

IMPROVING STUDENT LEARNING OUTCOMES IN STATISTICS FOR RESEARCH EDUCATION COURSES USING MOODLE PLATFORM DURING PANDEMIC

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Abstract

Currently, the education system is experiencing a situation that requires teachers to be able to master distance learning media, especially during this Covid-19 pandemic outbreak. The distance education system is one of the solutions to overcome difficulties in face-to-face learning with the existence of social distancing rules considering the problems of time, location, distance, and cost which are major obstacles at this time. Moodle is a platform that can be used for distance learning. This study aims to see whether there is an increase in student learning outcomes in studying educational research statistics using the Moodle platform. The type of research is classroom action research with the Pelton model. This research sample is 42 students who take education research statistics courses. The sample data was processed using descriptive statistics taken from student learning outcomes. The results showed that student learning outcomes in studying educational research statistics have increased. The Moodle platform can help students get more learning outcomes, and it is effectively used as a solution in distance lectures. Suggestions for further research are the need for improvisation in using the Moodle platform to maximize its use.

Keywords: Learning outcomes; moodle platform; statistics for research education.

Abstrak

Saat ini sistem pendidikan sedang mengalami situasi yang menuntut guru untuk dapat menguasai media pembelajaran jarak jauh, terutama di masa wabah pandemi Covid-19 ini. Sistem pendidikan jarak jauh merupakan salah satu solusi untuk mengatasi kesulitan dalam pembelajaran tatap muka dengan adanya aturan social distancing mengingat masalah waktu, lokasi, jarak, dan biaya yang menjadi kendala utama saat ini. Moodle adalah platform yang dapat digunakan untuk pembelajaran jarak jauh. Penelitian ini bertujuan untuk melihat apakah ada peningkatan hasil belajar siswa dalam mempelajari statistik penelitian pendidikan menggunakan platform Moodle. Jenis penelitian ini adalah penelitian tindakan kelas dengan model Pelton. Sampel penelitian ini adalah 42 mahasiswa yang mengambil mata kuliah statistika penelitian pendidikan. Data sampel diolah dengan menggunakan statistik deskriptif yang diambil dari hasil belajar siswa. Hasil penelitian menunjukkan bahwa hasil belajar siswa pada pembelajaran statistika penelitian pendidikan mengalami peningkatan. Platform Moodle dapat membantu siswa mendapatkan lebih banyak hasil belajar, dan secara efektif digunakan sebagai solusi dalam kuliah jarak jauh. Saran untuk penelitian selanjutnya adalah perlu adanya improvisasi dalam penggunaan platform Moodle untuk memaksimalkan penggunaannya.

Kata kunci: Hasil belajar; platform moodle; statistika penelitian pendidikan.



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INTRODUCTION

Mathematics is a branch of science that plays an important role in human life and it is the basis for other

sciences. Given the importance of the role of mathematics, mathematics is one of the main subjects in schools ranging from elementary school to university

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(Yensy, 2012). One of the branches of science in mathematics is statistics. Statistics is an important subject to be taught at the secondary school to university level. In the faculty of education, there are special courses that need to be taught, namely Educational Research Statistics. This course is a compulsory subject to be taken to support students' ability to process statistical data. This course teaches how to process data, collect, analyze and even give conclusions on research data. In general, the goal of learning statistics from American Physocology Association is students are expected to to evaluate research results, by interpreting statistical results correctly (McGrath, 2014). In other words, the purpose of studying statistics is that students are expected to master statistical concepts that can be used to conduct research. However, in practice, many students have difficulty understanding the statistical concept, so that not a few students experience anxiety in studying statistics and cause a lack of responsibility for the tasks given (Ningsih Y.L, 2017).

Many students think that statistics courses are difficult courses to understand because they contain many formulas and need to process data. This problem is seen when students work on statistical tasks. Most students have low learning outcomes.

Learning outcomes are the abilities possessed by students after receiving their learning experiences (Hasibuan, 2015). The definition of learning outcomes is a reflection of the learning effort. The better the learning effort, the better the results achieved. Good learning outcomes will be achieved by students if they can overcome the learning difficulties they experience (Fitriana S, Ihsan H, 2015).

