



Al Ibtida: Jurnal Pendidikan Guru MI
ISSN: 2442-5133, e-ISSN: 2527-7227

Journal homepage: <http://syekhnurjati.ac.id/jurnal/index.php/ibtida>
Journal email: alibtida@syekhnurjati.ac.id

Al Ibtida

The Effect of Edmodo-Based E-Learning toward Participation and Understanding of Elementary School Teacher Candidate

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Received: July 19th, 2020. Accepted: September 27th, 2020. Published: October 29th, 2020.

Abstract

This study aims to determine the effect of Edmodo-based E-learning on the participation and understanding of elementary school teacher candidate in science 1 biology courses. This study used a quasi-experimental method using a non-equivalent control group design. The sample of this study was 49 elementary school teacher candidates in semester 2 of PGRI Yogyakarta University. The data collection technique used a participatory questionnaire instrument and a pretest-posttest comprehension test. The results of the Independent Sample t-Test show that the value of Sig. for the participation variable of $0.004 < 0.05$ and the Sig. for the understanding variable of $0.005 < 0.05$. While, the MANOVA test results show the value of Sig. for the participation variable of $0.004 < 0.05$ and the Sig. for the understanding variable of $0.005 < 0.05$. This means that there are differences in the increase in participation and understanding of elementary school teacher candidate after using Edmodo-based E-learning. In addition, the application of Edmodo-based E-learning also has a positive effect on the participation and understanding of elementary school teacher candidate on science topics. Edmodo-based e-learning makes elementary school teacher candidates more active in participating and easier in understanding science lecture material 1.

Keywords: *edmodo-based e-learning, participation of elementary school teacher candidate, natural science understanding.*

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh E-learning berbasis Edmodo terhadap partisipasi dan pemahaman calon guru Sekolah Dasar pada mata kuliah IPA 1 materi biologi. Penelitian ini menggunakan metode eksperimen semu dengan menggunakan desain penelitian *non-equivalent control group design*. Sampel penelitian ini adalah 49 calon guru Sekolah Dasar semester 2 Universitas PGRI Yogyakarta. Teknik pengumpulan data menggunakan instrumen angket partisipasi dan tes pemahaman melalui pretest-posttest. Hasil Uji Independent Sample t-Test menunjukkan nilai Sig. untuk variabel partisipasi sebesar $0.004 < 0.05$ dan nilai Sig. untuk variabel pemahaman sebesar $0.005 < 0.05$. Sedangkan hasil uji MANOVA menunjukkan nilai Sig. untuk variabel partisipasi sebesar $0.004 < 0.05$ dan nilai Sig. untuk variabel pemahaman sebesar $0.005 < 0.05$. Hal ini berarti bahwa terdapat perbedaan peningkatan partisipasi dan pemahaman calon guru Sekolah Dasar setelah menggunakan E-learning berbasis Edmodo. Selain itu, penerapan E-learning berbasis Edmodo juga berpengaruh positif terhadap partisipasi dan pemahaman calon guru Sekolah Dasar pada topik IPA. E-learning berbasis Edmodo menjadikan calon guru Sekolah Dasar lebih aktif dalam berpartisipasi dan lebih mudah dalam memahami materi perkuliahan IPA 1.

Kata kunci: *e-learning berbasis edmodo, partisipasi calon guru SD, pemahaman IPA.*

INTRODUCTION

Natural science is a branch of science concerned with the natural phenomenon in our surroundings. It aims to encourage people's awareness about science, to make people realize that the world development continues to grow, consequently, it needs adaptation by improving self-ability (Mukhlisoh & Khisbiyah, 2015). Natural Science at college becomes one of the courses that must be taken by the elementary school teacher candidate. As a teacher candidate, the basic concept of Natural Science can be a background of knowledge for them in elementary school learning activities. However, the fact that the elementary school teacher candidate from the educational background of vocational high school and senior high school with the study concentration of social science leads to minimum basic competence of Natural Science at the college. Zunaidah & Mukmin (2017) stated that the diversity of the students' graduate background becomes one of the factors to determine the successfulness in the basic concept of Natural Science.

