

Impacts of formative evaluation model towards improving students' learning outcomes in online teaching platforms

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Abstract

Education is one of the areas that was affected by the Covid-19 pandemic. In the current situation, lecturers must have the ability to use the appropriate approach in the teaching and learning process. The majority of universities have used online teaching platforms in the teaching and learning process. However, Lecturers have many obstacles in the learning process. One of them is that the lecturer does not know the online-based evaluation platforms. This situation has decreased students' knowledge. Therefore, innovation of the learning evaluation model is imperative to development. This study discusses the impacts of the Formative Evaluation Model (FEM) in improving students' learning outcomes. FEM is applied in KULINO as a Learning Management System (LMS). A total of 120 students and 2 lecturers were involved in this research. Using two learning approaches; one group used the summative evaluation model while the latter group used the FEM evaluation model. Questionnaires about students' perceptions were distributed before and after the experimental learning process. There were differences in the mean scores between pre and post-test. The mean score of students' attitude increased by 6.74 points and students' knowledge mean score increased by 2.23 points.

Keywords- Education, Formative evaluation model, Learning management system

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1. Introduction

The educational objectives can be well achieved if the integrity of all the educational components are engaged and cooperates in realizing the goals of national education. Frye & Paul (2012) states that in the teaching and learning process, lecturers are an important educational component. Hamdi (2020) added that lecturers as the main actors in the teaching and learning process activities in the classroom must have the ability to design, plan, implement and evaluate learning. Therefore, providing lecturers' knowledge of learning models must continue to be carried out so that the learning model applied is appropriate. In addition, Goldfarb & Gail (2014) states that lecturers must be able to become facilitators and motivators during teaching and learning activities so that the obstacles in teaching and learning activities can be identified properly. Developing interactions between lecturers and students during the learning process is very important to create an interesting learning process (Morris et al., 2021). Many researchers state that the lecturer's activities related to the evaluation of the learning process must always be developed to monitor and control the development of mastery of student learning outcomes (Martin et al., 2022; Leenknecht et al., 2020; Anh 2018). Learning evaluation activities can also be used as learning reflections to improve the next learning activities.

In the other hand, Online Learning constructed to become an alternative learning system for students who live far from campus might be a good choice to deliver educational lesson while the old method couldn't be maximize due to the pandemic. It gives the students a chance to authorize their learning. Research conducted by Sezer, Karaoglan, & Yilmaz (2017) reveals that Online Education gives a benefit and effectiveness better than the old-traditional method learning if it is well-designed.

Assessment is one of significant part in learning process that uttered by Lubinescu, Ratcliff, & Gaffney (2001) if the assessment becomes the evaluation during the learning process. Also, assessment helps students to know their comprehensive process in learning lesson according to Ustun & Tracey (2019). The summative assessment commonly used to give certification in performance, to decide final grade, and to make pass-fail decision (Harlen & James, 1997). However, Formative Evaluation is chosen as the premier part in learning online process (Yilmaz, 2017; Gikandi, Morrow, & Davis, 2011).

Online formative assessment is an approach in giving an assessment which helps students to comprehend themselves using online utilities. Feedback is showed to give them learning process, whereas aimed students to decide their learning process based on self-assessment on consequences. Students make a decision on their self-assessment in order to improve the learning. Online formative assessment has a main benefit to give student to do test everywhere and every time. Meaning, they could do assessment independently and get on going feedback regularly (Gikandi et al., 2011). It helps them to indetify their self awareness in both strengths and weakness also comprehension about the lesson that already given (Karaogan, et al., 2020). Therefore, it is very suitable during learning online session (Yilmaz, 2017; Gikandi, Morrow, & Davis, 2011).

