



Comparison of the Effectiveness of Biomedical Subject Learning Methods

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ABSTRACT

The Covid-19 outbreak requires the teaching and learning process to change to using online methods. The purpose of this study was to determine the evaluation of student learning in basic biomedical science courses consisting of theory and practicum with offline and online methods by looking at the scores of students' final semester exam results. The sample for this assessment is 174. The value of offline theory compared to online differs by 4.94 points, where the online value is high. The value of online practicum learning compared to offline is 8.2 points different, where the online value is also higher. Final semester test scores method theory offline varies from 43 – 88 while method online from the value of 52 – 92. The results of the final semester practicum exam scores method offline from 68 - 90 while online ranging from 60 - 98. The average percentage of online theory learning methods is 74.15 and the average offline theory learning method is 69.21. Meanwhile, the average percentage of offline practicum learning methods is 74.59 and the average percentage of online practicum learning methods is 82.79. The analysis of this research uses the SPSS program independent samples t-test with the results of the value of $t = 4.818$ and $sig = 0.013$ (less than 0.05), then the conclusion is the result of the value of basic biomedical science with online learning methods is higher than offline learning.

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1. INTRODUCTION

At the end of 2019 the whole world was hit by an outbreak of the corona virus disease (covid-19), where the virus attacks the human respiratory system, even causing death if suffering from congenital diseases. Corona virus disease is a new generation of severe acute respiratory syndrome/SARS where the epidemic started in 2002 and Middle-East respiratory syndrome /MERS in 2012 [1]. Covid-19 spread very quickly, initially in Wuhan-China and now almost the whole world has been hit by Covid-19. The latest data on COVID-19 data as of October 24, 2021, recorded 4,239,396 people who were infected and caused 143,176 deaths. The occurrence of transmission is very fast in Indonesia starting from March 20, 2020 to December 19, 2021, 4,260,544 positive patients with the number of deaths 144,002 people, while patients who recovered amounted to 4,111,619 (R & D data). The epidemic is growing so fast that it threatens all fields including education. Anxiety arose over the enormous risk that the government through the Minister of Education and Culture (Mendikbud) on March 17, 2020 issued Circular Letter No. 36962/MPK.A/HK/2020 which urges the start of the online method learning process (on the network) in the process. teaching and learning in schools and universities aims to break the chain of the spread of Covid-19.

Universities have begun to facilitate online learning by holding an Academic Management System (AMS) to make it easier to carry out the online learning process. With the issuance of Circular Number 36962/MPK.A/HK/2020, an appeal for the online method of teaching and learning by the government is strengthened by the development of information and communication technology in the Industrial 4.0 era which has affected the teaching and learning process.

The development of this technology provides changes to learning activities ranging from elementary school to college level. The development of this technology forces teachers to be able to in a short time change the method outside the network (offline) to the method in the network (online).[2]. This is related to research[2]who said thatIn learning to use language, information technology can be accepted as a method for carrying out the educational process as well as helping in the implementation of teaching and learning by looking for references and sources of information. The online method means the online learning method by enabling internet information technology media to replace face-to-face meetings in class. The course material delivered using the lecture method is definitely more effective with the online method when compared to the delivery of practical material using the method. There are several problems encountered when carrying out this online method, namely network disturbances, especially in remote/rural areas and other technical problems[3]. Based on the Circular, the Minister of Education and Culture explained that the circular provided flexibility for the education sector to make policies for the implementation of WFH (Work From Home) and apply online learning methods.

Nursing vocational education is an educational institution that will provide education to students so that they can have nurse competencies so that they are able to work in the field of health services. The implementation of education refers to the nursing curriculum where there are theoretical, practical and clinical practice courses. Theory is given in class and practicum is given in the laboratory while clinical practice is carried out in health services. Clinical practice activities in health services where students are directly involved in treating patients either by observation, accompanied or independently. In this case, students must have adequate knowledge of both theory and practice. Education will provide nursing knowledge according to the curriculum and instructions of the director.