According to the observation when learning activities of Natural Sciences biology material, the little number of students share their opinion and ask questions, the character of students unconfident over the competence of Natural Science they basically less master the subject, the monotone or less creative learning methodology as just giving speech leads the learning activities of Natural Science to be passive. Therefore, the participation of the elementary school teacher candidate on discussion activities classified as being minimum. This is match with the research of Pratiwi, et al. (2016); Raharja, et al.(2018) arguing that the

question and answer session between the students and the lectures regarding the unclear subject is minimum, just once discussed with their peer both inside and outside the class, learning activities are only by listening to the teacher explanation, and the learning atmosphere to be passive. The diversity of students' graduate backgrounds and the lack of participation increase the misunderstanding of the elementary school teacher candidate about Natural Science. In the learning activity, general participation is an effective component and can be more effective in online learning (Weiser, et al., 2018).

In the educational paradigm, learning nowadays is connected to the development of Information and Communication Technologies (ICT). The development of ICT has improved the competence level to achieve success in the knowledge-based economic era (Rahardiansah, 2013). E-learning is learning support that involves the development of ICT. E-learning can be used as an alternative for increasing student participation and understanding of Natural Science. In line with the need for knowledge and skill for supporting the 21st century. It can be completed by education that emphasizes life skills such as communication, creativity, cross-culture collaboration, understanding, and critical thinking (Teo, 2019). E-learning is a learning media and a new approach in the educational field that is oriented to the students and it is usually refer to the use of computer network technology especially the internet in the process of sending information and instruction to one and another (Govindasamy, 2002; Lee, et al., 2013). One of the E-learning system advantages that is adapted in the learning process can assist the teacher in the application of traditional teaching methods (Chang, et al., 2017). Edmodo is an E-learning system which is easy to be used and managed by the teacher in the learning process.

Edmodo belongs to the Learning Management System (LMS) program that provides some features which can be used by the teacher in the learning process (Purwaningtyas, et al., 2017). Edmodo is a platform similar to Facebook that provides many facilities or feature to be accessed and benefited for discussion, online quiz, and many other options that be able to connect with the international experts in many disciplines, as well as leads the student of today's generation and the teacher to be more intimate (Balasubramanian, et al., 2014). It does not take a long time for the students to learn Edmodo in detail since the design is similar to Facebook. Therefore, the students will easily adapt Edmodo system (Wadman, 2013). The features in Edmodo (Basori, 2013) are Assignment, File and Links, Quiz, Polling, Gradebook, Library, Award Badges, and Parents Codes. These features facilitate the process of natural-science online learning. Undoubtedly, many teachers use Edmodo to make a group of study, make a digital library and post a video, picture, and audio to trigger the online class

discussion and also give a medium to the student and teacher in sending messages and involved in micro-blogging (Contant, et al., 2010). The group of online learning is a medium for college students to participate in Natural Sciences biology material.

Participation is a mental involvement, decision-making involvement, attendance, education intervention, leaving meaning in an indefinite and an unassuming context, also someone's emotional involvement that is active in the class in to achieve the goals by giving a question and has a responsibility toward it (Harcourt & Gray, 2013; Safrida, et al., 2017). Student participation needs to be created actively in the learning process because active participation affects the increased quality of the learning process and a better understanding of the lesson than passive learning (Ginanjari, et al., 2019). Some factors that affect participation, are knowledge/cognitive; situational condition; social habit; needs including the needs of Approach, Avoid, and individual need; and attitude in interacting (Iskandar, 2017). Precourt et al. (2018) also stated that factor which affects the participation is centered on the three main elements that are the frequency of participation, the consistency of participation and presence.

The college student's high participation (active) in the learning process can rise and increase the result of the study. The increasing result of the study is because of the student's ability of understanding. The understanding is directed to conceptual change and development in the form of new information to the structure of knowledge through mental development so that it becomes an acceptable concept (Reinfried, et al., 2012). The importance of understanding the learning process is because it can explore the student's basic knowledge to construct new knowledge (Margunayasa & Riastini, 2014).

