



The Effect of Online Learning System Through Blended Learning Model toward Higher Student's Academic Achievement

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Abstract

Era industry 4.0, especially in the field of education, emphasizes the use of digital technology and the internet which develops rapidly in the learning process. Online learning is one form of implementation of learning in industry 4.0 era. The purpose of this study is to determine the effect of the implementation of the learning system on the higher students' academic achievement. This research is experimental research, with a pretest-posttest control group design. The purpose of this design is to reveal whether online learning systems can affect students' academic achievement or not that's measured through the learning outcomes of biology education students at the concept of structure and transport of cell membranes in the University of Muhammadiyah Makassar. Based on analyzed data, it shows the difference in the increase of students' learning outcomes taught by the online learning system and without using an online learning system. Based on the findings of this study, students who are taught by online learning system get a higher score of learning outcomes. It can be said that there is an effect of the online learning system toward students' academic achievement.

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INTRODUCTION

The era of the fourth world industrial revolution or commonly referred to as the era of the industrial revolution 4.0 has become a warm conversation and a challenge for Indonesia. This new era of mining has had an impact on changes in various fields, one of which is in the field of Education. Information technology has become the basis in human life (Kemenristekdikti, 2018). Having the ability to compete in this digital age, Indonesia needs to immediately improve the capabilities and skills of human resources through Education (Syamsuar & Reflianto, 2018). Education in the industrial era 4.0 requires us to innovate and be creative to improve the quality of education (OECD, 2016).

Online learning is a form of teaching that innovates with new genres and makes individuals/students equipped with technological devices and software that provide a learning environment. anywhere (Ceylan & Kesici, 2017). Improvement learning processes depend on the strategy that's used in the learning process while the use of technology will facilitate effective teaching (Helen B. Boholan, 2017). Using technology supports the achievement of learning objectives, the learning process and desired learning outcomes. This gives students 21st-century skills opportunities in the learning process that is supported by technology (Kong & et.al, 2014) . The use of technology can help students to develop digital literacy skills that are part of 21st-century competence.

Online learning has been widely applied in several universities, by offering several types of online learning that is fully online learning or combining online and face to face (learning hybrid/blended learning) (Sun & Chen, 2016). The advantages of online learning are reducing costs and travel time, providing and increasing opportunities to collaborate with professional experts on a global scale, giving students flexible learning (Finch & Jacobs, 2012) .

Online learning can help students in academic achievement. This can be proven from the story of Battushig Myanganbayar who was born in Ulan Bator, Mongolia who took the Circuits and Electronics class online. Battusig came from a disadvantaged area, but he and 340 students received perfect scores from 150,000 students who took the course. Battusig's story shows that online learning systems can help in academic achievement (Bilfaqih & Qomaruddin, 2015).

Online learning makes education not limited by space or time. This makes learning more accessible and is the basis of many distance education programs. (Butcher & Wilson-Strydom, 2013). The main feature of online learning is that it refers to flexibility, accessibility, student focus, interactivity, and student improvement. learning developed on the web has the advantage of providing learning material content that can be accessed anywhere and faster than other conventional distance education methods. (Lopes A. P., 2014).

Learning allows students to gain knowledge, skills and increase competence efficiently without direct intervention from the instructor (teacher/lecturer). It can be said that online learning is one form of learning that supports educational mechanisms (Widower, Korga, & Gnapowski, 2014).

The learning process is a very important activity in education. To overcome the problem of readiness in the digital era. One of the learning models that can be used in online learning is blended learning. Design of the blended learning model allows the content of the material to all students to be conveyed even in large numbers (Rovai & Jordan, 2004). Blended learning has the potential to improve student learning outcomes (Dziuban, Moskal, & Hartman, 2004) .

Aim of the present study is 1) to find out the academic achievement of students taught by the Online Learning System on the concept of membrane structure and transportation, 2) to find

out the academic achievement of students not taught by online learning on the concept of cell membrane structure and transportation, 3) to determine whether there is an influence of the application of online Learning Systems on the achievement of academic achievement of students on the concept of cell membrane structure and transportation

RESEARCH METHOD

Type of research is experimental research. Design of this study is Pretest Posttest Control Group Design. The aim of this design is to see the academic achievement of students taught by using an online learning system and to determine whether there is an effect of online learning systems on students' academic achievement as measured through learning outcomes. Two classes will be the groups of this research, the class taught using the online learning system as an experimental group and another one taught without using the Online Learning System as a control group.