Currently, the Learning Management System (LMS) has become the main choice as a relevant teaching and learning approach. According to Riyanda et al., (2020) LMS is software developed to support learning and administration activities. Lecturers as an important component in the teaching and learning activities must be able to plan and execute the Subject Material Plan on the subjects being taught. In addition to the two abilities above, the ability to evaluate the Subject Material Plan must also be mastered by a lecturer (Roswanati et al., 2015). The expertise and experience of lecturers in choosing and using evaluation models are essential considering that there are so many evaluation models in learning. Nearly all lecturers use the formative-summative test evaluation model where formative tests are conducted in the middle of the semester while summative tests are conducted at the end of the semester.

As of today, the teaching and learning process of Universitas Dian Nuswantoro (UDINUS) adopts the formative-summative test evaluation model. However, the evaluation model above makes it difficult for lecturers to know the extent to which learning outcomes have been achieved in each meeting. Lecturers find it difficult to know to what extent the material designed at each meeting went well. In addition, lecturers have difficulty identifying the obstacles found when the material is running. Due to difficulties that were not identified from the start, this led to a low level of achievement in Subject Learning Outcomes. It is stated in many studies that there are problems with measurement and evaluation in online education, especially with the pandemic. For this reason, the issue of formative evaluation gains importance (Gikandi, Morrow, & Davis, 2011). Therefore, FEM was designed as an alternative learning evaluation model to evaluate the students learning achievements at every meeting in the classroom. In addition, it was developed to improve students learning outcomes including students' attitudes and students' knowledge as well as to increase the lecturer's role as a facilitator in the teaching process.

2. Methods

2.1. Research Population and Sample

The population and sample of this research involve lecturers and students who are scheduled to teach and take E-Business Concept courses in the Odd Semester of the 2021 academic year, namely 2 lecturers of the Information Systems study program and 54 students who are taking E-Business Concept subject in over 4 groups.

2.2. Classes, Lecturers, and Students' preparation

4 groups were selected as samples for this study. Each lecturer teaches 2 classes and each is grouped as a control class and an experimental class. Using a Quasi-Experimental approach where the class will be divided into 2 groups, namely the Control and Experiment groups. The control group used the formative-summative test evaluation model, while the experimental group used the FEM evaluation model.

2.3. FEM as an evaluation approach in online learning

FEM is designed and carried out in every meeting in the teaching and learning activities to evaluate the current level of learning achievements, the obstacles experienced, and the extent to which the designed material is going. Therefore, this study is conducted to measure students' perceptions of FEM as an alternative learning evaluation model.

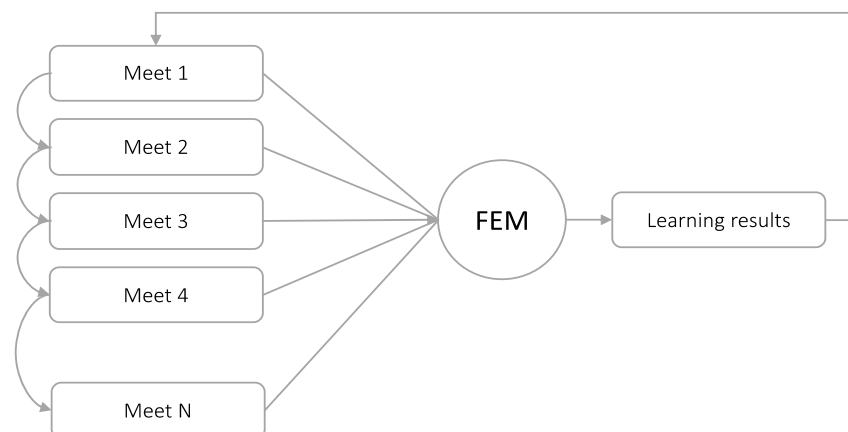


Figure 1. FEM activities

Figure 1 illustrates that the lecturer evaluates using FEM in every teaching and learning activity meeting. The results of the evaluation of learning in each meeting are used as learning outcomes. Furthermore, the learning outcomes achieved will be used as feedback for further learning improvements.

In the teaching and learning process, learning tools which include lesson plans, teaching materials, learning videos, exam questions, and others are prepared and designed in the KULINO learning management system as shown in figure 2. Online learning through KULINO is one of the important efforts made by UDINUS to overcome learning problems during the pandemic.

