge is low, and also overcome the problem of modules that require substantial funds. Electronic module is a module teaching materials are displayed using an electronic device in the form of a web Some electronic devices are coupled to build their electronic modules are Contain Management System (CMS) as a present material, the video sharing website you tube which makes it possible to present the information in a video and quiz management system (QMS) class-marker to present a scoring system based automated web [2]. It would be more efficient to utilize mobile devices.

Mobile learning is the process of acquiring knowledge through conversation mediated cellular technology in the learning environment both formal and non-formal (daily life and at work); the implications of learning m-learning is that students should develop technological competence to manipulate the mobile device, and autonomous learning and competence in interaction [3]. mobile learning is: "Learning across multiple Contexts, social and content through interactions, using personal electronic devices" [4]. Simply put, it can be defined that mobile learning is learning using a variety of learning contexts, both social and interactions of matter using personal electronic appliances. Mobile Learning is one alternative that should be implemented learning services anywhere and at any time [5].

The reason for choosing to develop an electronic module based on mobile learning in the form of applications because it comes with facilities learning management system (LMS), an electronic module is displayed using a computer screen or other electronic devices, more practically brought anywhere, cheap production costs that are accessible to all students. Apart from the device utilization Mobile learning provides advantages such as: (1) learning can occur anywhere and at any time, (2) access to information to learn fast and broad influence the performance of students in the learning environment, (3) two-way interaction and collaboration content between teachers and students, (4) the variation of learning that enables students to gain knowledge at their own pace, and (5) motivation with multimedia resources can make learning fun [6] [17] [8].

Research on electronic modules have been carried out, such as the development of an electronic module web-based [3], mobile technologies in engineering education [9], the Mobile Learning for education: benefit and Challenges [10], Defining mobile learning in the higher education landscape [11] . Some of these studies only examine the problems of implementing mobile learning in higher education and technical education, there is no research that examines the electronic module based mobile learning in vocational secondary school level. This research focuses on developing electronic module based mobile learning in secondary vocational schools (SMK).

2. Method

The method used in this research is the Research and Development (R & D). Model development in this research using the model Borg and Gall with the development of the following procedures. Figure 1 shows the Borg and Gall Development Procedure.
The Stage of the Borg and Gall model are as follows:

a) Collection of Information: This stage aims to find information about the potential of the product to be developed. And reveals the problems of students in the exam competency skills both vocational theory test and vocational practice exams.

b) Planning (Planning): This planning stage aims to produce a module application design electronic based mobile learning. Process based electronics module design mobile learning focuses on data structures, software architecture and interface representation.

c) Development stage (Develop): This stage is the stage of making electronic module-based products mobile learning. The designed design is then implemented into e-module form using the Modular Object-Oriented Dynamic Learning Environment (Moodle).

d) Preliminary Field Testing: The trial was conducted by two material experts and one media expert and ten TKJ students at SMKN 3 Sorong, West Papua.

e) Main Product Revision: Products that have been assessed by experts and students are then revised accordingly with input by each expert, both media experts, experts material and students.

f) Field product Test: The field trial phase was carried out at SMKN 3 Sorong, West Papua, involving 28 TKJ students. The field trial aims to see the product effectiveness and practicality of the mobile learning-based electronic module.

3. Results and Discussion

3.1. Results

Electronic modules developed using Modular Object-Oriented Dynamic Learning Environment (Moodle). Electronic modules developed in the form of mobile applications, mobile application electronic module is equipped with several features, among others: the user manual, electronic modules features, feature video tutorial, features Try Out and e-forum features. These features have each function that allows students in the process of laboratory practice UKK TKJ. Figure 2 shows results of development initial.
Menu features instructions for use is one of the tools mobile application module electronics that provide clues use of applications, ranging from manual make Accounts students, manual execution of Try Out, Instructions for use module electronics, and instructions for use forum discussion. In general, usage instructions section serves as an introduction and steering to help students use this mobile application.

Feature electronic module is one or the Tools menu of the mobile application electronic module containing practical guidance vocational competency exam year 2019/2020 Computer Engineering and Networks. PDF-type electronic module is specially designed to suit the needs of the UKK 2020.

