The Effectiveness of Blended Learning Using Moodle on Student Independence and Learning Outcomes

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Abstract

This study aimed to determine the blended learning model's effectiveness using Moodle on the human respiratory system learning material's independence and student learning outcomes. This research type is a quasi-experimental type nonequivalent control group design with the sampling technique using purposive sampling. The observation results showed that the experimental class learning independence average was better than the control class. This is in line with the results of the student learning independence questionnaire. The average value of cognitive learning outcomes through the t-test shows a significant difference between the experimental and control classes. The analysis of the improvement in students' cognitive learning outcomes showed that the experimental class was more significant than the control class in the moderate category. Based on this, it can be concluded that blended learning using Moodle is useful for student independence and learning outcomes.

INTRODUCTION

The Natural Sciences contains the universe and everything in it (Sumarsih, 2017). Science is one of the subjects that require students to be active during learning. Education must be student-centered so that students can be engaged in learning. The phenomenon that often occurs today is that the learning process tends to be teacher-centered, so that students are only learning objects (Setyobudi, 2017). The concepts taught by the teacher are only presented on the screen and oral. Students only listen and write essential things put forward by the teacher so that the teaching and learning process is dominated by the teacher. As a result, students are easily bored, lack initiative, and depend on teachers. This will result in low independence and student learning outcomes.

Low student learning independence is indicated by the dependence of students on teachers and peers in learning. Students also lack the confidence to express opinions and answer questions given by the teacher. Many students are playing by themselves when explained by the teacher to not follow the indicators of learning independence. According to Latifa (2015), students learning independence, namely, students do not depend on teachers and peers in learning, have learning initiatives, have self-confidence in their learning activities, and are responsible for the teacher's assignments.

Based on the results of observations at SMP Negeri 12 Semarang, it shows that students' independence and learning outcomes, especially in class VIII, are seen when only a few students have scores above the KKM (Minimum Completeness Criteria). The KKM in science subjects at SMP N 12 Semarang is 74. The students' low learning independence is because students only depend on the teacher's material. Students lack confidence when they ask students to move forward, and students lack the initiative to learn independently. The learning process that is only face-to-face, and sometimes still conventional or learning is still teacher-centered. It has not maximized existing technology such as the internet as online learning can also reduce student learning independence.

Online learning is the implementation of teaching and learning that is entirely carried out with internet technology and does not require face to face activities. Online learning makes it easy for students to learn from anywhere and can be done synchronously (directly) or asynchronously (indirectly) (Sari, 2013). Online learning is part of blended learning. Blended learning is learning that combines face-to-face learning and online learning (Kurniawati et al., 2019). The blended learning model offers flexibility in terms of time and place. Besides, the blended learning model has several advantages. The advantages of the blended learning model include learning that can be done from anywhere and anytime. Besides, students can study subject matter independently by utilizing materials available online (Latifa, 2015).

Sandi (2015) states that the learning outcomes of students with high independence who take blended learning are better than those of students who take direct learning. Student learning outcomes are in the good category with blended learning using the flipped classroom model assisted by google classroom (Kurniawati et al., 2019).

The blended learning process requires suitable media. One of the media that supports blended learning is Moodle application media. Moodle is a Learning Management System (LMS) application that is widely used in online learning. You can enter text, graphics, animation, simulation, audio, and video (Sandi, 2015) inside Moodle. Moodle or Modular Object-Oriented Dynamic Learning Environment is open source software to carry out independent learning without being bound by time and place. This application was first developed by Dougiarnas in August 2002. Moodle can be downloaded for free and is equipped with various features, and can be accessed by students using either a student's personal computer or smartphone. Setyobudi (2017) states that Moodle media is very appropriate for improving student learning outcomes compared to students taught by conventional methods. The implementation of the blended learning model with Moodle media can improve students' cognitive abilities (Budiharti et al., 2015).

Muchlis & Fadriati (2018) stated that the advantages of Moodle include its proper use for online classes and learning outcomes are relatively as good as learning face-to-face with teachers. Its operation is simple, easy to install, and efficient. Another advantage of moodle is that the scoring (grading) can be adjusted to class conditions and can be downloaded by the teacher (Subadi et al., 2020). The research results of Samala et al. (2019) state that learning using the Moodle Mobile App has a positive, good and effective effect, which can help overcome difficulties in the learning process and improve learning outcomes.

Based on the background that has been explained about the low independence and student learning outcomes. Researchers will research with the title "The Effectiveness of Blended Learning Using Moodle Against Independence and Student Learning Outcomes in Human Respiratory System Material."

METHOD

The research subjects were students of SMP Negeri 12 Semarang class VIII C and VIII D. Class VIII D as the experimental class and class VIII C as the control class. The sampling technique in this study was purposive sampling, namely the sampling technique with specific considerations.