The understanding of knowledge concept is a beginning to learn the new concept that is supported by the experiences. First, students understand a concept and then apply it (Nurjaya, 2015). Because of it, participation can support student's understanding as to the basics of the knowledge-content expertise, definition, the reason for knowledge-having, and the expertise of higher ability. Through the technological and communication advancements, participation will be more support the student's understanding of online learning. Edmodo-based E-learning allows student to grasp the knowledge easily. The student can communicate directly and can brush up their understanding about the lesson that has ever been learned and is still not understood when the learning process is being done.

Despite online learning, participation and understanding in lecture activities are essential to concern. Edmodo-based E-learning gives the opportunity to students to grasp the knowledge easily. According to the previous researches about Edmodo conducted by some researchers. Firstly, the research by Şenel (2016) applies Edmodo to share the information,

check the assignment as the authentic assessment, and review the course; second, Qomariyah, et al. (2019) Implements Edmodo to find out the student understanding in learning the grammar rules with fitter timer in the Edmodo online class; third, Uzun (2015) applies Edmodo to know how the student behaves towards management system of the Edmodo Learning, and determine the attainment; fourth, Trust (2017) maximize Edmodo to find out how the teacher participates in the online classroom to manage the Learning and teaching practices; and fifth, Okumura (2020) optimizes Edmodo as the media to increase the student interest to master their native and foreign languages through Edmodo. Being different from previous researches, the research conducted by researchers was in the form of learning applications with Edmodo to increase participation and understanding of the elementary school teacher candidate of Universitas PGRI Yogyakarta (UPY). Consequently, the research by Okumura (2020); Qomariyah et al. (2019); Şenel (2016); Trust (2017); Uzun (2015) clarifies that Edmodo can be applied on students or teachers as the media to increase the owned abilities more easily, more simply, and more efficiently in the online class. Because of those reasons, the researcher wants to conduct the research with its problem about "How the effects of implementing Edmodo-based E-learning towards the elementary school teacher candidates' participation and understanding on Natural Science?" This research aims to find out the elementary school teacher candidates' participation and understanding after using Edmodo and to investigate the effects of implementing Edmodo-based E-learning toward the elementary school teacher candidates' participation and understanding on Natural Science biology material.

METHODS

This research belongs to the quantitative research with a quasi-experiment method. The research design is a nonequivalent pretest-posttest control group design. Choosing the experimental and control groups is not done randomly (Creswell, 2009). The research population is all of the second semester student of elementary school teacher study program of Universitas PGRI Yogyakarta. The samples of this research are 49 students in the second semester which consists of, 22 students as the experimental group and 27 students as the control group. Experimental class with E-learning based Edmodo and control class with a conventional approach is the speech and discussion concept.

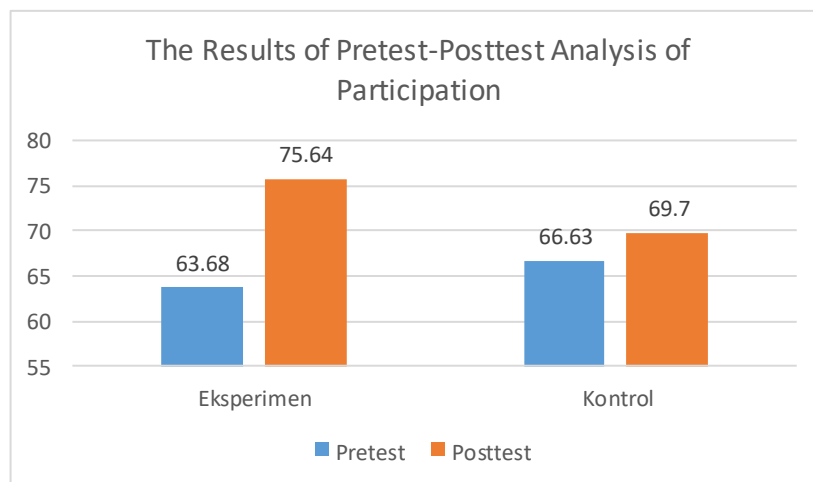
The instrument of the research is a participation questionnaire with 21 question items and uses a Likert scale. The result of the participation instrument test is the comparison between r-table with the $N = 47$ at the Sig. = 5% which is 0.2876. Moreover, the result of all instrument validity tests is more than 0.2876 which means that the instrument is valid. The

reliability test of the participation instrument results in a significant number of 0.944. Then the second instruments namely understanding test in the form of essay questions as much as 5 question items about the subject of biology in the term of the digestive system. The test result of the understanding experiment with the $N = 47$ is generated r -calculation $>$ r -table at the significance of 5% which is 0.2876 for all question items, so that the understanding instrument is valid. And then the understanding instrument reliability test result is 0.703.