Video Tutorial is a tool application electronic module containing practical guidance in the form of a video in order to better facilitate students in the laboratory. This tutorial video use the video from You Tube. Video Tutorial Composed of one parts in accordance with practical UKK. Video tutorial contain technique practice guide UKK computers and networks. test UKK is a Vocational theory exam simulation using mobile devices. In these applications have prepared various forms of vocational theory exam started the exam in 2016, 2017, 2018, and 2019 with the expectation that students can practice independently, self-assess and develop the capabilities of each.

3.2. Product Trial Results

Test Product Applications of mobile-based electronic module consists of two aspects rated that aspect of appearance and practicality aspect. While the material aspect consists of three aspects are considered which aspects of language feasibility, feasibility and feasibility language presentation.

| Expert Validation | Aspect of eligibility content | Aspect feasibility of presentation | Aspect feasibility language |
|--------------------|-------------------------------|-----------------------------------|----------------------------|
| Expert Material    | 29                            | 28                                | 19                         |
| Total              | 29                            | 28                                | 19                         |
| Average            | 65,91                         | 70,00                             | 95                         |
Based on Table 1 can be seen, Experimental results show that the subject matter expert electronic modules of the feasibility aspect of the content meets the criteria feasible, aspects of the presentation also included a decent and very worthy aspects of language. Average contents of feasibility aspects of 65.91%, 70.00 presentation feasibility aspects and aspects of language by 95%.

Table 2. Results Trial Expert Media

| Expert Validation | Aspect display | Aspect practicality |
|-------------------|---------------|---------------------|
| Expert Media 1    | 54            | 29                  |
| Expert Media 2    | 51            | 29                  |
| Total             | 105           | 58                  |
| Average           | 77.20         | 80.55               |

Table 2. show The trial results that the product media expert electronic module based mobile aspect and the aspect feasible display meets the criteria Eligible and very practical. On average aspect views of 77.20% while the practicality aspect of 80.55%.

Table 3. Student trial results

| The subject      | Aspect display | Aspect material presentation | Aspect of effectiveness |
|------------------|----------------|------------------------------|-------------------------|
| N = 15           | 298            | 431                          | 324                     |
| Max Score        | 4              | 4                            | 4                       |
| Shoes Criterion  | 360            | 480                          | 360                     |
| Average          | 82.77          | 89.79                        | 90                      |
| Criteria         | Very feasible  | Very feasible                | Very feasible           |

Table 3. Student's test results show that the electronic module application products based mobile learning is considered very worthy display aspects average 82.77%, 89.79 Material presentation aspect and the aspect of usefulness 90%.

3.3. Discussion
Based on table 1 of the aspect turned out to see an average of 77.20% included in the category feasible. Results were then adjusted to feasible criteria. According to the table 2 can be analyzed that the average content of 65.91% feasibility aspects that are in the category of decent, presentation feasibility aspect with an average of 70.00% included in the category of decent and feasibility aspects of the language with the average of 95% included in the category of very worthy, thus, it can be concluded that the electronic module application products had escaped trials and meet the criteria for eligibility for a limited trial.

The results of the students' responses to developed electronic module. Limited testing of students conducted in State SMK 3 Sorong Class XII with a total sampling of 27 people. Students are selected randomly based on the level of knowledge and skills.

Results were then adjusted to feasible criteria. According to the table 3 can be analyzed that the average aspect views 82.77% are in the category of very decent, presentation of the material aspects of 89.79% on average enter the category feasible, and the aspect of usefulness with the average of 90% included in the category of very eligible, thus, it can be concluded that the electronic module application products had escaped trial by students.
4. Conclusion

The results showed that the electronic module (E-module) based mobile learning has been developed using Modular Object-Oriented Dynamic Learning Environment (Moodle). Electronic modules are made in the form of mobile learning applications that can be installed on mobile devices students and teachers. These features are produced include try out features (e-exam online), the electronic module (E-module), video tutorial (e-video), a discussion forum (e-forum) and user manual. The test results from the aspect of media experts see as feasible with a percentage of 77.20% and a very practical aspect of practicality expressed by media experts with a percentage of 80.55%. While the test results of material experts feasibility aspects of the content to be feasible with the percentage of 65.61%, 70.00% presentation feasibility aspects and feasibility aspects of language 90%. While the test results by the students indicated that the electronic module is otherwise very good condition. Students scoring average of 82.77% aspect display, presentation of the material aspects of 89.79% and of 90% aspect effectiveness.

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