The type of research used is experimental research. The method used in this study is a quasi-experimental design with a nonequivalent control group design. The research design to be carried out can be seen in Table 1.

Table 1. Nonequivalent Control Group Research Design

Group	Pretest	Treatment	Posttest
Experiment	O_1	X	O_2
Control	O_3	Y	O_4

(Sugiyono, 2016)

Information:
X = Blended learning using Moodle
Y = Conventional learning
O_1 = Pretest before conducting blended learning using Moodle
O_3 = Pretest before conducting conventional learning
O_2 = Posttest after conducting blended learning using Moodle
O_4 = Posttest after conducting conventional learning

RESULT AND DISCUSSION

Students' learning independence is measured using the independence observation sheet and learning independence questionnaire sheet. Observations of student learning independence were carried out in the experimental class and the control class when learning activities took place. Students' independence questionnaire sheets were given at the end of the lesson after treatment. Observation of student learning independence is carried out at every meeting, namely at first to fourth meetings. Student learning independence as measured in this study includes four indicators, namely (1) indicators of self-confidence, (2) indicators of responsibility, (3) indicators of initiative, and (4) indicators of discipline.

Table 2. Observation Results of Student Learning Independence

Meeting	Criteria	Percentage (%) Experiment Group	Control Group
1	Less Independent	3	19
	Moderately Independent	81	81
	Independent	16	0
	Very Independent	0	0
2	Less Independent	3	13
	Moderately Independent	22	53
	Independent	75	34
	Very Independent	0	0
3	Less Independent	0	9
	Moderately Independent	9	31
	Independent	75	53
	Very Independent	16	9
4	Less Independent	0	3
	Moderately Independent	3	19
	Independent	47	75
	Very Independent	50	3

Table 3. Results of the Student Learning Independence Questionnaire

No	Learning Independence Criteria	Percentage (%) Experiment	Control
1	Very Independent	6	6
2	Independent	78	69
3	Moderately Independent	16	25
4	Less Independent	0	0

The results of the observation of learning independence based on Table 2 can be seen that there are differences in the learning independence of the experimental class and the control class. The first meeting of the

experimental class has the criteria of being less independent, moderately independent and independent. The sufficiently independent criteria have the largest percentage, namely 81%, compared to other criteria. This is because, at the first meeting, students still adapt to the learning process using moodle. Students are very enthusiastic and active in the learning process. Some students have studied the material that has been uploaded in moodle so that students begin to have the confidence to ask or answer questions given by the teacher. However, there are still many students who have not studied the material, so that the indicator of student initiative is still low.

At the end of the lesson, students are given an assignment/quiz that must be done through the assignment feature in Moodle. Through this feature, students are given assignments/quizzes online with a certain period, but only some students have done the assignments/quizzes so that the responsibility and discipline of students at the first meeting are still low. The lack of responsibility and discipline of students resulted in low criteria for independence in the experimental class. Giving assignments and quizzes through moodle can effectively increase students' learning independence during the Coronavirus Disease (Covid-19) pandemic as it is today (Rochmah, 2020).

In the second meeting, the experimental class's independent learning has the criteria of being less independent, moderately independent, and independent. The criterion for independence at this meeting has increased. Namely, the percentage of independent criteria is greater than sufficiently independent, which is 75%. This is because more and more students are enthusiastic and have studied the material in moodle so that more and more students dare to ask, answer or convey the discussion results. The more students who do assignments/quizzes in moodle on time show responsibility and discipline of students better than the previous meeting, in line with the research results by Sari (2013), which states that blended learning can increase responsibility for student learning independence. At this meeting, several students had used the chat feature in Moodle to communicate with each other between students and also students and teachers. This feature is used as a means of online communication in the Moodle application. This feature is beneficial for students when they want to ask the teacher outside of class hours.

In the third meeting, the experimental class's independent learning has increased, indicated by the reduction in the criteria for being less independent, and there are criteria for being very independent. The independent criterion has the highest percentage of 75%, while the very independent criterion is 16%. The highest rate of independent criteria is because students are very enthusiastic and active in the learning process. Students can deliver the results of the discussion independently without being appointed by the teacher. In addition, students also took the initiative to find additional reference material from various sources. This was evidenced by students' presence asking questions about material that was not included in the book or in moodle. Most of the students also worked on the assignments /quizzes contained in Moodle on time. The increasing number of students doing assignments/quizzes shows that students' responsibility and discipline are increasing. Students began to take advantage of the forum features contained in Moodle as a means of online discussion. This feature is one of the features provided by Moodle with the aim of being a means of online discussion between students. Moodle e-learning media can increase student learning activities so that students are very enthusiastic and active in learning (Utami, 2016).

