

The Effectiveness of Developing Econometrics Learning Media Based on the Website "Poetrisilaban.com" on Learning Outcomes (Case Study of Economic Education Study Program)

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ABSTRACT

One of the breakthroughs to facilitate learning is to change the concept of online using a platform that is more practical and more accessible to students, namely website-based learning media. One of the latest innovations in the development of web-based econometrics learning media is named Website Poetrisilaban.com. So all materials, quizzes and other assignments have been listed on the website. In general, this study aims to determine the level of feasibility and effectiveness of website-based learning media in econometrics courses to improve student learning outcomes. This study uses research and development (R&D) methods using the ADDIE model. Where the procedure for research and development of teaching materials for the ADDIE development model consists of the stages of analysis, design, development and implementation, as well as evaluation. This research was conducted on fifth semester students of class A who took econometrics courses in the economics education study program in the 2021/2022 academic year. For a small trial sample, 30 students were taken. Based on the results of the effectiveness test in this study, the t-count value was 25.78 with a Sig value. $000 < 0.05$, then H_0 is rejected. This means that student learning outcomes after learning treatment using web-based econometrics learning media are significantly higher than the students' pre-test results. This shows that the resulting web-based econometric learning media is proven to be effective in improving student econometric learning outcomes.

Keywords: *Econometrics, Mobile Learning, Website Poetrisilaban.com.*

1. INTRODUCTION

The development of information technology has grown very rapidly, where almost all fields of work have been dominated by information technology. Technological developments are science and technology that continue to develop to bring civilization more advanced [1].

One form of this technological development can be seen from the transformation of online-based learning media (mobile learning). Mobile learning is one of the learning media that can be used anywhere and anytime without knowing space and time. Its nature that can be carried anywhere makes it easy for users to use it. The presentation of creative and innovative materials will

add to its own attraction for its users. The material presented in the learning media has been summarized and adapted to the learning objectives so that students can quickly understand the content of the subject matter contained in the software.

The rapid development of the use of web-based mobile learning indicates the development of the industrial revolution era 4.0 which is increasingly dominant and continues to be integrated in the world of education. Efforts to integrate technology with the learning process are an effort to improve students' technological literacy. This is what is trying to be developed in the econometrics course.

The problem right now is that the world is going through a COVID-19 pandemic. The government implements a policy of Work from Home (WFH). Finally, the Ministry of Education in Indonesia also issued a policy, namely by closing schools and replacing the teaching and learning process (KBM) using an online system. The limitations of movement and the red zone due to Covid-19 of course limit student access to lectures, looking for books and so on.

Based on the experience of online implementation so far, it turns out that there are obstacles both experienced by students but also faced by facilitators, namely teachers/lecturers. According to the Director of Secondary Education and Special Education, there are 3 main areas that are often debated or complained about by teachers. First is how teachers can design a good learning program. Second, if the design already exists, then the material aspect or what the content is like. Then what is also felt is that the home environment is often not conducive to online learning. This often makes some teachers implement online learning activities at night [2].

The results of observations on students regarding the constraints of online lectures are that in addition to signal problems, there are obstacles to accessing information in the form of relevant teaching materials. Learning from home in all corners of the region makes it difficult to distribute textbooks. In addition, other obstacles exist in the management of learning which is still not familiar among lecturers and students. For this reason, lecturers as lecture facilitators are required to be more creative and innovative in finding better learning solutions that are more comfortable to implement both in terms of students and lecturers. One of the breakthroughs is to create web-based mobile learning in econometrics courses. This is considered relevant as a learning solution today because mobile learning is considered more accessible on students' smartphones. According to [3] explaining the popularity of mobile applications can be seen from several factors, including: 1) the speed factor, 2) the productivity factor, the variety of applications marketed makes it easier for users to overcome the problems they face on a daily basis so that users do not feel disadvantaged by various problems. it faces, 3) the design creativity factor, a display that is tailored to the needs of consumers based on age, and education, 4) the flexibility and reliability factor, can overcome various problems and application limitations in doing work and can function normally with relatively short handling.

Research on the development of web-based learning media has been studied before [4,5,6]. The

overall results of these studies confirm that the use of web-based learning media provides effectiveness on student learning outcomes.

