

Practical Analysis of Web-Based Assessment to Improve Student's Understanding in Economic Mathematics Course

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Abstract. Web-based e-learning is one proof of technological developments in learning. The development of technology has many benefits for the learning process, making it easier for lecturers and students to carry out the teaching and learning process. The use of the web in learning is a major requirement that requires all learning devices to be designed digitally. One of these components is a learning evaluation/assessment that can improve student understanding, especially the economics mathematics course. This study aims to analyze the practicality of web-based assessments to improve student understanding in the mathematical economics course. This literature study is supported by curriculum analysis, student needs analysis and learning analysis. The results of the practical analysis of Web-based assessment research can be seen through a literature review to improve student understanding through questionnaires with an average percentage gain of 88.23% in the very practical category, with data from 120 students 30% of students choose to do assignments through sending answers in file form, 3% of students choose to do assignments manually and 67% of students choose to do assignments using the web. This also increases the result of understanding with 37.5% of completeness in pre-cycle 1, 65% in cycle I and 85% in cycle II.

Keywords: Analysis, Practicality, assessment, understanding, web.

1 Introduction

The development of science and technology plays an important role in human life, one of which can be seen in the field of education. The faster the pace of technological development will thus encourage the creation of new innovations in the world of education that renew the quality of education and will produce quality individuals.

From the development of technology, many benefits are obtained to make it easier for lecturers and students in the teaching and learning process. However, in addition to having many benefits, technological advances also have a fairly serious impact on student life as stated (Yuliana et al.) The development of information technology has had a tremendous influence on human life and perspective. Computers, cell phones, and other technological innovations have become the main work support tools, while in learning Good use of technology will facilitate the learning process,

dig up information, and find the latest ideas, so that they (students) will become good learners. active, creative and innovative.

Web-based e-learning is very useful in improving education in Indonesia as seen in research (tiur malasari siregar et al, 2020) obtained from the results of the media and material test each obtained a score of 80.3% and 86.7% which means it is included in the "Very Good" category. "We can conclude that the use of the web in learning has become a necessity. According to Arsyad (2011: 4) In order to support and maximize learning, including e-learning, of course, learning media are needed that are able to provide solutions for students so that they can understand the material being studied easily.

The use of the web in learning is be a primary need in a teaching and learning process that requires all learning devices to be designed to be digitized starting from learning designs, teaching materials, media, worksheets and assessments. With the rapid development of technology, the obstacle that often occurs in the world of education is the assessment design where it is very necessary to adapt to current technological advances. Thus the adaptation that needs to be done is to develop an assessment in web form.

The practicality of web-based learning media to support e-learning obtained a very good response rating by obtaining an average response result of 87.88% and obtaining the "Very Practical" category. There are three main aspects that affect the practicality of web-based learning media, namely the attractiveness of the media, the suitability of the content and the quality of the media. So that a conclusion can be reached that web-based learning media are categorized as very practical to use to support e-learning according to (Kiki, 2020) as well as stated (Elsa Pertiwi, 2021) that the web-based learning media developed have a valid category after data processing is carried out and states effective web-based learning media as evidenced by an increase in student learning outcomes. From the results of previous research, it can be seen that this web-based assessment is a very practical assessment carried out online

Many things can affect the level of student understanding in learning, especially in economics mathematics courses, such as the limitations of learning tools, as currently we are doing online learning but the assessment system that we use is still manual in the sense that we are still giving questions in the form of files that we send via E-learning, problem solving in textbooks, quality of teachers who do not understand technology and lack of references related to economics mathematics subject matter according to the economic cases currently being faced as stated (kiki, 2020) Web-based assessment is one of assessment method that is carried out online, basically a web-based assessment is an assessment that is designed to be practical and easy to use and has advantages for teachers and students, school institutions and parents of students, as well as for the academic community and government. If the assessment is carried out accurately (objectively) the web-based assessment provides objective results in accordance with the criteria desired by teachers and students.

Based on the explanation described above, considering the importance of practical assessment, especially web-based assessment, which is increasingly needed today, especially in economics mathematics courses. According to Nieveen (in Plomp & Nieveen, 2013: 28) there are three general criteria for high-quality media, namely validity, practicality and effectiveness. These three quality criteria will experience a shift in emphasis during the study. According to Plomp (in Plomp & Nieveen, 2013: 30, Table 3), in the preliminary research phase, the main priority is emphasized on content validity and the second is consistency and practicality. The next phase is the development or manufacture of prototypes which initially emphasizes consistency

(construct validity) and practicality, then prioritizes practicality and gradually pays attention to effectiveness. At the assessment stage, the emphasis is on practicality and effectiveness. Practicality is a media quality criterion that is always present in each phase. So when choosing media for learning, the first thing to consider is whether the media is practical or not.