Moreover, the collected data was analyzed quantitatively and qualitatively by using SPSS 22. The researcher uses Independent Sample t-Test (Sugiyono, 2016) to both know the effect of each variable, and measure the correlation between some independent variables and two or more dependent variables by using MANOVA (Hair, et al., 2009).

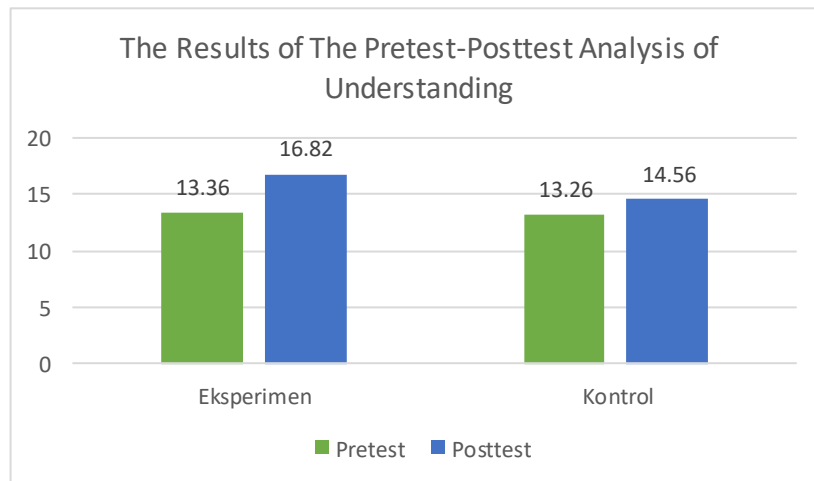
RESULTS AND DISCUSSION

Data analysis is processed based on the test of the average difference between the experimental class and the control class. The experimental class uses Edmodo-based E-learning as well as the control class uses conventional learning is in the form of lectures and discussion. The result of quantitative participation can be seen in the graphic below.



Graph 1. Quantitative Participation Analysis Results

From Graph 1, it seems obvious the difference of participation pretest-posttest between the experimental group and control groups. The result of understanding quantitative analysis is presented on the graph 2.



Graph 2. Quantitative Understanding Analysis Results

From the graph 2, it seems clearly the difference between the understanding pretest-posttest of the experimental and control classes. Moreover, quantitative analysis is pre-condition test and hypothesis test resulted from the pretest-posttest of the experimental and control classes for participation and understanding variables. Before hypothesis test (the independent sample-test and MANOVA test), firstly done pre-condition test that includes normality and homogeneity test. The normality test result of participation and understanding pretest-posttest toward both classes is the lowest significance counted for 0.106 and the highest counted for 0.969 or Sig. value > 0.05 , which means that it is distributed normally. Then, homogeneity test result of participation and understanding pretest-posttest toward both classes reveals variant value is more than 0.05, which means that it is distributed heterogeneous. Furthermore, the hypothesis will be tested which includes the independent sample t-test and the MANOVA test.

Table 1. The Independent Sample t-Test result of participation of experimental and control classes.

Variable	Approach	Df	Sig.
Participation	Pretest	47	0.136
	Posttest	47	0.004

Table 1 show that the result of the pretest-posttest from both classes is Sig. = 0.136 > 0.05 , so that H_0 is acceptable (no deference of participation). Meanwhile, for the posttest of both classes, it shows Sig. = 0.004 < 0.05 , so that H_0 is rejected (there is a deference of participation). Then, this is Independent Sample t-Test of understanding can be seen on the table 2.