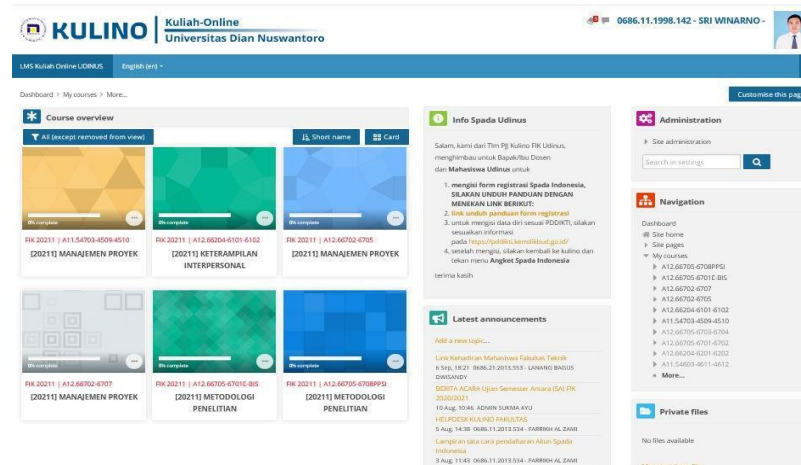


Figure 2. Kulino learning management system

Each meeting is held once every week in which each meeting will be used to evaluate the knowledge achievement of the course. The lecturer prepares an assessment framework for each meeting that will be used as a reference for evaluating each meeting during the teaching and learning activities. Assessments of learning achievement are carried out in every meeting to evaluate the student's knowledge of the material in every meeting. After 14 meetings, questionnaires were distributed to students via google form to measure student perceptions of FEM. A total of 54 students participated in filling out the questionnaire. The results of the data extraction through questionnaires were then tested for reliability. The test results show the Cronbach's Alpha value of 0.791. This indicates that the questionnaire is declared reliable or consistent.

2.4. Data Analysis

In this study, several approaches were used to analyze the extracted data. The data analysis approach was used to determine the extent to which students' perceptions of the applied learning evaluation model. Questionnaires were distributed to students using a Likert scale of 1 to 4 which respectively indicates strongly disagree, disagree, agree, and strongly agree to the questions asked. Some of the data analysis approaches used include Reliability and Validity Test, Normality Test, and Descriptive Analysis using SPSS software.

3. Results

After the data collection process is done, then the reliability test is executed on the student knowledge achievement data. The test results show the Cronbach's Alpha value of 0.791. This indicates that the questionnaire is declared reliable and valid. Furthermore, the test is followed up by finding the impacts of FEM on students' attitudes and knowledge from the data that has been collected. T-test

analysis was conducted to find the comparison of the mean scores of the group.

Table1 showed the comparison of the mean scores of students' attitudes. The comparison of mean scores showed that there was a difference in the average score of 6.742 at the time of the pre-post test between the control class and the experimental class. In other words, there is an increase in students' attitudes when FEM is implemented as a learning evaluation approach.

Table1. Comparison of mean scores of students' attitude

Variable	Group	Mean	SD	T-Test for Equality of Means			
				T-Test	df	Sig.(2Tailed)	Mean Difference
Attitude Pre-Test	Control	74.213	2.083	1.021	59	.000*	0.648
	Experiment	74.861	3.612				
Attitude Post-Test	Control	77.017	3.239	1.229	59	.000*	6.742
	Experiment	83.759	5.477				