2 Method

This study aims to analyze the practicality of web-based assessment in order to improve students' understanding, especially in the mathematical economics course by using curriculum analysis, analysis of student needs, analysis of learning needs and literature study through collecting several sources or references and literature study related to the faced title of the problem, literature such as journals, articles and books that support this discussion with a time span from 2013 to 2021. The formulation of the research problem is an analysis of the practicality of web-based assessments to improve students' understanding in economics mathematics courses. The data from the practicality results are then calculated on average according to the following formula (1) :

$$\bar{x} = \frac{\text{amount of data}}{\text{number of data}} \quad (1)$$

The practicality criteria will be determined based on the average percentage according to table 1. The Value Interpretation Criteria.

Table 1. The value interpretation criteria.

Number	Value Rating	Category
1.	81%-100%	Very Practical
2.	61%-80%	Practical
3.	41%-60%	Currently
4.	21%-40%	Less Practical
5.	0%-20%	Not Practical

3 Result and discussion

The results of the curriculum analysis carried out in terms of economic mathematics courses with the aim that students are able to use mathematical analysis in solving macro and micro economic problems that have an impact on making decisions. With this goal, students are expected to be able to develop their abilities in solving learning problems and integrating them in the economic field, such as currently learning activities are carried out in hybrid learning with the learning process and all learning tools are implemented and prepared according to needs, from the results of the economics mathematics curriculum analysis through the semester learning plan, it can be seen that the assessment given in the form of routine assignments at each meeting increases student understanding. It is very practical to use in learning and this statement is also supported by Arief Wisaksono (2020) which states that the learning evaluation application is a solution for everyone involved in the world of education so that they can learn effectively while at the same time being able to quickly find out who is not meeting the target,

both students and teachers in accordance with the k13 curriculum and Yunita Dwi Ermawati (2019) also stated in the results of his research that internet-based learning evaluation tools have feasibility with very feasible and effective categories.

The results of the analysis of student needs with a total of 120 students were asked to fill out a questionnaire, with answers as shown in **Figure 1. [1]** below :

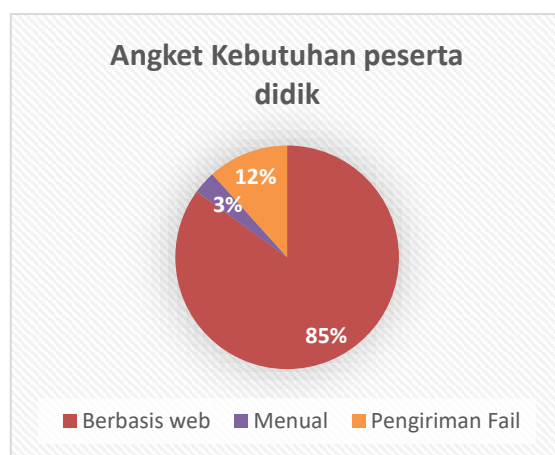


Fig. 1. Student Needs

Based on the figure, it can be seen that 30% of students choose to do assignments by sending answers in the form of files, 3% of students choose to do assignments manually and 67% of students choose to do assignments using the web. From these results, it can be seen that assessment using the web is needed by students in learning, besides being practical in use, saving time, and can be done anytime and anywhere. Analysis of learning seen from the learning process through evaluation of 120 students taking economics mathematics courses in the Mathematics Department of State University of Medan, giving pretest questions three times, namely before cycle 1, cycle 1 and cycle 2 with the aim of knowing how the level of students' understanding of use of web-based assessment. The results of the evaluation analysis can be seen in the following table 2:

Table 2. Result of learning evaluation

Earning Aspect	Result of Evaluation		
	Pre-cycle	Cycle 1	Cycle 2
Number of student	120	120	120
Understand	45	78	102
Less understand	75	42	18
Score	7652	8981	10.651
Average	63,77	74,84	88,76
Understand percentage	37,5%	65%	85%

From the table above, it can be seen that the level of student understanding has increased. The web-based assessment system can improve students' understanding in the learning process, this can be seen from the pre-cycle scores of 7652 out of 120 students with an average acquisition of 63.77 and a percentage of 37.5%. This can prove the completion of the evaluation by sending files through hybrid learning before using a web-based assessment. In the Cycle I, after using the web-based assessment system, it proved that there was an increase in student understanding with an average value of 74.84 with a completeness percentage of 65% and in the Cycle II, students' mathematical understanding increased even more with an average value of 88.76 with a percentage completeness of 85%.

The results of the literature study analysis, there are 4 journals or articles related to the analysis of the practicality of web-based assessments to improve students' understanding of the mathematical economics course. Journals or articles used as references are journals or articles with a time span of 2013-2021.

In Muliansani's research (2017) related to Web-Based E-Tests to Improve the Efficiency of the Learning Outcome Evaluation Process, he said that the results of implementation and analysis during the application of the system design that were built, can be presented with several conclusions that the process of implementing the evaluation of student learning outcomes is much faster and more efficient with the efficiency rate reaches 75% of the previous method; The exam implementation process becomes easier and user friendly; The examination process is safer and more reliable. This is because the time limit given to take the exam is not enough for students to cheat or other things that can waste exam time.

In Ayu Irsalina's research (2018) stating the results of online and offline responses and activities, it can be concluded that the development of this student worksheets is very practical to use in acid-base learning in terms of online activities of 97.03% and offline activities of students of 98.33%, the results The student response questionnaire was 93.33% with an average of 92.37%.