Table 2. The Independent Sample t-Test result of Understanding of experimental and control classes

Variable	Treatment	Df	Sig.
Understanding	Pretest	47	0.906
	Posttest	47	0.005

Table 2 with the pretest result of both groups shows Sig. = 0.906 > 0.05 which means that H_0 accepted (no difference in understanding). Meanwhile, for the posttest result of both group shows Sig. = 0.005 < (0.05) which means that H_0 is rejected (there are differences in understanding). The next test is the MANOVA test to decide the effect of applying Edmodo-based E-learning on participation and understanding. The result of the MANOVA test can be seen in the table below.

Table 3. Pretest-Posttest MANOVA test toward Participation and Understanding of Experimental and Control Groups

Approach	Variable	Sig.
Pretest	Participation	0.136
	Understanding	0.906
Posttest	Participation	0.004
	Understanding	0.005

Table 3 implies that the pretest result of participation and understanding of both groups shows that for participation variable, the Sig. = 0.136 and 0.906 for understanding variable more than 0.05 which means that H_0 is accepted (no positive and significant effect toward participation and understanding). Meanwhile, the posttest result of participation and understanding variables of both groups shows that Sig. value for participation is 0.004 and 0.005 for understanding variable less than 0.05 which means that H_0 is rejected (there is a positive and significant effect toward participation and understanding). According to the three results of the previous hypothesis test can be concluded that:

- There are differences in the participation of the elementary school teacher candidate in the term of Natural Science after given treatment that is the use of Edmodo-based E-learning.
- There are differences in the understanding of the elementary school teacher candidate in the term of Natural Science after given treatment that is the use of Edmodo-based E-learning.
- There is a positive and significant impact on student participation and understanding of the elementary school teacher candidate in the term of Natural Science after given approach that is the use of Edmodo-based E-learning.

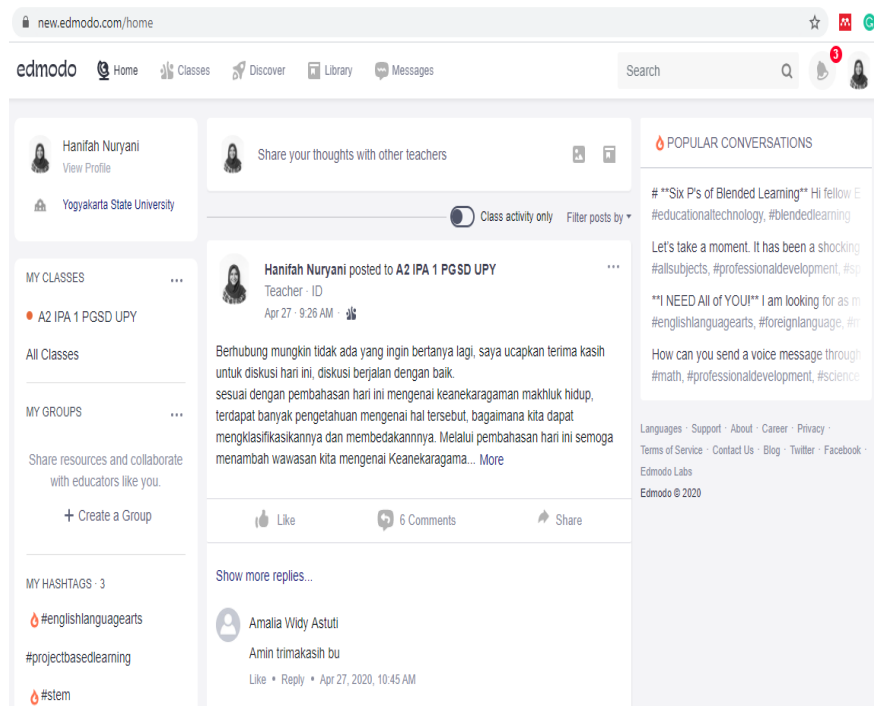
According to the precondition of recapitulation, the Sig. value is more than α (0.05), which means the data were normally and homogeneously distributed. While, at table 1 and 2 also show that there are differences in participation and understanding of the elementary

school teacher candidate who receives Edmodo through t-Test Sample Independent test. The result of the posttest point of both groups shows Sig. < 0.05. Furthermore, the MANOVA test in Table 3 shows that posttest Sig. point of both dependent variables is less than 0.05, meaning that there is a significant and positive influence on participation and understanding of the elementary school teacher candidate in Natural Science after being given the approach of E-learning usage based on Edmodo.