Currently, the use of information technology has shown an increase in the quality of education, but it will be different if it is implemented in an impromptu manner with very minimal preparation. This unpreparedness will cause obstacles such as the inaccessibility of internet signals in the student's residence, especially those who live in rural areas. From a psychological point of view, where this pandemic requires people to stay at home, this can make students feel like they are locked up and make them less focused on online learning. This research was conducted on students of the D3 Nursing Study Program level 1 consisting of two classes (A and B) focused on basic biomedical science courses which have 4 credits of theory and practicum.

2. RESEARCH METHOD

This research is included in the type of comparative quantitative research. Quantitative research is a quantitative approach where the data is in the form of numbers and data processing by statistical methods. Comparative research is research conducted in order to know the difference in a variable from two different groups. This study aims to find differences in the value of basic biomedical science to groups of students who learn to use online and offline methods, both theoretical and practical using a quantitative approach and the data obtained will be processed using statistics. A quantitative approach is used in testing a theory, for presenting a fact / describing statistics and is used in showing the relationship between variables,[4].This research was carried out in 1 semester, namely September 2018 - February 2019 for the offline learning method. Online learning September 2019 – February 2020 for online learning methods where lecturers and students are in their own homes. The population in this study were all level 1 students of one of the D3 Nursing Study Programs in Palembang. The sample was taken using a total sampling technique, namely class A and B as the research sample. The supporting equipment in this research is a computer that will process the final semester test scores for classes A and B for basic biomedical science courses. Analysis data in this study using statistics. Descriptive statistics are needed to describe semester result data using online and offline methods for basic biomedical science courses in the form of: mean, standard deviation, minimum and maximum values, and percentage distribution tables. Inferential statistics are useful in testing the significance of differences in final semester grades for theoretical and practical basic biomedical science courses, both online and offline methods. Independent sample t-test is one of the inferential statistical techniques needed in this study. Computerized to process the SPSS program, in testing the data it was declared significant if the sig value of the computational result was less/equal to 0.05. This research uses[5]as a reference in data analysis.

3. RESULTS AND ANALYSIS

Description yield value study basic biomedical sciencethese two methods are presented using descriptive statistics in table 3.1

Table 1. Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error mean
Pair 1	Theory Online	74.15	174	8,103	,614
	Theory Offline	69.21	174	9,409	,713



Table 2. Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error mean
Pair 1	Theory Online	74.15	174	8,103	,614
	Theory Offline	69.21	174	9,409	,713

DESCRIPTIVE STATISTICS OF LEARNING OUTCOMES

The value of the final semester examination for Basic biomedical sciences in both methods is obtained from the score offline theory compared to online differed by 4.94 points, where the online score was high. The value of online practicum learning compared to offline is 8.2 points different, where the online value is also higher. The results of the final semester test scores for basic biomedical science theory offline vary from 43 - 88 while online ranging from values 52 - 92. The results of the final semester exam scores for basic biomedical science practicum offline vary from 68 - 90 while online ranging from 60 - 98. The average percentage of online theory learning methods is 74.15. The average percentage of offline theory learning methods is 69.21. Meanwhile, the average percentage of offline practicum learning methods is 74.59 and the average percentage of online practicum learning methods is 82.79. $t = 4.818, p = 0.013$ (less than 0.05). The conclusion is that the results of learning basic biomedical science with the online method are higher than the offline method class.

1. Tables 3.1 and 3.2

Based on the categories of learning outcomes for basic biomedical sciences, it can be seen in table 3.1 that the learning outcomes of the theoretical and practical basic biomedical science courses of the two research methods are not categorized as very low. For the high category value, there is an online method class which has a higher value. Meanwhile, the offline method has a moderate value. Based on the test results tested with the independent samples t-test procedure, it was concluded that the learning outcomes of basic biomedical sciences in the online method class tend to be higher than the offline method class. This trend is then verified by inferential statistics.

