RESEARCH ARTICLE | MAY 15 2023

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AIP Conference Proceedings 2595, 020002 (2023)
https://doi.org/10.1063/5.0124733

Effectiveness of Physics Online Lectures Through Moodle-based E-Learning in the Middle of the Covid-19 Pandemic

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Abstract. In the spring of 2020, the Ministry of Educational proposed to suspend classes but keep learning and carry out online learning. The research was conducted based on quantitative descriptive approach. The purpose of this study was to determine the effectiveness of online lecturer through Moodle-based e-learning in the middle of Covid-19 Pandemic. This research was conducted at the physics Education at UIN Raden Intan Lampung. The population of this study was all students of the fifth semester of physics education who took the wave course. Data collection techniques used in the form of pre-test and post-test in the form of multiple choice as many as 20 question and the questionnaires that have been tested by validators. Data analysis was carried out with the help of SPSS 23 software. Based on the result of data analysis, online lectures through Moodle-based e-learning were effectively used during the pandemic.

INTRODUCTION

Corona Virus Disease 2019 (Covid-19) or called the corona virus is a pandemic that shocked the global community at the end of 2019[1]. The World Health Organization (WHO) declared Covid-19 a health emergency of International concern in January 2020 and two month later, on March 11, 2020 Covid-19 as pandemic [2] Covid-19 attacks the entire world including Indonesia. Physical distancing in all fields of life, both in education, economics, and other social field. As a result of the covid-19 outbreak, the Ministry of Education proposed that classes be suspended but that students continue to learn and carry out comprehensive online teaching [3]. Despite the limitations of interaction, the implementation of Education continues to run with the help of the media, specifically the teacher in conducting online learning.

According to The Indonesia-Central University Organizing Alliance (Apperti), 58 Universities modified their teaching techniques on March 14, 2020. With the spread of the covid-19, this data will continue expand [4]. Online learning is the best solution for teaching and learning activities during the Covid-19 pandemic [5]. The application of online learning with the help of the internet is expected to provide education to anyone, anywhere, and anytime[6]. Since the last few years e-learnibg has become a demand in the education sector, so online learning is not only caused by the Covid-19 outbreak [7]. E-learning was first introduced by the University of Ilion at Urbana-Champaign using a computer-assisted teaching system and a computer called PLATO [8]. E-learning is defined as distance learning that uses computer and internet technology internet [9]. E-learning is also known as online learning, internet-enabled learning, virtual learning, or web based learning [10,11]. There are many types of e-learning applications that are used to help the online learning process such as, Moodle, Schoology [12], Google Classroom [13,14], Edmodo, Zoom Meeting, and others. Moodle is the most popular open-source program among all existing E-learning. Moodle was ranked first among the 20 best LMS based on user experience in 2018-2019 [15] and is widely used by universities in the world including UIN Raden Intans Lampung.

The implementation of online learning in Indonesia, which was carried out, suddenly caused several problems. Based on research conducted by Darmayanti [16], online learning during the Covid-19 pandemic was sufficient to replace face-to-face learning [17]. Research also conducted by Rachmat states that online learning is less effective and can be seen from students' lack of understanding in education [18]. Based on the data frompre-research that has been done at the Physics Education Study Program, UIN Raden Intan Lampung as many as 74,1% of students still

Young Scholar Symposium on Science and Mathematics Education, and Environment
AIP Conf. Proc. 2595, 020002-1–020002-5; https://doi.org/10.1063/5.0124733
Published by AIP Publishing. 978-0-7354-4491-1/$30.00

have difficulty understanding lecture material conducted online, especially in wave courses. Researchers think this underlies the need for research on how effective the use of Moodle-based e-learning for lecturing during the Covid-19 pandemic. In addition, there are no articles that explain the effectiveness of online lectures through Moodle-based e-learning in wave courses. The learning effectiveness criteria used in this study are the improvement of student learning outcomes, student activities in the lecture process, and student responses to the online lecture process.

METHOD

This research is a type of descriptive research with a quantitative approach. It was conducted at UIN Raden Intan Lampung, Faculty of Tarbiyah and Teacher Training, Physics Education Study Program. The Subjects of this study were all students of the fifth semester who took the wave course, amounting to 75 people.

Data were collected by instrument test and questionnaire. The test carried out in pre-test and post-test in the form of multiple choice questions. Test result data is used to see student learning outcomes during online lectures. While the questionnaire was used to determine learning activities and student responses to online lectures using Moodle-based e-learning. All data analysis processes were carried out using SPSS 23 software. This study used Moodle-based e-learning. All instruments used have been tested for validity by expert validators. The test was conducted twice, namely before and after the online lecture. The effectiveness of lectures, in this study, measured on student learning outcomes, student activities and student responses to the lecture process of wave courses for one semester through e-learning moodel-based.