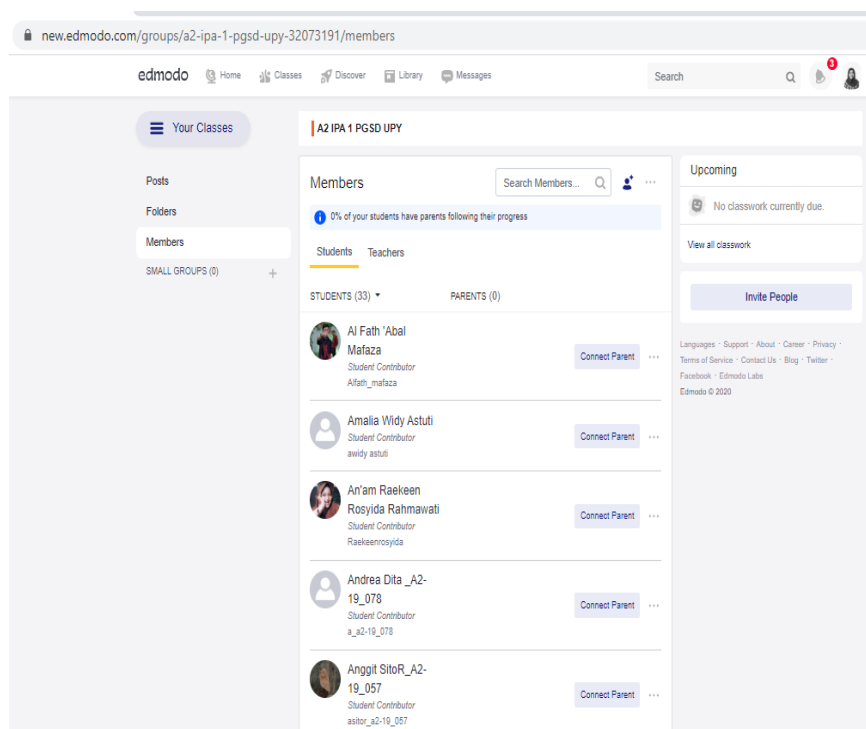
The existence of Edmodo-based e-learning on student participation is seen in calculations to be monitored, involvement in decision making, attendance, educational interventions, leaving meaning in an undefined and assumed context (Harcourt & Gray, 2013). The involvement in deciding student problems can improve motivation of going to school and studying due to the existence of feeling possessing and student's vote (Smit, 2013). If there is student involvement, it will motivate the elementary school teacher candidate from passive in the beginning to participate actively in learning.

Participation gives a positive effect on the student such as; the existence of the development of democratic creativity; enhancing the learning and academic achievement; enhancing relationship between student-teacher and peer; then for school, as taking effect on class content, learning strategy, policy, regulation, procedure, the strongest finding, and work ethic improvement (Mager & Nowak, 2012). The student and teacher involvement and easiness of the use of Edmodo-based E-learning will bring up interactive communication so that it will result in higher quality learning and become a solution to the lack of maximum participation and the elementary school teacher candidate understanding in Natural Science. Behind the ease of Edmodo use, Purnawarman, et al. (2016) found that there is a problem in their research such as confusion in Edmodo use, unsuitability of the smartphone application, and less responsibility of the student for studying. So, it is necessary for the tutorial of Edmodo use on the student before online learning implementation in order to minimize such problem.

E-learning process based on Edmodo can be accessed through www.edmodo.com and be created class on Classes feature as A2 IPA 1 PGSD UPY. Previously, the student is provided in the tutorial video of the use of Edmodo and class code to enable join in online learning in Natural Science. These are the image of the Edmodo class in the experimental class.