Some students consider statistics a difficult subject. Therefore, many of the students taking statistics lessons are nothing more than routines to fill out attendance lists, look for grades without awareness to add insight and skills, students just come, sit, listen, and take notes (Nasir, 2016).

As experienced by some students from the 2019 FIP UPH batch, 42 students had a low average learning outcome of 43,57. Low statistics learning outcomes make some students repeat the course. Consequently, the time required to graduate from university also increases. Opportunities to get or open jobs are reduced because graduation is hampered so that after graduation, they compete with fresh graduates who graduate on time and the workforce who have not found work (Hidayat, 2020).

Another problem that arises is because of the conditions currently happening in the world due to the Covid-19 pandemic that has occurred since 2020. Because of this, all learning activities that occur must be carried out remotely. Therefore, lecturers need to understand the characteristics of the material and students in the learning process, especially Many mathematics teachers use class time by discussing past assignments, giving new lessons, and giving assignments to students about the selection of learning models. (Sobel, 2001). This approach that is carried out routinely every day is boring, dangerous, and destroys all students' interests. This habit will unwittingly lead to low student learning outcomes, especially material on statistics (Panjaitan, 2016).

Lecturers need to think about online media that can help overcome student problems in studying statistics for educational research. Why the

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solution to the problem is the use of online media. Because previously Moodle had not been used optimally, the lecturer was only limited to uploading material. While Moodle offers many features that can improve student learning outcomes. Moodle has an effect on student learning outcomes (Setiawan, 2013).

Furthermore, because of this unfinished pandemic. Learning must be carried out online. In online learning, facilities are needed that can help lecturers and students interact with each other. Lecturers need to explore more media include online platform so that learning objectives can be achieved optimally. Moreover, at this time, learning that is carried out must be carried out remotely. Internet and online media used in learning has an important role to carry out distance learning (Pasaribu, M.H & Listiani, T 2021). Lecturers need to use media or platforms that can help these problems. One of the platforms that can be used is Moodle. Moodle is a digital platform to facilitate distance learning (Badia, Martín & Gomes, 2019). Many features can be explored by using Moodle. Learning that is carried out using Moodle can also be carried out flexibly. So that students can study anywhere and anytime (Rizal & Walidain, 2019). By using Moodle, teachers can upload materials, give quizzes, give assignments, and conduct discussions (Sara, K., Witi, F.L., Mude, 2020).

Moodle stands for 'Modular Object-Oriented Energetic Learning Environment'. It may be a web-based Learning Administration Framework (LMS), unreservedly given as an Open Source computer program and created to back on the ground, blended as well as hybrid teaching and learning. Moodle is one of the foremost prevalent online

stages utilized for instructive purposes (A. Badia, D. Martín, 2019; C. DeMedio, C. Limongelli, F. Sciarrone, 2020). In comparison with other comparative LMSs, such as Schoology or A Tutor, Moodle stands out with its customizable plan and a tremendous assortment of devices that can be successfully utilized to form both synchronous and asynchronous learning openings (Krouska, Troussas, & Virvou, 2018).

In higher education, Moodle is commonly inserted inside a locally branded LMS and permits for the improvement of an internet course zone, to which particular computerized assets and exercises can be included. The array of tools available in Moodle include but are not limited to: a file, a folder, a discussion forum, a chat, an assignment, a wiki, a blog, a glossary, a checklist, a workshop, a quiz, and various polling instruments. Within this virtual environment, students learn by direct, collaborative participation, where both students and teaching staff can have synchronized or non-synchronized access to the platform (Oproiu, 2015).

This study will discuss the improvement of student learning outcomes in educational research statistics courses using the Moodle platform. The research formulation used is whether there is an increase in student learning outcomes in the statistics for research education course with the Moodle platform and how to increase it.