Based on the problems and expert opinions above, it is emphasized that efforts need to be made to make improvements to manage learning in the classroom so that it is more conducive and controlled. One of them is through research and development of learning media, in this case the web-based econometrics course to improve student learning outcomes.

2. THEORETICAL STUDY

2.1. Learning Media

Muhammad Ali suggests that learning media is defined as everything that can be used to channel messages (messages), stimulate the thoughts, feelings, attention and willingness of students so that they can encourage the learning process. Media forms are used to enhance the learning experience to make it more concrete. Teaching using media is not just using words (verbal symbols). Thus, the results of the learning experience are more meaningful for students. More specifically, the notion of media in the teaching and learning process tends to be defined as graphic, photographic, or electronic tools for capturing, processing, and rearranging visual or verbal information. So that it can be interpreted as a tool that conveys or delivers learning messages. with a series of activities for example by reading, observing, listening, imitating, and so on. There are many types of learning media that can be used to support student learning outcomes. One of them is the use of website-based learning media such as mobile learning.

Mobile learning is a learning process that utilizes technology and mobile devices. The use of mobile learning can be assisted with a cellular phone, laptop, or tablet PC. The educational process assisted by mobile learning can facilitate the learning process, because with mobile learning it can be accessed anywhere and anytime and by anyone.

Mobile learning is an alternative to the current learning process. It can be said as an alternative because with mobile learning it can be done anywhere and anytime. The nature of mobile learning that can be done anywhere and anytime certainly cannot stand alone, therefore mobile learning needs additional assistance from the cellular network. Easy to use makes mobile learning can be used by anyone without exception [7]. The use of mobile learning as a learning medium also has several characteristics, including that it can be done wherever and whenever the user is, situational in carrying out the learning process, real

time in providing feedback from the teacher, and increasing a sense of belonging [8].

2.2. Website-Based Learning Media

This concept, known as e-learning or web-based learning media, has the effect of transforming learning into digital form, both in content and in the system. Web-based learning media is an innovation that has a very large contribution to changes in the learning process, the learning process is no longer just listening to material descriptions from educators but students also carry out other activities such as observing, doing, demonstrating and others. The web-based learning media or e-learning which is now becoming very popular because of its flexibility and effectiveness is a way of delivering learning material via the internet that can be accessed anytime and from anywhere [14]. Through web-based learning media and adequate resources, learning materials can be accessed anytime and anywhere. Learning materials can be enriched with various learning resources including multimedia and can be quickly updated by the teacher, so econometrics learning can also take advantage of the advantages of this web-based learning media.

This website-based learning media can be accessed from student smartphones, with the hope that the smartphone can meet the needs or daily activities of humans with an unlimited reach by region. This can be done if there is the availability of a wireless infrastructure network with a wide coverage for data communication or digital audio and video communication [3].

According to [3] explaining the popularity of mobile applications can be seen from several factors, including: 1) the speed factor, the use of efficient applications in presenting data and providing output in accordance with the wishes and needs of consumers, 2) the productivity factor, the variety of applications being marketed makes it easier to use. users in overcoming problems faced daily so that users do not feel disadvantaged by the various problems they face, 3) the creativity factor in design, a display that is tailored to the needs of consumers based on age, education, or people with disabilities, even though it adds to its own attraction for users, 4) flexibility and reliability factors, can overcome various problems and application limitations in doing work and can function normally with relatively short handling.

2.3. Econometrics Learning Outcomes

The learning process occurs because of a goal to be achieved. The intended purpose is in the form of learning outcomes. Learning outcomes must show a

change in behavior that is permanent, functional, positive and conscious. The realization of learning outcomes will always be related to evaluation activities. For this reason, learning evaluation techniques and procedures are needed that can effectively assess learning processes and outcomes. In essence, student learning outcomes are changes in behavior. Behavior as a result of learning in a broad sense includes the cognitive, affective, and psychomotor fields. Then reports on student learning outcomes include cognitive aspects, psychomotor aspects, and affective aspects. Information on affective and psychomotor aspects is obtained from the billing system used for subjects according to the demands of basic competencies.