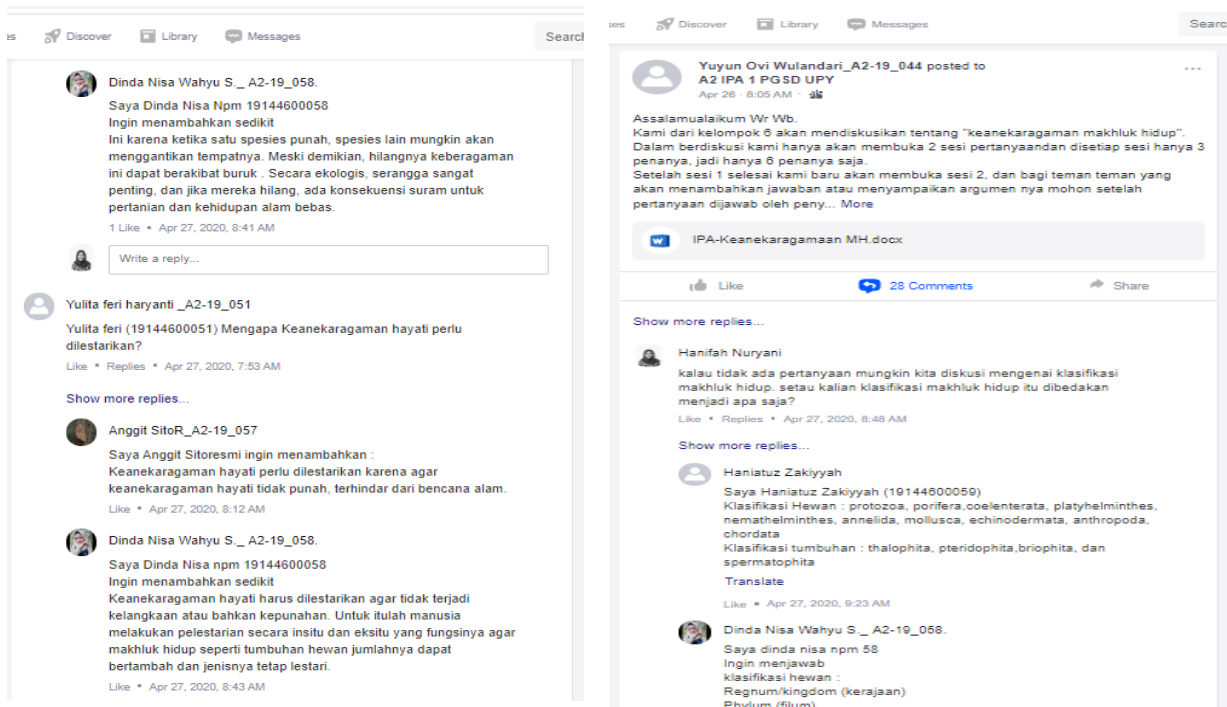


Picture 1. The initial view of A2 IPA 1 Class of PGSD UPY at Edmodo



Picture 2. The view of Edmodo class member

It can be seen half of A2 member of PGSD student of Universitas PGRI Yogyakarta (UPY) as the experimental group has joined in the Edmodo Class. Then student participation in online learning activity can be seen in the picture 3.