THE RESEARCH METHOD

a. Research Design

The model used in this study is the Classroom Action Research (CAR) method. CAR comes from the English term Classroom Action Research, which means research conducted in a class to

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find out the consequences of actions applied to a research subject in that class (Trianto, 2011). Class CAR is an observation of learning activities in the form of an action (given by the teacher for students to do), which is intentionally raised and occurs in a class simultaneously (Arikunto, Suhardjono, & Supardi, 2012). Based on the expert opinion above, CAR is a suitable research method used to solve problems that occur in the classroom by taking deliberate action and seeing its effect and CAR is reflective so that it triggers teachers to continue to update the learning system used. The CAR in this study is the CAR based on the Pelton stages, namely problem identification, data collection, action planning, action implementation, and assessment results (Pelton, 2010). In simple terms, it can be seen in the Figure 1.

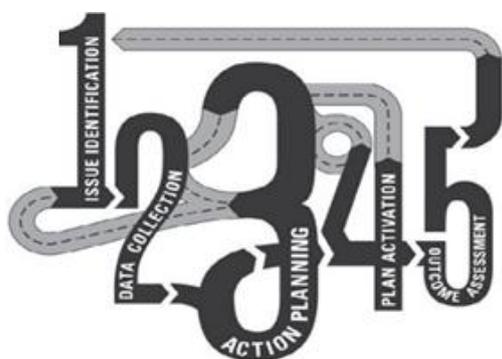


Figure 1. Classroom Action Research Model according to Pelton

The actions carried out are 2 cycles, the actions carried out refer to the steps in the Pelton model, including issue identification, data collection, action planning, plan activation, and outcomes assessment.

Issue Identification. At this stage, observations were made on the implementation of learning. The teacher identifies the existing problems. The

problem that arises is that students are required to use a platform that helps in distance learning as a solution to reduce the spread of the covid-19 virus (Sudarti, 2020).

Data Collection. In this study, data collection was carried out through observations on student learning outcomes after working on statistical problems. The thing that is observed is when the observation is followed by after the action. That is how the implementation of learning using Moodle.

Action Planning. In this step, the teacher conducts a lesson plan that is specifically designed for distance learning. The thing that is focused on in this action planning is that the teacher prepares teaching materials which are then recorded in the form of videos, followed by compiling quiz questions on Moodle, opening discussion forums, attaching material files, etc.

Activation Plans. In this step, the teacher takes action. All learning plans are applied. The teacher must have finished doing the settings in Moodle. Then give instructions on what agenda students need to do during class sessions. The teacher also manages the time, students must have finished before the due date.

Outcomes assessment. This is the last step used. In this step, student learning outcomes will be seen after participating in distance learning. On each learning topic, students are required to complete a quiz in Moodle. The results of this quiz are used as a measuring tool, how students understand in studying statistical material. From these learning outcomes, it will be seen whether there is an increase in student learning outcomes from before.

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b. Location and Data Sample

The subjects in this study were students of the class of 2019 from the Chemistry and Biology Education study program from a private campus in Tangerang Indonesia called UPH. The selected students are those who take education research statistics courses. The number of one class is 42 students. All students are supposed to live in dormitories, but due to the unfinished COVID-19 pandemic, students return to their respective homes. The research location is a private university in Tangerang. This school provides complete facilities to support learning to run well and comfortably. The school is in an environment that supports teaching and learning activities. One of them provides the Moodle platform as learning support. This research was carried out in 2021 in the even semester when Indonesia was still experiencing the COVID-19 virus pandemic.

c. Instrument and Data Analysis

The data instrument used is student learning outcomes after using Moodle. Student learning outcomes are obtained when students work on questions that are set in Moodle. The way to process the data is by using descriptive statistics, especially looking for the average value, maximum value, and minimum value of student learning outcomes. Data analysis was performed for each cycle in the Pelton model step. From the results of the average calculation for each cycle, it will be seen whether there is an increase in learning outcomes or not. The learning cycle will be stopped when students get average learning outcomes that meet the standards. In this study there are 2 learning cycles using the Pelton model.

RESULT AND DISCUSSION

The results of this classroom action research reached 2 cycles. Before the data on student learning outcomes will be shown, the following will convey the value of student learning outcomes before being given action. The Diagram 1 shows the low student learning outcomes before being given treatment.