From this learning process, it is expected that the end result is to increase student success. The learning outcomes are the result of an interaction between teaching and learning [9]. From the lecturer's point of view, the act of teaching ends with the process of evaluating learning outcomes, while from the student's side, learning outcomes are the end of teaching from the peak of the learning process.

Student learning outcomes are influenced by several learning conditions, namely internal and external conditions. Internal factors are factors that exist in the organism, which are called individual factors. These factors are maturity or growth, intelligence, training and repetition, motivation, personality traits. External factors that exist outside the individual factors include: family factors, lecturers, facilities and infrastructure, and the environment [10]. External factors in this case by the way lecturers develop teaching materials that will be studied in this study are one of the factors that affect learning outcomes.

The learning outcomes referred to in this study are student learning outcomes in econometrics courses. When viewed from the type of material in this course, there are several concepts, principles and procedures that require interesting learning and motivate students to learn.

3. RESEARCH METHOD

This study uses research and development methods. The purpose of development research using ADDIE development design according to [11] is to develop and validate research products. In this case, it aims to develop appropriate and effective web-based econometrics learning media in learning.

The subjects of this study were fifth semester students in the Econometrics course at the Economics Education study program, Faculty of Economics,

Medan State University, Academic Year 2021/2022. Data analysis in this study refers to three things, namely testing the feasibility of experts using the Likert scale method [12]; test the practicality; and testing the effectiveness of tutorial teaching media on social media in a small trial group of students using a paired sample test. This article only examines the results of the effectiveness test for the development of web-based econometrics learning media.

The research design used a quasi-experimental design in the non-equivalent group design type [13]. This design is almost the same as the pretest-posttest one group only design, only in this design the experimental group is not chosen randomly. The research design can be described as follows:

Table 1. Research Design Table

Class	Pretest	Treatment	Post Test
Experiment	O1	X	O2

- O1 : Pretest score (before treatment) in class experiment
- O2 : Posttest score (after treatment) in class experiment
- X : Lectures using media web-based econometrics learning

4. RESULT

The research and development procedures for teaching materials adapt the ADDIE development model, including:

4.1. Analysis

At this stage the analysis starts from the curriculum and material analysis where the material used in this website-based learning media is in accordance with the existing curriculum. Meanwhile, when viewed from the side of user needs, where this website is very suitable to be used especially during online learning as it is today, as well as when viewed from program content analysis, specification analysis and job analysis.

4.2. Design

Researchers do the design before making learning media products, it aims to make the media that is made according to what is needed by the subject. The designs carried out in this research are data design, navigation design, and user interface design which is a rough description of the development of learning media. Where at this stage, the collection of teaching materials in accordance with the basic competencies of the econometrics course is carried out, determining

the use of the right text in terms of colour, size, and type. Determine interesting pictures so that they can be more interactive with students. Collecting questions / quizzes and types of assignments that have been used in the course.

4.3. Development and Implementation

The results of research and product development in the form of web-based econometrics learning media. This is done by realizing that the pandemic that has hit the whole world has affected all aspects of people's lives, especially in the world of education, of course more innovation and creativity from educators are needed to be able to create better learning media so that the learning process can run well. Therefore, this is the background for the presence of a website-based LMS called PoetriSilaban.com.

PoetriSilaban.com is an innovation for lecturers who teach economics courses such as Econometrics. PoetriSilaban.com is a website-based LMS (Learning management system), which is designed to create, distribute, and manage the delivery of Economics course learning content that can be accessed by all devices from Android, PC, and others. This system can help lecturers who support economics courses to plan and create syllabus, manage learning materials, manage student learning activities, manage grades, recapitulate student attendance, display transcripts for one semester, and manage e-learning displays even on the website. PoetriSilaban.com, students are able to communicate virtually together with their lecturers. This is done in order to establish closeness between the lecturers and students. Because it is website-based, in addition to making it easier for lecturers to plan online learning processes, it also makes it easier for students to access learning content from anywhere and anytime.

This website-based LMS consists of several menus in it. The menus consist of the Home menu, About Us, Courses, Blog, FAQ, Language Selection, Log-In Menu, as well as the admin address of the website owner. And on the dashboard display there are main menus such as: display menus, such as messages menu, profile menu, settings menu and grades menu.



