

Module with Electronic Project-Based Learning

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ABSTRACT

Digital teaching resources have been among the most significant needs in education in the 4.0 age. Modules in learning, for example, are being developed as digital teaching tools. This study aims to create modules that can collaborate with E-PjBL to focus on teaching-learning skills. The study was conducted utilizing a research detection method-based model of development. A development study is funded using an expert validated test and a user test to provide data for analysing the item's application as suitable instructional material. The results of developing the product noticed that the combination of modules and E-PjBL was highly appreciated by experts, users, lecturers, and learners, relevant for instructional material. As students prepare to teach in the digital world, this idea is a sample of digital technology development that connects present and projected learning demands.

Keywords: *module, electronic project-based learning, E-PjBL*

1. INTRODUCTION

The modernization of the education process was one of the developments in education during the 4.0 era. The digitizing of education is packed in a network. It does not require the presence of educators and participants who can make better use of space, time, and money [1]. Learning metaphors have emerged as a new ecosystem due to digitalization, which is strongly related to technology advances and stresses the transformative and performative components of its use [2]. The growth of educators' and learners' ability to move closer to technology is required for transformation and performance.

Various alternative learning management systems have been developed due to search query discoveries, and they can be accessed publicly or custom-built by an institution. This finding is in line with prior research, which found that this approach encourages e-learning, including conference calls, discussion groups, e-questions, modules, and other digital teaching aids [3]. This fundamental demand has just been addressed with various learning methods and creativity to maximize education technology use [4]

A need analysis was conducted at Universitas Negeri Padang on implementing virtual teaching tools in teacher education study programs. According to the needs analysis results, not all course material is created

as digital teaching materials, dominated courses as group exercises, especially in light of educators' limited classroom attendance. As made evident by the results found that digital technology has been a central factor of undergraduate education, resulting in changes to learning experiences by increasing the affordability of systems and certainly widening the chasm in the 4.0 era [5]

Innovated electronic teaching materials can be blended into the digital learning activity. It is required due to the gap between IT progress and reality. Innovative aspects should be included in the design of educational materials as part of developing competencies. Innovation is a fundamental part of reacting to changes and improvements of IT in the education of the 4.0 industry revolution era [6]. The development of innovative electronic teaching materials will increase IT used by students and educators, who will also participate as instructors, in this century's more advanced digitalization period.

According to the needs analysis results, course delivery is generally accomplished in group tasks. Therefore, electronic project-based learning (E-PjBL) is recognized as a relevant innovation in this study's development. E-PjBL is a motivating learning paradigm that focuses on projects that allow students to apply scientific knowledge in real-world circumstances [7]. This research aims to provide digital educational

materials to meet the teaching materials requirements for validity, readability, presentation, applicability, and practicability.

The module was created as part of a project for solo or group learning in a hybrid system. Project assignments are frequently designed to support instructional activities that expand on the topic matter provided by educators [8]. This project assignment is especially important for universities that encourage students to study independently and get a deeper understanding [9]. By selecting process-oriented courses of basic learning skills and the products of students' mastery of basic skills in teaching, communication skills, teamwork, critical thinking, creativity, and invention are developed.

2. METHOD

Model is a systematic strategy for producing educational materials in this experiment. This research project had seven steps: (a) evaluating targets, (b) resource review, (c) formalizing set objectives, (d) verifying product lines, (e) looking to develop learning resources, (f) planning and implementation formative evaluation evaluations through verification and validation, and (h) general revision of research and development results. In determining product validity, material experts and technological experts are contacted. The product was changed in line with expert recommendations and formally tested to the user to make it practical due to its users based on expert validation [10].

3. RESULT AND DISCUSSION

This study determined the learning skills of user targets of students and instructors in courses. This research included the material and technologies and expert educators who functioned as product validators [11]. Questionnaires, personal interviews, and documentation will be used to obtain quantitative and qualitative data from all of these research subjects [12]. As follows, the study data were processed utilizing a combination of two different descriptive-analytic methodologies.

The professional validator and user results were analyzed using a quantitatively descriptive data analysis [13]. In addition, the degree of product eligibility is represented using some criteria [14]. The results of experts' validation about the products can be shown in Table 1.

Table 1. Validation Result

| Indicator | Material Expert | Media Expert |
|------------------|------------------------|---------------------|
| Content | 83,27% | 84,25% |
| Practicability | 82% | 91,5% |
| Presentation | 95,77% | 85% |
| Legibility | 77% | 81,7% |
| Average | 84,7% | 84,87% |
| Qualification | Good, feasible | Good, feasible |

According to the validation results, the product now has a reasonable level of qualification, with an average of 84.7 % for material aspect and 84.87% for media aspect. Based on the outcomes of these models, material updates are equipped to provide a more reduced material presentation and a faster video guide for students and instructors in their operation. The product is next tested with users (instructors and students) [15]. Tested product results from the users showed that the average respondent claimed the product had a significant enough quality in terms of efficacy, effectiveness, interest, and applicability. The outcomes of data collected and talks taken throughout user testing are also incorporated into this material. Learners, on average, use modules well utilizing accompanied with smartphones or PCs, according to raw data [16]. Modules with action guides help students understand the assignment and better comprehend the topic, especially when using the provided connections to access learning resources. The use of an e-learning system, video lesson instruction complements modules by providing operational methods for material and access that students and instructors can follow [17]. There were some difficulties, particularly with the show's duration, which was far too long; as a result, revisions were made to reduce the show's time to roughly by minutes [18].