The criteria for the effectiveness of online kearning during the pandemic [17] can be seen below:

TABLE 1. Score Interval

Interval	Category
76-100%	Very Good
51-75%	Good
26-50%	Pretty Good
0-25%	Not Good

RESULT AND DISCUSSION

From the research that has been obtained, it is processed using SPSS 23 and analysed using descriptive statistics to determine students learning outcomes, learning activities and student responses to the lecture process carried out. Student learning outcomes were analysed using descriptive analysis with the aim of describing the understanding of student wave material after conducting online lectures through Moodle-based e-learning for one semester. Descriptive statistical analysis was used to calculate the size of the data concentration of learning outcomes. In this study, the earning outcomes data used were the data from the pre-test and post-test results that had been carried out. The amount of increase before and after learning is calculated by analysis of the N-Gain test, the N-Gain score formulation defined by Hakke [19] is :

$$N - Gain\ (g) = \frac{post\ test - pretest}{100 - skor\ pretest}$$

With the interpretation of the gain score criteria as follows:

TABLE 2. N-Gain Score Criteria

N-Gain	Category
N-gain > 70	High
$0{,}30 \leq N - gain \leq 0{,}70$	Medium
N-gain < 0,30	Low

Questionnaire analysis of student responses to online lectures through Moodle-based e-learning. The student response questionnaire that has been carried out by the researcher is calculated by the following formula:

$$Percentage = \frac{n}{N} \times 100\%$$

Information:
n : The score obtained by the students
N : Maximum score

Categories given by students to online learning are presented in the following table [20] :

TABLE 3. Students Response Criteria

Response	Criteria
$> 85\%$	Very Positive
$70\% \leq response < 85\%$	Positive
$50\% \leq response < 70\%$	Quite Positive
Response <50%	Negative

The learning activity questionnaire used in this study aims to determine student learning activities during online lectures through Moodle-based e-learning. The types of learning activities observed in this study include Visual Activities, Oral Activities, Writing Activities, Mental Activities, Emotional Activities using a Likert scale. Likert scale is used to measure attitudes, opinions, perceptions of a person or group of people about a phenomenon. The scoring on the questionnaire sheet is based on the table 4.

TABLE 4. Students Response Criteria

Scale	Criteria
1	Very Bad
2	Bad
3	Good
4	Very Good

The test results in the form of pre-test and post-test were conducted to determine the difference in student learning outcomes before and after using Moodle-based e-learning can be seen in the table 5.

TABLE 5. Pre-test and Post-test Results

Statistics	Pre-test	Post-test
Sample	75	75
Ideal score	100	100
Highest score	90	100
Lowest score	10	30
Average	59,07	78
Variance	449,117	391,892
Standard deviation	21,192	19,796

The result of student learning activity and response questionnaire distributed to find out the level of student learning activity during online lectures in the middle of the covid-19 pandemic:

TABLE 6. Students Learning Activities

Max score	Average
80	64,78

TABLE 7. Students Response

No	Question	Positive Response (%)
1	Do you enjoy learning wave material online through Moodle-based e-learning?	88
2	What is your concern. Is it better to do online lectures on wave material during a pandemic if it is done through Moodle - based e learning?	85,3
3	Do you easily adapt to the way lecturers teach in the online lecture process through Moodle-based e-learning?	88
4	Do you like the teaching and learning process carried out through Moodle-based e-learning during the covid 19 pandemic?	92
5	Do online lectures with the help of Moodle-based e-learning make it easier for you to understand wave material?	80
6	Does online lectures through Moodle-based e-learning make you an active student?	78,7
7	Has your confidence increased in expressing ideas / opinions/ questions during online lectures through Moodle-based e-learning?	86,7
8	Are you motivated to learn wave material independently during online lectures through Moodle-based e-learning?	86,7
9	After attending online lectures through Moodle-based e learning, is waves an interesting subject?	88
10	Do you feel that online lectures through Moodle-based e- learning are effective during this pandemic?	86,7
11	Do you feel any progress in learning after the implementing online lectures through Moodle-based e-learning?	85,3
12	After taking online lectures, does Moodle -based e learning have features that support lecture activities?	90,7
13	Do you find it difficult to access Moodle - based e-learning during online lectures?	60
14	Does online lectures through Moodle-based e-learning improve your learning outcomes?	84

From the table of the results of the post-test and pre-test scores that have been carried out, there is a very significant increase in the value of learning outcomes. The criteria for the success of student activities in this study are said to be effective. if at least 70% of students are actively involved in the learning process. Based on the table above, it can be said that student activities in this study are still less effective. This can be seen from the average percentage of student activity, which is 64.78% active in wave lectures. In the table of student responses to online lectures, the average student gave a positive response of 84.3%, which means online lectures through Moodle-based e-learning are effective during this pandemic. The results of this research, is in accordance to the Harry Dika et.al research which explaining the use of e-learning can be applied in schools as an effective and efficient learning media, even more, effective if implementing blended learning as a method of learning today [21].