Diagram 1. Low grades of diagram students

It can be seen that the average obtained is 43, 57. The value is so small for students in understanding educational research statistics material. Actually, at this observation stage, students have started using the Moodle platform. However, the implementation of learning has not been maximized, the thing that causes it is that students are still not used to using this platform. Students are still used to face-to-face learning. Another reason is that the teacher does not give clear instructions in Moodle. So that student are confused in following every activity that has been arranged in Moodle. After reflecting on the previous learning process. Next, the teacher takes action, namely using the Moodle platform properly. The first thing to do is to make a lesson plan. Develop a learning agenda, compile teaching materials that are easy to learn, and prepare questions to measure learning outcomes.

This distance learning presents a great challenge for teachers. Because

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teachers have to work extra to design lessons. The goal is that students can learn the material easily. The teacher records a learning video which is then uploaded to YouTube. After uploading then the youtube video link is embedded in Moodle. The teacher also provides teaching materials that have been given before the class schedule. The teacher also provides a discussion room so that students can ask about the difficulties they face.

In Figure 2, the following is a display of the Moodle used for teaching.



Figure 2. Moodle display

In this course, the teacher organizes and designs lessons. There are interesting things when using this platform, namely, there is level-up and activity completion that challenges students to complete each learning activity. All student learning activities are well recorded through this Moodle. So that when there are students who have not worked, the teacher can reprimand them. In addition, students who have not completed the previous activity can be set so that students cannot access the next activity. Of course, this is very challenging for students, to keep working on every learning activity in Moodle.

The following is a diagram of student learning outcomes after the first action was carried out.

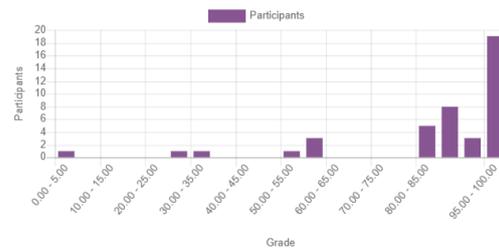


Diagram 2. Student success in the first action

After students use the Moodle platform. It can be seen that students are enthusiastic about participating in learning. The average obtained by students in working on the questions is 84.74. This shows a good improvement from before the action was taken. The use of the Moodle platform has helped overcome the problems of student learning outcomes. Previously, students admitted that they felt confused in studying statistical material for educational research. But after the teacher gave clear instructions in Moodle. Students are helped and can convey what is the difficulty in studying statistics. From Diagram 3, there is a diagram for the second action. It can be seen that there is an increase in student learning outcomes in studying educational research statistics.

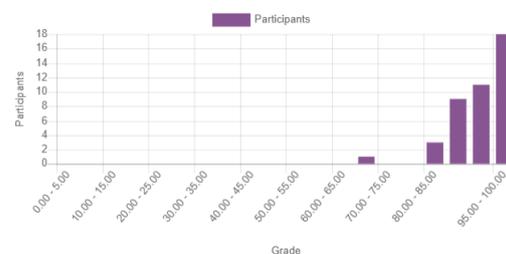


Diagram 3. Student success in the second action

Students get an average of 93.18 in working on the questions. This value can be said to be a very good value. The use of the Moodle platform can be said to be effective in helping to overcome the low student learning outcomes.

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Table 1 shows the comparison of learning outcomes from observation, action 1 to action 2.

Table 1. The comparison of student's learning outcomes

| | Observation | Action 1 | Action 2 |
|------|-------------|----------|----------|
| Mean | 43.57 | 84.74 | 93.17 |
| Max | 70 | 100 | 100 |
| Min | 10 | 4.55 | 66.67 |

The Table 1 shows that there is an increase in student learning outcomes after using the Moodle platform. In the observation phase, students obtained an average of 43,57 where there was one student who got a score of 10 and the maximum score obtained was 70. Then in the first action students obtained an average learning outcome of 84,74 where there was one student who got 4,55 and the maximum score obtained is 100. In the second act, the average obtained is 93,17. In this second action, a pretest result is carried out to see if there is consistency in student learning outcomes in working on statistical problems. It turned out that the learning outcomes obtained showed good results. Students experienced an increase in learning outcomes.