Furthermore, testing the effectiveness of module services in learning fundamental skills courses reveals that they can be used effectively in learning basic skills courses. Applying the skills concept, developing the learning process, modelling basic study ability, and academic supervising are all included in electronic classes [19]. On the initial topic, students employ critical thinking abilities to further their grasp of concepts and implement basic teaching strategies in ideal and field conditions. After mastering this subject, students create learning tasks that incorporate basic teaching abilities simulated at the upcoming meeting. During this instructional process, classes are available offline online for interaction and homework. Based on the research findings of designing educational activities and simulation outcomes, students appear to be better at

acquiring content and can replicate basic learning abilities [20].

Digital teaching tools such as modules, according to interview data, assist students and teachers in online learning. This quick and effective online teaching material is useful when instructors are unable to teach because it includes an overview of the topic and explicit learning assignments. Tutorial videos are quite crucial for module operations due to the restriction of mastering the current software features. Even though modules can include videos, links, and other information in one package, learners and instructors feel that this device's structure is more practical to utilize. Device support is essential, even though upgrading supporting features for specific devices is essential for the application [21].

According to the user, modules and tutorial videos are examples of creating digital solid teaching resources in terms of performance. This is consistent with other findings, which revealed that studying digitally improves students' learning goals and motivation in the present generation. When students have access to the technology and practical things to explore, they are more engaged in learning, which can be discovered through eLearning with a range of school resources like video tutorials and modules. These inventions imply that, besides earning concern to the kind of digital teaching tools available, educators should look into the elements of students' interest and activeness as learning designers [22].

The focus and activity of students will have an unintended impact on scholarly output. This is presented through simulated tasks that students can complete and master as learning outcomes. Students' attention and active participation become a component of self to collect knowledge autonomously, according to the instructions supplied in the module [23]. Whether or not educators are present, students must comprehend the value of the learning process in achieving success.

Customers, particularly students, are passionate about attaining basic learning abilities, according to product development data. This reaction illustrates consumers' awareness of and needs for digital developments in the fourth millennium, especially in the academic realm [24]. The bulk of the participants were ecstatic about the prospect of creating digital teaching resources that would be useful in the classroom. To address this demand, one of the main tasks of tertiary institutions is to develop curricula, activities, and learning materials for the student.

Furthermore, students in teacher education programmes should be aware of the progression of digitalized learning as one of their future teaching talents. Because education is becoming more digital, aspiring teachers must use various learning technologies [25]. This is evident in the presentation of the module

format, which necessitates the inclusion of supporting files to utilize its capabilities fully. To put it another way, students who flourish at using modules can use technology for students who struggle.

The e-learning module's style allows students to develop their knowledge and talents through independent study rather than depending entirely on instructors. The innovations in this module can be studied in phases to enhance their knowledge and essential teaching skills in the industry 4.0 era [26]. This is based on a previous study that discovered that creating learning characteristics that present a range of knowledge that may be learned progressively over time in learning is helpful.

The e-stages learning modules contribute to independent learning and students' comprehension of the importance of continuing to study. The process includes understanding concepts, designing them, putting them into practice, and evaluating them. At this moment, students might determine their abilities to improve their achievement of learning objectives. The learning process results will be specified and reinforced for the evaluation process from the initial to end [27]. The assessment determines if students have completed their goals and improved their learning process and outcomes throughout a semester.

The trial's findings imply that project-based learning modules can accurately duplicate both independent and group activities. Students should practice independently or in groups when learning activities in practical disciplines, such as basic learning abilities. This exercise will impact the job requirements of potential teachers, which will be higher than those who are given training [28]. Concept comprehension exercises, learning activity design, and teaching skill simulation are used to develop the module product for this learning activity.

Because the foundation of individual and group activities increases students' learning, collaboration with the Project-Based Learning model generates tremendous outcomes. Students' activeness was more effective than the experimental group employing normal class designs. [29]. Educators can use project activities to suggest more practical tasks and place them in appropriate learning contexts. E-PjBL in digital learning promotes meaningful learning [30].

Meaningful learning is demonstrated by students' participation and engagement in project work, particularly in practical teaching tasks. This is because students are more likely to apply what they've learned in class to real-life situations [31]. Instructors must continue to monitor students' learning processes on a project basis due to this activity. Study on the adoption of Electronic Project-Based Learning in learning, this behaviour will positively impact student learning

objectives. Influence aims to monitor student's learning processes and results related to learning activities to assess if they have improved or deteriorated.

4. CONCLUSIONS

According to the conclusions of E-PjBL's research into the manufacturing of modules, the product meets the standards for use as teaching material. Product viability is determined by expert testing findings that satisfy the requirements of validity, practicality, aesthetic, and readability. Product test results promote this from the users, which reveal that both participants and educators praise the project's simplicity, efficacy, excitement, and applicability. Overall, the product meets specified quality standards and can be utilized in a web IT system offline and online, according to the 4.0 century's learning digitalization criteria. The E-PjBL foundation indicates that the product may be used as a solo and group learning material for deepening and assigning information in its application. Students are encouraged to participate more actively in the process and assess their studying outcomes through module projects.

According to the conclusions of this study, academics, university lecturers should design a kind of instructional learning materials such as modules or other types of learning materials that have been qualified and validated by specialists in the area to suit students' learning demands in the 4.0 industry revolution era and future century. The study results should also be used in experiments to see how modules affect students' learning performance and effectiveness.

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