Research by Kiki Ayu Faradayanti (2020) stated that the practicality of web-based learning media to support e-learning obtained a very good response assessment by obtaining an average response result of 87.88% and obtaining the "Very Practical" category. There are three main aspects that affect the practicality of web-based learning media, namely the attractiveness of the media, the suitability of the content and the quality of the media. So that it can be reached a conclusion that web-based learning media is categorized as very practical to use to support e-learning on the subject of Electrical Motor Installation (EMI) in vocational high school.

In the research, Riana Maylinda (2021) stated that teaching materials for scoology-assisted buffer solution enrichment developed were feasible and practical as learning resources in enrichment programs. It can be seen from the results of the validator's assessment of teaching materials that the average score of the material components is 45.5 out of a maximum score of 60 in the appropriate category, while the media component average score is 43.5 out of a maximum score of 56 in the appropriate category. The enrichment teaching materials that have been prepared have received positive responses from students in large-scale trials, namely 76.75% of students gave a positive response to the developed teaching materials, and 97.67% of students assessed the practicality of the developed teaching materials. This buffer solution enrichment teaching material development product can be used as a learning resource in the enrichment program.

According to the percentage data from the four journals that have been described, the average percentage can be obtained in the following table 3:

Table 3. Results of literature studies from the four journals

Number	Journal/Article	Year	Percentage(%)
1.	Muliansani	2017	75
2.	Ayu Irsalina	2018	92,37
3.	Kiki Ayu Faradayanti	2020	87,88
4.	Riana Maylinda	2021	97,67
Average			88,23

The four journals or articles are then mapped out their practicality data on a graph as shown in **Figure 2.** [2] below :

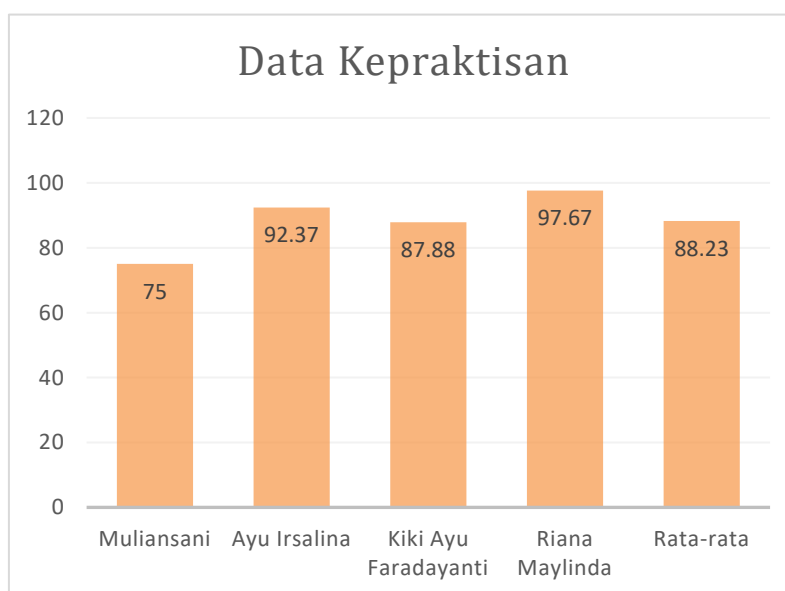


Fig. 2. Results of literature studies from the four journals

Based on Table 3, the practicality of Web-based assessment to improve students' understanding gets an average percentage gain of 88.23% with a very practical category according to table 1 of the value interpretation criteria.

Based on the articles presented with the average acquisition of reference data calculations, of course there are several factors that make it possible for web-based assessments to improve student understanding and become very practical to use as alternatives in improving learning understanding, especially economic mathematics. If seen from the results of the questionnaires used as research instruments, all of them focus on three aspects of the practicality of web-based assessments, including 1. The attractiveness of web-based assessments, 2. The suitability of learning materials and problem development, and 3. The quality of web-based assessments presented. . Attractiveness is related to the appearance of web-based assessments, the

presentation of questions is also very influential in increasing student understanding, especially since it is designed in the form of the current economic case.

With the current hybrid learning system assisted by web-based assessments to improve student understanding, it will be easier for students to access and use the internet either through computers, laptops, smartphones or other devices, so it will be easier to carry out the learning process anywhere and anytime.

4 Conclusion

Based on curriculum analysis, student needs analysis, learning analysis and literature study, it can be concluded that this web-based assessment is very much needed by students in Hybrid learning besides being practical in its use, it can save learning time and can be done anytime and anywhere, seen from 120 people. students 30% of students choose to do assignments through sending answers in the form of files, 3% of students choose to do assignments manually and 67% of students choose to do assignments using the web and this web-based assessment can also improve student understanding in learning seen when pracycle 1 completes learning 37.5%, cycle 1 learning completeness is 65% and cycle II learning completeness is 85%. This proves that web-based assessment is very much needed and effectively used in learning and can improve student understanding. While the analysis of the practicality of Web-based assessment can be seen from the results of the literature review, it can be concluded that to improve students' understanding, the average percentage gain is 88.23% in the very practical category.

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