How the teacher organizes and designs learning greatly affects the success of learning in using the Moodle platform. Teachers need to have the ability to use technology, especially Moodle. Moodle has many features that can be put to good use. Moodle can be accessed via PC/laptop and even via smartphone. The most important thing so that learning can be achieved optimally is the willingness of the time given by the teacher. One of the weaknesses felt by teachers when using Moodle is that it takes a long time in setting up and inputting quiz questions. To overcome this, teachers need to

arrange well in advance of the class schedule. Teachers also need to re-check the timing of giving assignments. By adding level up and activity completion features, it seems that students' learning motivation is increasing. Students feel challenged to complete every activity given by the teacher. If students are left behind in one learning activity, students will be constrained to continue the next activity.

The use of quizzes also helps teachers to do the grading. By giving a quiz, students can see firsthand the value obtained after taking the quiz. So that, students can see which answers are still wrong and are moved to learn which parts have not been understood.

Another advantage is that the teacher can also have discussions with students to discuss the subject matter and check student understanding. Teachers can also arrange assignments to be done independently and in groups. There are other drawbacks to using Moodle. Among other things, there is the possibility of students cheating on each other with their classmates. To overcome this, the teacher overcomes by giving different types of questions for each student. Then the questions tested are also randomized, so this can reduce cheating that arises from students.

Previous research has also shown that Moodle has been reported to be an efficient way to improve academic achievement in some important specific aspects: declarative knowledge, general and on text use of learning strategies, approach to learning, self-regulation, and statistically significant differences in academic outcomes (J.C. Nunez, R. Cerezo, A. Bernardo, P. Rosario, A. Valle, E. Fernandez, 2011). I. Novo-Corti, L. Varela-Candamio (2013)

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showed promotion of participation, motivation, competence, and qualifications in the students by using mixed e-learning (Moodle multiple-choice tests) and face-to-face (traditional classroom exams) teaching. Yang, Y.C. Chuang, L.Y. Li (2013) also provided a study with students' significantly improved English learning skills using Moodle.

The data collected amid the utilize of Moodle to oversee a course can be valuable in connection to anticipating the scholarly comes about of the understudies. E. Romero L. García & J. Ceamanos (2021) created a particular Moodle mining instrument pointed at teaches to classify the understudies depending on their utilization of courses in arrange to foresee the students' last scholastic marks. As an imperative device for making a difference the conventional address, the utilize of tests was appeared within the think about as the most determiner of last marks, even though a few other exercises might offer assistance the educators to choose whether to advance or diminish a few of them to progress the results. Moodle tests can moreover be utilized to move forward developmental evaluations (D. Cohen & Sasson, 2016).

Another research was obtained from (Samsuddin, Rahman & Nadjib, 2013) stating that the use of Moodle can improve students' mathematics learning outcomes and also students' motivation. Sitanggang (2019) also stated the same thing that the use of Moodle on student learning outcomes was more effective than those who did not use it. Meanwhile, Fadillah, Munoto & Nurlaela (2014) through their research concluded that the use of e-learning Moodle has been proven to lead to better student learning outcomes compared to the use of LKS media. So,

it can be concluded that this research is in line with previous research that the use of Moodle can improve student learning outcomes.

CONCLUSION AND SUGGESTION

The results showed that the Moodle platform could improve student learning outcomes in educational research statistics lectures. It can be seen that the average student in the first cycle is 84.74 while in the second cycle is 93.17. The implementation of learning using the Moodle platform is certainly not perfect, the advice that can be given is that teachers need to observe the devices used by students. Whether the facilities used support or not during learning to use Moodle, as well as the need for special regulations for students who are constrained by the network. Teachers also need to pay attention to the division of time in each learning activity wisely. For this reason, the suggestion for further research is the use of the Moodle platform can also be seen whether it is able to increase student learning motivation or student learning independence

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