Figure 1. Opening Menu Display

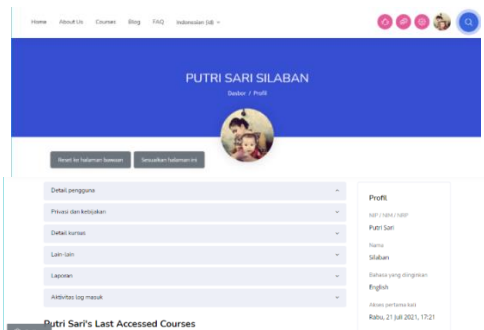


Figure 2. Profile Menu Display

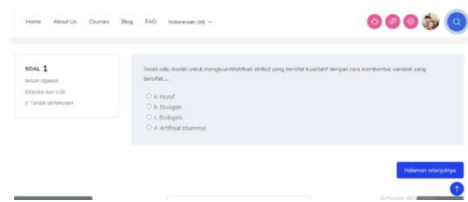


Figure 7. Quiz Display



Figure 3. Display of Grades . Menu

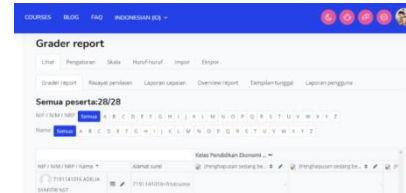


Figure 8. Value Display

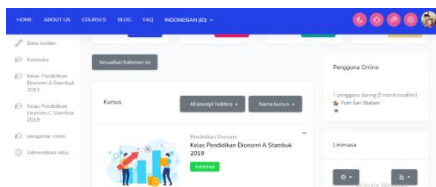


Figure 4. Dashboard Menu Display

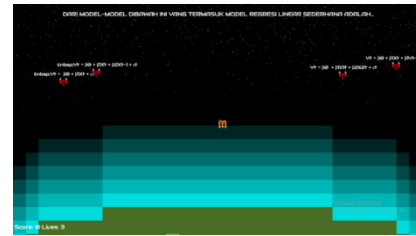


Figure 9. Econometrics Game Display

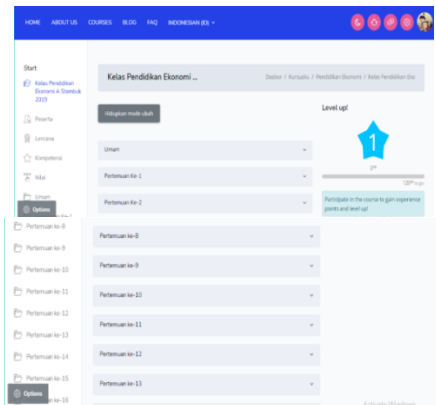


Figure 5. Menu Display for Meeting Courses 1-16

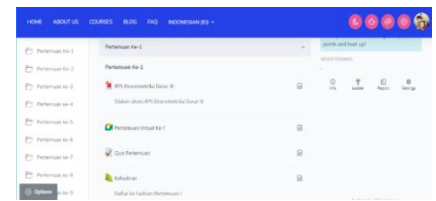


Figure 6. Meeting Menu Display 1

This research was conducted on fifth semester students of class A who took econometrics courses in the economic education study program in the 2021/2022 academic year. For a small trial sample, 30 students were taken. After the implementation phase of this website product was finally carried out, the effectiveness test was carried out.

4.5. Effectiveness Test

The effectiveness test was carried out using a quasi-experimental non-equivalent group design approach. This study tested the pretest-posttest on multiple regression material in two meetings from one class group. The test was carried out on 28 students in the fifth semester of class A with the following results:

Table 2. Calculation Results of Pairwise Difference Test

		Paired Differences				t	d	Sig (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pa irs 1	Pret est - Post test	- 30. 5	6.479	1.1 82	- 32. 919	- 28. 08	- 25. 78	2 9	.00 0

Based on the table above, the t-count value is 25.78 with a Sig value. $000 < 0.05$, then H_0 is rejected. This means that student learning outcomes after learning treatment using web-based econometrics learning media are significantly higher than the students' pretest results. This shows that the resulting web-based econometric learning media is proven to be effective in improving student econometric learning outcomes.