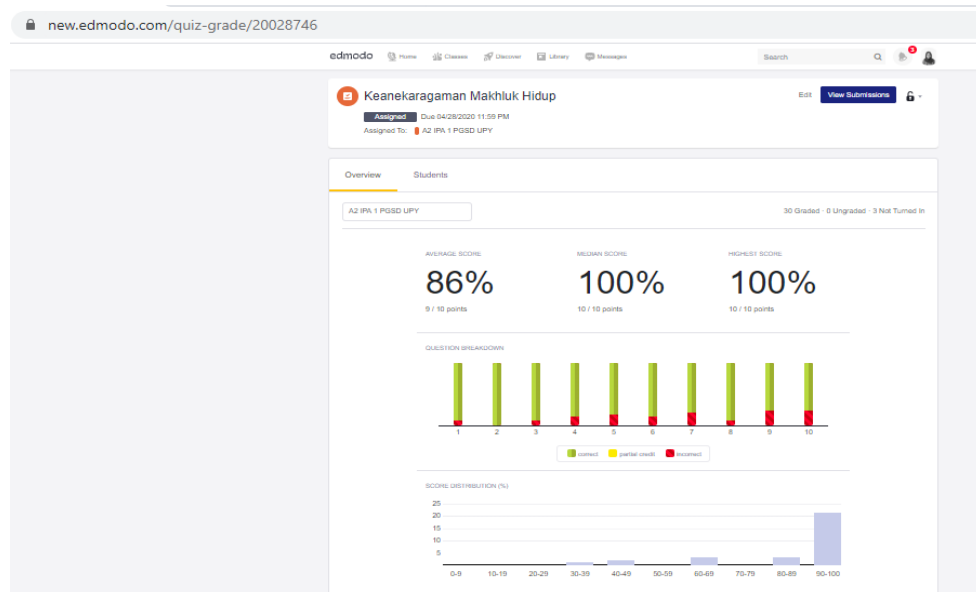


Picture 3. Participation of the elementary school teacher candidate in Natural Science.

Participation is seen in the student question-answer activity or giving feedback in the comment column. Research shows that participation gives for impact on student motivation, which is seen at the positive response of presentation in implementation of Edmodo learning media in vocational high school level and it is very effective and has much influence on student study interest (Muhajir, et al., 2019). Besides, the use of Edmodo also takes effect on student participation in class discussion in theoretical and practical teaching material (Asmuni & Hidayati, 2015). Another research said that student participation improves in the virtual class which is given treatment by using Edmodo (Wicaksono, 2017).

If the usage of Edmodo is applied in learning, it can give knowledge about the suitable application which can be harnessed in learning, training student about creating Edmodo account, and understanding how student response about the coaching of making Edmodo account (Mafulah & Wilujeng, 2018). Because of this condition, the use of Edmodo-based E-learning possesses a positive impact on the elementary school teacher candidates' participation in lecture activity of Natural Science. Online participation also gives an effect on the elementary school teacher candidates' understanding.

Comprehension is defined on student capability in understanding the concept of relationship one another, so it can be applied for solving the problem (Holme, et al., 2015). To know the level of student understanding of Edmodo use is by the learning outcome and Quiz activity of Natural Science as follows.



Picture 4. *Quiz* activity of Natural Science

The result of the quiz in Picture 4 is seen that half of the elementary school teacher candidate shows the good outcome. Beside Quiz activity, the enhancement of the elementary school teacher candidate understanding is also supported by the high posttest outcome of the experimental group represented in Picture 2. The result of experimental class in Edmodo-based E-learning is higher compared to the control class with conventional learning. The findings of using Edmodo are also supported by the research conducted by Pratama & Rahmawati (2017) showing there are a significant difference and positive pull in the experimental group in comparison with control group class X high school student in the economy subject. Understanding Natural Science also improves because of Edmodo online media on class VII-B Junior High School which is seen in study outcome (Suwarno, 2017). Another research explained that the improvement of the study outcome of the PGMI student is also influenced due to the usage of Google Classroom (Arifin, 2019).

According to previous research, the use of E-learning can improve study outcome and student participation although it has yet been maximum. It is needed preparation before Edmodo-based E-learning is implemented, so the student will be more responsible and active to participate in learning. The student feels new learning experience they acquire through Edmodo, more expressive, very relaxed learning condition (chat), and it can be accessed everywhere if the student forgot the material that had been studied as the published material has been uploaded on Edmodo or Youtube channel (Pratama & Ismiyati, 2019). Therefore, the student prowess of technology can also influence the effectiveness in Edmodo-based E-

learning to enable to give positive pull to participation and comprehension of the elementary school teacher candidate in Natural Science.

CONCLUSION

According to the finding and discussion explained, it can be concluded that the use of Edmodo-based E-learning takes the significant and positive effect on participation and comprehension of the elementary school teacher candidate in Natural Science biology material. The existence of online classes can open a chance for the elementary school teacher candidate to gain achievement. The elementary school teacher candidate can participate actively in lecture activities and can re-review about received comprehension and it can increase knowledge broadly through the available information on the Edmodo platform. The elementary school teacher candidate can access knowledge anytime and anywhere as well as can be more intimate with the expert through communication globally. However, in turn to implementation of learning online, tutorial or explanation about how to use the learning platform is highly needed so the study can run more effectively.

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