2. Test The Difference in The Value of The Two Research Classes

Differences in basic biomedical science test scores in the two research methods were also tested with the independent samples t-test procedure. The computational results of the SPSS program give the value of $t = 4.818$ with p value = 0.013

4. CONCLUSION

The education sector is trying to adjust to the Covid-19 Pandemic period so that it changes learning methods with online methods. Based on government directives that the education sector can change learning methods and advance become an internet-based online learning method. This directive should be complied with by the education sector to support minimizing the risk of unwanted spread and trying to break the chain of the spread of Covid-19. Changes in learning methods suddenly, so that lecturers and students try hard to learn the internet. There is concern that the achievement of learning objectives will not be optimal (Mediarti et al., 2021). The results of this study revealed that the learning outcomes of online method lectures were higher than those of the offline method. Students are given the same knowledge but different methods. Need to be developed for method online can even open remote classes [6]. The obstacles faced when implementing the online method were network disturbances (visual and audio) and the availability of time to provide feedback to control students' understanding or not. The researcher and the team tried to overcome these obstacles by making and sending videos aimed at enabling students to learn again. The effort was quite successful, seen from the average value of online theory learning outcomes of 74.15 which was classified as high and online practicum was 82.79 so that it can be said that online learning class learning outcomes were high. This study uses the SPSS program and inferential statistical analysis of independent samples t-test with the results of the value of $t = 4.818, p = 0.013$ (less than 0.05). The conclusion is that the results of learning basic biomedical science with the online method are higher than the offline method class. The results of this study are in line with Ali Sadikin's research which says that online learning has flexibility in its implementation and is able to encourage the emergence of independent learning and motivation to be more active in learning [7].

The results of this study are also in line with the research of Intan et al [8] on the Effectiveness of Offline and Online Learning on Students' Thematic Learning Outcomes in Elementary Schools with the result that the value of online learning is higher than offline learning. The shift in the habit of teaching and learning processes in the industrial era 4.0 has made online methods an absolute choice during this Covid-19 pandemic [2]. Also in line with research conducted by Ririn regarding the impact of online learning during Covid-19 on student achievement in geography subjects for class xi ips sman 1 Labuhan haji, it showed the results of increasing student scores when learning the online method [9]. This research is also in line with the research on the effect of e-learning learning on

the learning outcomes of the statistics course for the English language tadaris students at the Tarbiyah faculty, Iain Walisongo, written by Lulu et al., with the result that students' scores were higher with the e-learning method compared to the conventional method.[10]The online method is indeed the most preferred by students compared to the face-to-face method with lecturers because the online method is more practical and can be done anywhere and anytime.[11]. This situation forces lecturers and students to adjust even though they are limping and this needs support from parents/guardians of students. Monitoring and evaluation must be carried out by the government to ensure infrastructure certainty in the application of online methods during the Covid-19 pandemic(Kusumawaty et al., 2022). Efforts from educational institutions that can be done are inviting lecturers to continue practicing using online methods, providing adequate internet bandwidth on campus, providing single tuition waivers to students as a form of refunding costs for using the internet at their respective homes. Efforts to cover the shortcomings of online methods, namely the need for high creativity and innovation of lecturers in making teaching materials, for example, creating learning and motivating videos that can increase student independence in learning, the impact is that students will be independent. Build students' enthusiasm so that they don't focus on campus as the main learning resource, but they can use social media to get the most important knowledge related to the learning material.

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1. The value of learning outcomes in offline learning classes for basic biomedical science theory varies from 43 – 88 and the value of online learning of basic biomedical science theory 52 - 92 is in the high category, so that it qualitatively states that the results of the value of basic biomedical science in the online method class are relatively high compared to the offline method.
2. The value of learning outcomes for offline basic biomedical science practicum methods varies from 68 to 90 and online basic biomedical science practicums varies from 60 to 98, it can be concluded that the results of basic biomedical science values using online methods are also fairly high.
3. The learning outcomes of basic biomedical sciences in the online method class were significantly higher than the offline method class.