4.6. Evaluation

At this stage, an evaluation of the practicality of the product that has been developed is carried out, by analyzing the practicality data, effectiveness data and the final result of using the product.

5. DISCUSSION

The development of web-based econometrics learning media turned out to have a significant impact on student learning outcomes. This is in line with the results of research on the development of web-based learning media that have been studied before. The overall results of the study confirm that the use of web-based learning media provides effectiveness on student learning outcomes. In addition, web-based learning media are able to foster student independence in learning because learning is up to date and practical through the grip of each student's smartphone.

This strengthens the opinion, [14] suggests that web-based learning media or e-learning which is now becoming very popular because of its flexibility and effectiveness is a way of delivering learning materials via the internet that can be accessed anytime and from anywhere. Through web-based learning media and adequate resources, learning materials can be accessed anytime and anywhere. Learning materials can be

enriched with various learning resources including multimedia and can be quickly updated by the teacher, so econometrics learning can also take advantage of the advantages of this web-based learning media.

6. CONCLUSION

The rapid development of technology brings various changes in communication patterns and information dissemination, including in the world of education. One of the breakthroughs to facilitate learning is to change the concept of online using a platform that is more practical and more accessible to students, namely website-based learning media. The results of this research and development are in the form of web-based econometrics learning media.

The results of the effectiveness test concluded that the student learning outcomes (post-test) after using web-based econometrics learning media were higher than the students' pre-test results. This shows that the resulting web-based econometric learning media is proven to be effective in improving student econometric learning outcomes.

The results of this study are expected to increase students' interest and independence in learning with media designs that are more popular among students, more accessible, and more effective, so that students can study whenever they want, according to their respective learning styles.

The author has designed a systematic web-based learning media by collaborating with IT experts in the field of education. Prepare teaching materials, quizzes, and formative questions to evaluate student achievement. Furthermore, the authors also conducted trials on selected students to measure the effectiveness of web-based econometrics learning media.

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REFERENCES

- [1] Cholily, YM, Putri, WT, & Kusgiarohmah, PA, Learning in the era of the industrial revolution. 4.0. 2019, pp 1–6
- [2] (<https://news.detik.com/berita/d-4960285/kemendikbud-karena-kendala-learning-di-rumah-material-ajar-rumah-tak-kondusif>) accessed 10 May 2020.
- [3] Istiyanto, Jazi Eko. Smart Phone Programming using Android SDK and Android Hacking. Yogyakarta: Graha Ilmu. 2013.
- [4] Sari, H V., and Suswanto, H. Development of Web-Based Learning Media to Measure Student Learning Outcomes in Basic Computer Networking Subjects Computer and Network Engineering Expertise Program. *Journal of Education*, Vol. 2, No. 7, Month of July, Year 2017, pp 1008—1016.
- [5] Januarsyah, E., Ghufro, A. Development of Web-Based Learning Media for Natural Science Subjects for Class VII Students. *Journal of Educational Technology Innovation*. Volume 3, No. 2, October 2016, pp 166-182.
- [6] Peprizal., Syah, N., Development of Web-Based Learning Media in Electrical Lighting Installation Subjects. *Scientific Journal of Education and Learning*. Volume 4 Number 3 October 2022
- [7] Deni Darmawan. Learning Technology. Bandung: PT Pemuda Rosdakarya. 2012.
- [8] Jinglong, et al. Mobile Learning Research-based Intelligent Mobile Phone and 3G Network. *IEEE Journal*. 2012.
- [9] Dimiyati and Mudjiono, Study and Learning. Jakarta: Rineka Cipta. 2013.
- [10] Thobroni, M., Learning and Learning Theory and Practice. Jakarta : Ar Ruzz Media. 2015.
- [11] Mulyatiningsih, E., Applied Research Methods in Education. Bandung: Alfabeta. 2011.
- [12] Wagiran. Implementation of the 2013 Curriculum in Learning and Evaluation. Semarang: CV Bahtera Wijaya Perkasa. 2013.
- [13] Ismail, Fajri. Statistics for Educational Research and Social Sciences. Jakarta : Kencana. 2018.
- [14] Surjono, HD, Building a Moodle-Based e-Learning Course (2rd ed). Yogyakarta: UNY Press. 2013.