* Significant at $p < .05$

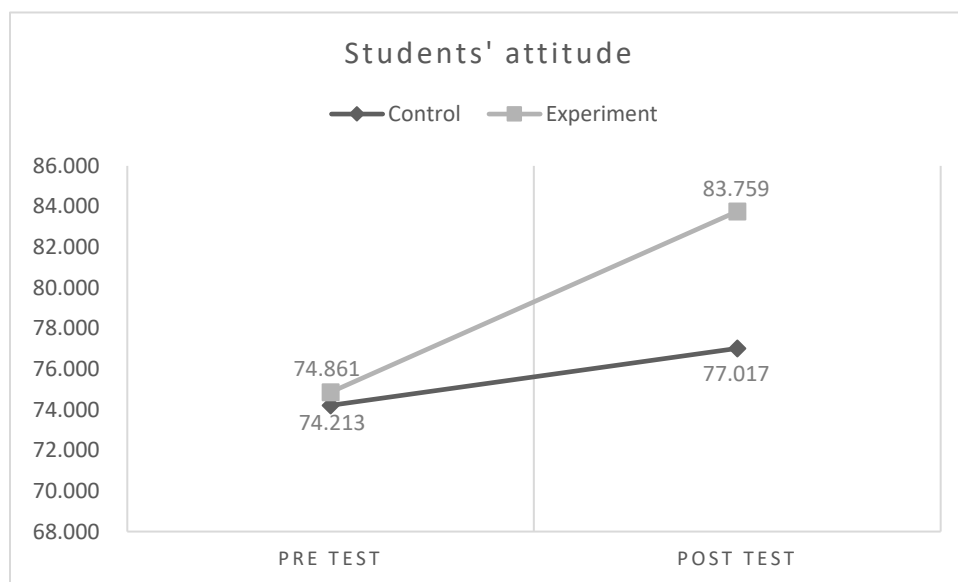


Figure 3. Students' Attitude

Table2 showed the comparison of the mean scores of students' knowledge. The comparison of mean scores showed that there was a difference in the average score of 2,233 at the time of the pre-post test between the control class and the experimental class. In other words, there is an increase in students' knowledge when FEM is implemented as a learning evaluation approach.

Table2. Comparison of mean scores of students' knowledge

Variable	Group	Mean	SD	T-Test for Equality of Means			
				T-Test	df	Sig.(2Tailed)	Mean Difference
Knowledge Pre-Test	Control	76.733	1.300	0.979	59	.000*	1.717
	Experiment	75.017	13.481				
Knowledge Post-Test	Control	79.517	5.225	1.713	59	.000*	2.233
	Experiment	81.750	8.477				