CONCLUSION

Based on the results of data analysis and discussions that have been put forward and all indicators of effectiveness have been met, it can be concluded that Moodle-based e-learning is effectively applied in online lectures during Covid-19 pandemic. Suggestions from this study is the online lecture process should be redesigned as creatively as possible and use varied learning methods so that it can support students to be more optimal in learning and be more active and not feel bored.

REFERENCES

1. L. Guo, M. Wu, Z. Zhu, L. Zhang, S. Peng, W. Li, H. Chen, F. Fernández-Aranda, and J. Chen, Eur. Eat. Disord. Rev. **28**, 816 (2020).
2. A.O. Mohmmed, B.A. Khidhir, A. Nazeer, and V.J. Vijayan, Innov. Infrastruct. Solut. 1 (2020).
3. W. Zhang, in J. Phys. Conf. Ser. **1634** (2020), 1–6.

4. R. Zainul, M. Adri, Sriadhi, Khaerudin, N. Wahyuningtyas, Darni, Rusdinal, Nasrun, Rahmulyani, Nuranjani, Nurmaniah, A. Wedi, E. Surahman, E.N. Aisyah, H.I. Oktaviani, R. Sri Martini Meilanie, S.N. Purnamawati, Hapidin, W.D. Listyasari, Irsyad, Syafril, Anisah, Y. Santoso, Muhardi, A. Kristanto, L.H. Susarno, D. Kuswandi, R. Wardani, and E. Adnan, in J. Phys. Conf. Ser. **1594** (2020).
5. Z. Fajri, H. Baharun, C. Muali, Shofiatun, L. Farida, and Y. Wahyuningtiyas, in J. Phys. Conf. Ser. **1899** (2021).
6. A. Putri, and S. Suparmi, J. Ecogen. **3**, 627 (2020).
7. W. He, G. Xu, and S.E. Kruck, J. Inf. Syst. Educ. **25**, 101 (2014).
8. A. Ekantini, Jur. Pend. Madrasah, **5**, 187 (2020).
9. R. Sayekti, in J. Phys. Conf. Ser. (2018).
10. M.A. Arlando, Efektivitas Proses Pembelajaran Daring Mahasiswa Pendidikan Teknik Mesin Upi Pada Masa Pandemi Covid-19, Uiversitas Pendidikan Indonesia, 2020.
11. M. Mustari, A.L. Hoya, M. Akmansyah, R. Diani, and A. Asyhari, in J. Phys. Conf. Ser. **1155**, 1-10 (2019).
12. I. Syafei, A. Saregar, H. Hairul, A. Thahir, P.M. Sari, and A. Anugrah, in J. Phys. Conf. Ser. **1467**, 1-9 (2020).
13. R. Ramadhani, R. Umam, A. Abdurrahman, and M. Syazali, J. Educ. Gift. Young. **7**, 137 (2019).
14. Y. Suryani, A.R. Ningrum, N. Hidayah, and N. R. Dewi, in J. Phys. Conf. Ser. **1796**, 1-9 (2021).
15. S.H.P.W. Gamage, J.R. Ayres, M.B. Behrend, and E.J. Smith, Int. J. STEM Educ. **6**, (2019).
16. A. Damayanthi, J. Sos. J. Penelit. Ilmu-Ilmu Sos. **21**, 53 (2020).
17. K.T. Haqiqi, E. Hariyono, and N.A. Lestari, PENDIPA J. Sci. Educ. **5**, 451 (2021).
18. D.S. Bestiantono, E.H. Sa'diyah, R. Rachmatya, H. Mubarok, A.S. Adam, and N. Suprapto, in J. Phys. Conf. Ser. **1417** (2019).
19. D. Permana, Efektivitas Model Pembelajaran Advance Organizer Terhadap Aktivitas Belajar Dan Pemahaman Konsep Peserta Didik Dalam Pembelajaran Fisika, 2019.
20. W. Wahyuddin and N. Nurcahaya, Al Khawarizmi J. Pendidik. Dan Pembelajaran Mat. **2**, 72 (2019).
21. H. Dhika, F. Destiawati, and M. Jaya, Psychol. Educ. J. **58**, 7279 (2021).