REFERENCES

- [1] Y. Yani and Bernarda Teteng, "Comparison of Learning Outcomes for Pathophysiology Courses Between Online Learning and Offline Learning (Offline) for Semester II Students Stikes Dirgahayu Academic Year 2019/2020," *J. Happy Nursing*, vol. 2, no. 2, pp. 23–31, 2020, doi:10.52841/jkd.v2i2.152.
- [2] NL Khusniyah and L. Hakim, "EFFECTIVENESS OF ONLINE-BASED LEARNING ;," vol. 17, no. 1, pp. 19–33, 2019.
- [3] RD Noviyantii, D. Pertiwi, D. Kusudaryati, and D. Luthfianto, "Comparative Analysis of Online and Offline Lectures during the Covid-19 Pandemic. Comparative Analysis of Online Lectures and," *Urecol Journal. Part A Educ. Trains.*, vol. 1, no. 1, pp. 25–32, 2021.
- [4] S. Subana, M., *Basics of Scientific Research*. Bandung: Faithful Library, 2011.
- [5] contour, *Research methods for thesis and thesis writing*. Jakarta: PPM, 2005.
- [6] AT Korucu and A. Alkan, "Differences between m-learning (mobile learning) and e-learning, basic terminology and usage of m-learning in education," *Procedia - Soc. Behav. science.*, vol. 15, pp. 1925–1930, 2011, doi:10.1016/j.sbspro.2011.04.029.
- [7] A. Sadikin and A. Hamidah, "Online Learning in the Midst of the Covid-19 Outbreak," *Biodic*, vol. 6, no. 2, pp. 214–224, 2020, doi:10.22437/bio.v6i2.9759.
- [8] IS Karlina and S. Astuti, "EDUCATIVE: JOURNAL OF EDUCATIONAL SCIENCES The Effectiveness of Offline and Online Learning on Students' Thematic Learning Outcomes in Elementary Schools," *J. Educational Sciences.*, vol. 4, no. 4, pp. 1717–1723, 2021, [Online]. Available: <https://doi.org/10.31004/edukatif.v3i4.642>.
- [9] Kusumawaty, I., Mediarti, D., Elviani, Y., Kesehatan, P., Palembang, K., Kesehatan, P., Palembang, K., Kesehatan, P., Palembang, K., & Info, A. (2022). UNLOCKING THE FACTS BEHIND NURSING STUDENT CLINICAL PRACTICES : CHALLENGES DURING THE COVID-19 OUTBREAK. 1(5), 845–852.
- [10] RC Andriana, "IMPACT OF ONLINE LEARNING DURING COVID-19 ON STUDENT'S LEARNING ACHIEVEMENT IN GEOGRAPHY CLASS XI IPS SMAN 1 LABUHAN HAJI," vol. 9, no. 2, pp. 82–89, 2021.
- [11] L. Nisa, Choirun, "The Influence of E-Learning on Learning Outcomes of Statistics Course for English Tadaris Students, Faculty of Tarbiyah Iain Walisongo," *J. Phenom.*, vol. 2, no. 1, pp. 7–27, 2012.



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- [12] T. Pinaka, R. Ning, and AS Fitria, "EFFECTIVENESS OF ONLINE LEARNING COURSE EVALUATION OF INDONESIAN LANGUAGE AND LITERATURE TEACHING DURING THE COVID-19 PANDEMIC," vol. 2, no. 01, pp. 11–20, 2020.
- [13] Mediarti, D., Kusumawaty, I., Yunike, & Oktarina, R. (2021). What Are the Facts in Online Nursing Education During the Covid-19 Pandemic? *Proceedings of the First International Conference on Health, Social Sciences and Technology (ICoHSST 2020)*, 521(ICoHSST 2020), 62–67. <https://doi.org/10.2991/assehr.k.210415.015>