* Significant at $p < .05$

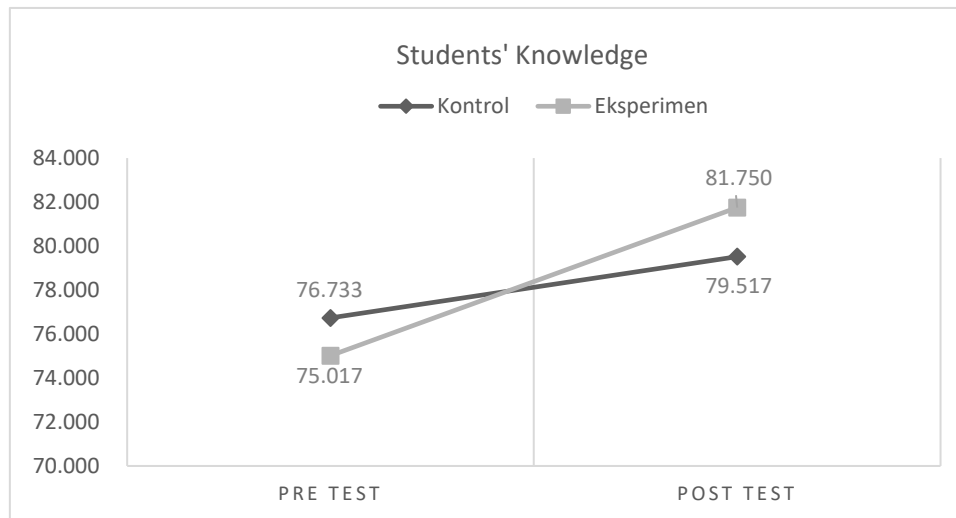


Figure 4. Students' Knowledge

In addition to measuring the learning achievements, the data extraction activity also distributes questionnaires about student perceptions of the model and learning atmosphere. The questionnaire totaled 6 questions. The respondents involved in this data collection were 54 students from the experimental group. Learning impacts using FEM. Questionnaires measuring student perceptions of the learning atmosphere were distributed to students via a google form. A total of 54 students participated in filling out the questionnaire. The results of data collection through questionnaires were then tested for reliability. The test results show that the value of Cronbach's Alpha is 0.75. This indicates that the questionnaire is declared reliable or consistent.

The student perception questionnaire of FEM consists of 6 questions. The results of data processing students' perceptions of the learning atmosphere showed that the average score was 3.16 and Std. The deviation is .578 as shown in Table 3.

Table3: Learning impacts using the FEM approach

Questions List	Results(N=54)	
	Mean	Std.Dev
I am motivated to learn E-Business Concept Class (Q1)	3.38	.489
FEM is an effective approach to E-Business Concept Class (Q2)	3.26	.684
I am interested in deepening my knowledge in E-Business Concept Class (Q2)	3.19	.557
I am enthusiastic about learning literature related to E-Business Concept (Q3)	2.94	.497
I am not having any difficulties learning every chapter taught in the E-Business Concept Class (Q4)	2.89	.543
I have always finished and submitted every assignment given by the lecturer (Q5)	3.30	.696
Summary	3.16	.578

4. Discussion and Limitations

One of the important aspects of developing teaching and learning curricula is determining the learning evaluation model (Goldfarb & Gail, 2014). In this study, the researcher applied the FEM to one of the subjects namely E-Business Concept. FEM was chosen as an alternative learning evaluation model to improve student learning outcomes.

Before using the FEM, it was seen that students' attitudes have a lower response. It is proven by the results of the pre-test on the experimental group of students which showed a decrease in students' attitude toward E-Business Concept subject learning. Then, after using FEM, there were many positive responses from the experimental group of students during the post-test (see table 1). It also happened to the students' knowledge. before using FEM, it was seen that students' knowledge had decreased. This is evidenced by the results of the pre-test on the experimental group of students which showed a decrease in students' knowledge of the E-Business Concept subject learning. Then, after using FEM, there were many positive responses from the experimental group of students during the post-test (see table 2). Therefore, it was proven that the attitude and knowledge of the FEM were better. This result is in line with Martin et al., (2022) that FEM improved students' attitudes and knowledge (Moris et al., 2021) towards the teaching and learning process.

In this study, FEM was designed as an alternative learning evaluation model to evaluate the students learning achievements at every meeting in the classroom. In addition, it was designed to improve students learning outcomes including students' attitudes and students' knowledge as well as to increase the lecturer's role as a facilitator in the teaching process. This study was limited in terms of the E-Business Concept subject and includes 14 topics. Those topics are learned by students who take from the two-year or second-semester students who have taken E-Business Concept subject for the first time. Secondly, this study is also limited in terms of the student group as participants. It was based on high E-Business Concept subject achievement. Lastly, this study had limitations in terms of the research samples, which were restricted to only one department (i.e Information System) at the Dian Nuswantoro University, Indonesia.

5. Conclusion

The Formative Evaluation Model (FEM) approach for E-Business Concept subject teaching and learning was designed specifically to improve students' attitudes and knowledge towards the taught subjects. Learning outcomes were significantly positive in terms of students' attitudes and knowledge. There were mean score differences between the control and experiment classes.

Learning outcomes were significantly positive in terms of students' attitudes and knowledge. There were mean score differences between the control and experiment groups. The mean score of students' attitude increased by 6.74 points and the mean score of students' knowledge increased by 2.23 points. Nearly all participants had a positive response to the FEM as an evaluation approach in the online learning strategy. The students' attitude and knowledge were increased. Therefore, the FEM approach was suggested as an evaluation approach for the online teaching platforms.

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