In the fourth meeting, the independent learning in the experimental class has the criteria of being very independent by 50%, 47% independent, and 3% moderately independent. This shows that students in the experimental class have excellent learning independence. Students are very enthusiastic during the learning process. This is evidenced by many students who ask, answer, and convey the results of the discussion without being asked by the teacher. Many students took the initiative to find additional material through various sources. Students also use the forum feature in Moodle to share supplementary material or information related to the material being studied. All students can also complete assignments well and on time. Then, students do a posttest at the end of the lesson through the Moodle mobile app. Students do the Posttest independently, without cheating and asking the teacher. This is in line with the research results by Huda et al. (2019), which states that problem-based learning assisted by Moodle mobile learning and Android applications can increase student independence.

The results of the observation of student learning independence were also supported by the questionnaire results on the students' learning independence. The result of the independence questionnaire is a student's assessment of self-reliance. Based on Table 3, it can be seen that the percentage of independent learning in the experimental class and the control class both have the highest value on the independent criteria. However, the percentage value of the experimental class's independent

criteria was greater than the control class, which was 78%. This is because the experimental class's learning process shows that students are very enthusiastic and active in blended learning using moodle. The teacher has facilitated students with the Moodle mobile app so that in addition to students being able to study the material that has been uploaded in Moodle, students can also look for other materials. In line with Syarif's (2012) opinion, the blended learning model has several advantages: it can activate students because this model requires students to take an active role in learning and seek information, while the teacher is only a facilitator.

The use of the Moodle Mobile app in learning, especially in giving assignments, is something new for students so that it increases students' interest in taking part in learning and doing given assignments. Based on the description above, using the Moodle Mobile app in blended learning can improve student learning independence. These results support previous research, which states an increase in student learning independence with a problem-based learning model assisted by Edmodo media (Aulia et al., 2019).

Table 4. Average Difference Test Results

Group	Variance	T_{count}	t_{Table}	Description
Experiment	33.8458	8.59	2.00	Significantly different
Control	20.8669			

Table 5. N-gain value of student cognitive learning outcomes

Data	Experiment		N-Gain	Control		N-Gain
	Pretest	*Post-test*		*Pretest*	*Post-test*	
AVG	59.06	83.91	**0.61** Moderate	60.62	75.31	**0.37** Moderate

Based on the results of the analysis, it is known that the Posttest mean score of the experimental class is higher than the control class, namely 83.91. The analysis of students' cognitive learning outcomes showed that there were significant differences between the experimental class and the control class. Several factors, among others influence the difference in student learning outcomes because the learning atmosphere is more enjoyable. The experimental class implements blended learning using Moodle, which in learning uses discovery learning syntax by combining internet-based learning (online) using the Moodle Mobile app, while the control class uses a conventional learning model. This blended learning model is carried out at the 1st to fourth meetings.

Learning is carried out by combining face-to-face learning and online learning. This is following research conducted by Kurniawati et al. (2019).

Implementing blended learning using moodle in this study follows the stages adapted from Kharb & Samanta (2016), namely online-face-to-face-online. In the online stage, students take online learning first using the Moodle mobile app as an initial provision for delivery at the face-to-face stage. Then the face-to-face stage this stage is the stage where students carry out experiments to get data. Furthermore, the last stage, namely online, at this final stage students are given reinforcement or enrichment and tasks that must be completed in the Moodle mobile app.

Students in the experimental class were very enthusiastic during the blended learning process using moodle. Students are very enthusiastic because the experimental class's learning atmosphere is centered on students so that students are more active, more independent, and more interested in participating in learning. The difference is seen during the learning process in the control class. Based on the observations, the control class students seemed less enthusiastic in learning. The small number saw this of students who could answer the questions correctly. This is consistent with research by Carolina (2012), which states that web-based active learning (blended learning) can create excellent quality active learning.

The experimental class has much more freely accessible material at Moodle. The use of moodle as a blended learning course also includes videos of the human respiratory system. Blended learning is not limited by time and space, and learning resources can be accessed freely and help students learn more efficiently. So that the experimental class has more learning resources that can be accessed through moodle with blended learning. This phenomenon makes the experimental class students more active and more correct than the control class. This study's results are in line with Suana's (2017) research that the application of blended learning makes students have more learning resources and have unlimited learning time so that more knowledge is obtained.

CONCLUSION

Based on the results of the research, "The Effectiveness of Blended Learning Using Moodle Against Independence and Student Learning Outcomes on Human Respiratory System Material" that has been carried out can be concluded as follows:

1. Blended learning using moodle is effective against students 'learning independence. It can be seen from the observation that the experimental class students' learning independence is better than the control class.

2. Blended learning using moodle is influential on student cognitive learning outcomes indicated by the experimental class, and the control class has significantly different results. Also, the increase in the N-Gain of the experimental class was higher than the control class.

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