Development of project and ICT-based learning media subject modules

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Abstract.
The purpose of this study is to develop a valid project-based learning media module and ICT, to determine the practicality of learning using the project-based learning media module and practical information technology, to determine the effectiveness of learning using the project-based learning media module and information technology. This type of research is development research. The conclusions of this study are the project-based learning media module and valid ICT, project-based learning media and practical ICT modules, and learning using project-based learning media modules and effective ICT.

1. Introduction

The Learning Media course is one of the courses in the mathematics education study program that provides students with how to understand the concept of learning media, selecting, compiling, developing, and evaluating learning media that have been made. In this course students are asked to understand the material about mathematics learning media, then they are asked to make learning media and presented the results. Some of the problems that arise in Learning Media Learning, including: (a) they are able to compile the media well, but the time of collection is often late, (b) the steps in media preparation are not maximally monitored, so in the end it only focuses on results, not processes.

Based on these problems, researchers are interested in developing project-based learning media and Computer information technology (ICT) modules. Through this module students can understand the concept of media and organize their assignments in a timely and controlled manner ICT based learning at higher education institutions has become a serious concern for managers of educational institutions [1]. The integration of ICT in e-learning into the process of internalizing values in ICT learning can be transformed, so that by integrating education in e-learning as teaching material, habituation, assignments, and role models become an integral, holistic, continuous, studied, understood part, practiced in everyday life [2].

The development of technology is currently increasing rapidly and this cannot be avoided. The demands of ICT development are also demands and efforts to improve the quality of education in general and increase learning. The importance of school culture in the use of ICT [3]. Information technology provides opportunities for students to complete their assignments using technology and the results of the assignments become more interesting and up to date. The use of contextual mathematical problems will provide opportunities for students to develop more complex thinking patterns [4]. The hope is that students have the understanding and ability to compile good mathematics learning media.

The preparation of instructional media really requires good skills. There needs to be an assignment in the form of a project to make learning media. Project-based learning can not only increase the learning motivation of vocational school students, but facilitate their problem solving abilities [5]. The results achieved with project-based learning include a higher level of perceived learning and an increase in the complexity of the products produced by students [6]. It is very important that the modules used are
project based. Other studies also show a good thing. Project-based learning techniques allow students to improve academic achievement as well as develop positive attitudes [7].

2. Research Methodology

The type of research to be carried out is development research. What is being developed is a research application program course module. The development referred to in this research is development that produces certain products and evaluates these products. The development model used is the Thiagarajan development model, with the following stages: (1) define; (2) design; (3) develop; and (4) disseminate. The model used is only up to the development stage. The dissemination stage was not carried out, due to time and cost limitations of this study. The stages of research carried out by researchers can be described as follows:

3. Result and Discussion

This type of research is development research. The development model that is carried out is the Thiagarajan development model. There are 4 stages, namely (1) Define; (2) Design; (3) Develop; and (4) Disseminate. However, in this study it only reached the Develop stage. The results of the Define stage are, the purpose of the Mathematics Learning Media course is that students have an understanding of media, its characteristics, types, selection, use and evaluation of media use. Then students are students...
of mathematics education study programs, where students are educated to become prospective mathematics teachers. The conditions of the Covid-19 pandemic were also considered in the preparation of this module.

The Design stage, the module created requires students to understand the material and carry out online discussions. Then there are assignments and challenges that are divided into each meeting. For challenges, created using the Kahoot application and Google form. Then for the task, several stages were made, namely the task of making a short movie and poster. However, in this assignment, only a poster was carried out. This is related to the Covid-19 pandemic. Making a media short movie requires teamwork. This is not possible in a pandemic. The develop stage; the module made with the following material arrangement:

Chapter I Definition of Media
Chapter II Functions and Benefits of Media
Chapter III Introduction to Media
Chapter IV Media Selection
Chapter V Use of Media
Chapter VI Media Development
Chapter VII Media Evaluation
Chapter VIII Examples of Props
Chapter IX Synopsis (Project)
Chapter X Treatment (Project)
Chapter XI Synopsis (Project)
Chapter XII Poster (Project)

The next stage, validation. The results of the validation questionnaire are valid without revision with good criteria. Two mathematics education lecturers carried out validation. The average validation score is 2.41 in the very good category. The next stage is testing modules that are still in the implementation process. The results of the student response questionnaire to learning using the project-based learning media module and ICT were 3.06. This score shows that the student response is in the very good category. It concluded that the project-based learning media module and ICT are practical. The meaning can be used.

Then, the results of the analysis of student achievement tests are as follows.

| Tabel 1 Tests of Normality |
|----------------------------|
|                          |
| Kolmogorov-Smirnov  | Shapiro-Wilk |
| Statistic | df | Sig. | Statistic | df | Sig. |
| Prestasi_Belajar | .188 | 28 | .013 | .950 | 28 | .199 |

a. Lilliefors Significance Correction

The significance value (p) in the Shapiro-Wilk test is 0.199 (p> 0.05), so based on the Shapiro-Wilk normality test the data is normally distributed.
In Table 2, the sig value obtained. (2-tailed) = 0.000). Because of the one-party test, the sig. divided by 2 into 0.000. Value 0.000 <0.05, which means that H0 is rejected. In other words, statistically, the students' learning achievement achieves 70 completeness. So it can be concluded that learning using project-based learning media modules and ICT is effective.

This module does a good job. This module helps lecturers in teaching instructional media materials. Project Based Learning or project-based learning is an alternative learning that can be used not only to assess cognitive aspects, but also student performance [8].

This project-based module trains students to understand the material through project activities to create media. Obviously, students also have the skills to prepare learning media. Project-based learning can improve students' skills in integrating competency attainment in the areas of attitude, knowledge, and skills, but it requires teacher readiness in planning and controlling time so that learning can be carried out properly, and students can acquire competency knowledge [9].

Similar research has resulted in a high positive correlation between teachers' computer skills and computer access [10].

**Conclusion**

The conclusion of this research is that the project-based learning media module and ICT are valid, the project-based learning media module and practical ICT, and learning using the project-based learning media and ICT modules are effective.

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