35 students participated in this study. 19 students as a control group and 16 students as an experimental group. Data collection tool is a 30 number multiple-choice question to measure student learning outcomes on the concept of structure and transportation cell membranes. The learning model used in the experimental group is blended learning type flipped classroom. While control group is taught by the traditional learning method.

RESULTS AND DISCUSSION

The average score of student learning outcomes taught by using the online learning system and those not taught by the online learning system show in table 1.

Table 1 The average score of the pre-test and post-test experimental and control group

Groups	<i>Pre Test</i>		<i>Post Test</i>	
	Mean	Standar Deviation	Mean	Standar Deviation
Experiment	31	9	53	6
contorol	29	5	38	10

Based on the results of the descriptive analysis in the table above, the average post-test score of the experimental group was 53, while the average post-test score of the control group was 38. It means that the average score of students taught using by online learning system was higher. Independent t-Tests on the pre-test scores of the experimental group and control group students were used to identify whether there was differences in their initial ability which might influence post-test scores. The results of the initial capability analysis show in the table below.

Table 2 Comparison of Pre-Test in Control and Experiment Groups

Pre-test scores	N	Mean	SD	t-test	Sig.(2-tailed)
Experimental	16	31	9	.850	.401
Contorol	19	29	5		

N=Number, SD= Standar Deviation,

Based on the results of the independent t-test in table 2, sig values were obtained. (2-tailed) $0.401 > 0.05$, means that there is no significant difference between the initial ability of students in the experimental group and the control group. To show how much the improvement students' scores from pre-test to post-test for whole groups, pre-test and post-test score was analyzed by using SPSS to find the gain score. The following results of the gain analysis shows in the following table..

Tabel 3 N-Gain Score of Experimental and Control Group

N-Gain score of two Groups	N	Mean	Std. Deviation
Eksperimen	16	21.57	7.18
Kontrol	19	9.57	9.86

In table 3, shows the difference average gain score of each group. The average gain score of the experimental group was 21.75 and the average gain score of the control group was 9.5. It shows that there are differences in the increase of students' learning outcomes taught by using online learning and without taught by online learning.

Tabel 4 Comparison of the N-gain score of the learning outcomes

Groups	N	F	t-test	df	Sig.(2-tailed)
Experimental	16	.595	-4.099	33	.000
control	19				

Based on the results of data analysis obtained from the independent t-test, a sig value (2-tailed) $0,000 < 0.065$ which means that there are significant differences in the improvement of student learning outcomes between the experimental and control groups. It can be said that there is an influence of the implementation of the online learning system toward students' academic achievement on the concept of structure and transportation of cell membranes.

The purpose of this study is to determine the effect of the implementation of online learning systems on the academic achievement of biology education students at the University of Muhammadiyah Makassar. Based on the results of statistical data analysis, it shows that the average learning outcomes of students taught with an online learning system are higher than students who are taught without an online learning system (the method used is a traditional learning method). It can be seen that online learning has a positive impact on student achievement. (El-Seoud, 2014). Online learning provides a change in the world of Education that provides opportunities for students to receive and share information easily (El-Seoud, 2014). Using the internet is not only effective but also students are also faster to access various learning materials (Muhisn, 2019).

Based on the results of the N-gain score analysis, students who were taught with an online learning system (experimental group) gained an increase in learning outcomes of 21.75 and an increase in the value of students not taught with an online learning system (control group) of 9.5. From this data, it can be said that the online learning system is effectively used in the learning process. The difference in the increase in learning outcomes of the experimental group and the control group was obtained from the independent T-test of the gain score The

analysis results obtained are (2-tailed) <0.065 which shows that there are significant differences in the improvement of learning outcomes.

Various surveys and studies that show online learning are effectively used in the learning process (Pappas, 2015) . Online learning is supported by increasingly sophisticated technology and the internet continues to grow. Online learning systems play an important role in improving students' thinking skills and innovation. (Chootonghai & Songkram, 2018) .

The learning model used in this study is blended learning. Integrating online and face-to-face learning with the help of instructors will make students more satisfied and interested in learning (Bakhsh, 2018). Blended learning model allows the delivery of material to students with an unrestricted amount, but face-to-face learning is still important to strengthen students' learning experience (Sana, Fenesi, & Kim, 2011). The findings in this study are students taught by the online learning system is more ready to take part in learning because it already has sufficient knowledge after conducting online lectures. In addition, the time needed to complete the worksheet is less than students who have not been taught with an online learning system.

CONCLUSION

The conclusion obtained from this study is that the academic achievement of students taught by online learning systems is higher than students who are not taught by online learning systems. And there is an influence of online learning systems on student achievement especially in the concept of structure and transport of cell membranes.

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