The Effectiveness of Distance Learning Using the Nht Type Cooperative Learning Model (Number Head Together)

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Abstract

This study aims to (1) determine the learning process using the Google Meeting application in the Electronic Measuring Instruments and Measurement Systems course with the NHT-type cooperative model, (2) determine the level of effectiveness of student learning outcomes using the Google Meeting application in the Measuring Instruments and Measurement Systems course Electronics with NHT type cooperative models. This type of research is PTK (Classroom Action Research) Participants. The subjects in this study were students majoring in Electronic Engineering Education (S1) Class 02, Faculty of Engineering, Universitas Negeri Makassar with 32 respondents. Data analysis techniques used in descriptive analysis research. The results of the study reveal that distance learning using the Google Meetings application is effective and improves student learning outcomes. The pretest in cycle 1 obtained an average N gain in learning outcomes of 0.31, which means that no student reached the minimum standard of completeness (KKM), while in the posttest stage, 15 students met the minimum standard of completeness. Furthermore, classically obtained a posttest value of 46% in cycle 1 and there was an increase in cycle 2 with an average value of N learning gain of 0.70. In cycle 2, 6 students obtained pretest scores reaching KKM, and 29 students achieved KKM on the posttest with a classical completeness percentage of 90%.

Keywords: Effectiveness; Google meeting application; Electronic measuring and Measuring instruments.

Introduction

In the history of human civilization, various kinds of pandemics have occurred successively and always cause not a few deaths. The pandemic has also resulted in significant changes in people's lifestyles and created clear differences between life before and after the pandemic. Covid-19 is a pandemic that is spreading around the world, infecting all countries. Therefore, this condition is caused by a new type of corona virus called SARS-CoV-2. The Covid-19 outbreak was first recognized in Wuhan, Hubei, China on March 11 2020 and lasted until November 14 2020 (Yuan et al., 2022).

This serious impact has hampered access to education for students who do not have adequate technological facilities at home, thus creating a learning gap between students who are able and unable; also the lack of social interaction and physical activity that has an impact on students' mental and physical health; and the decline in the quality of learning due to a lack of supervision and assistance from teachers and parents. Apart from that, the pandemic has also forced educators and education staff to adapt to the new online learning system, which requires skills and digital literacy that not all teachers and lecturers have(Aiusheeva, 2023); (Núñez-Canal et al., 2022).

Although the SFH system provides convenience in the learning and teaching process amid the COVID-19 pandemic, this system also raises several challenges, such as internet access that is not evenly distributed throughout the region, limited technological equipment, and decreased social interaction between students and teachers (AL-Nuaimi et al., 2022). Therefore, the Ministry of Education and Culture continues to evaluate and make adjustments so that education continues to run effectively and efficiently. Online learning is actually two combinations of the words learning and online, this learning can be interpreted as a process of mastering something or gaining knowledge and online is a situation where electronic devices are connected to an internet connection(Pham et al., 2022).

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Distance or online learning which is often called School From Home (SFH) is a form of online learning that is carried out via the internet or virtual media remotely (Muthmainna et al., 2023). At this stage, the teaching staff will determine online learning objectives which will serve as a reference for determining the types of learning materials, learning strategies, learning methods, and learning media to be used in the learning process. Without clear online learning objectives, online learning will actually become an activity without direction, without focus, and become ineffective. The identification of online learning objectives significantly simplifies the process for teachers to select and assemble appropriate teaching materials and media (Palioura & Dimoulas, 2022). It is undeniable that one key aspect of online learning is that it provides a unique set of opportunities and challenges compared to traditional classroom settings.

Online learning does not just replace face-to-face meetings using digital applications (Iskandar et al., 2022). Educational technology can be used to design more effective online learning systems, taking into account specific educational goals. There are several principles of using technology that should be a reference for teachers in utilizing technology, such as being able to present information that is difficult to find in class, providing illustrations of natural phenomena and science, providing opportunities for exploration, facilitating interaction and collaboration between students-teachers and students- students, as well as providing non-stop individual service (Nikolopoulou, 2022).

Online learning applications are currently one of the most sought-after applications. Since the Covid-19 pandemic took place (Alwafi et al., 2022). Online learning is one of the most reliable ways of learning. The applications that are often used in the online learning process are Google Meeting, Whatsapp, Line, Google Hangouts Meet, Line, Skype and so on. However, the application that is widely used in this online learning process is the Zoom application (Alturki & Aldraiweesh, 2022).

Google Meeting is an application that can be used as a learning medium that uses video (Setiawan & Mayurida, 2022). This application was founded by Eric Yuan and officially launched in 2011 at the Zoom application headquarters in San Jose, California. Besides being used for learning, this application can also be used for office activities, business, and so on. This application can be accessed free of charge with a usage time limit of 45 minutes, but when used by a paid account there is no time limit. By using it, we can communicate directly with other people via video from various devices such as PCs or cellphones. Therefore, the Google Meeting application is suitable for use as a learning medium that can be accessed through various devices such as websites, Mac OS, Windows, Linux, iOS, and Android (Rahman, 2023).

This research was conducted at Makassar State University (UNM), Faculty of Engineering, Department of Electronics Engineering Education, when online learning was still being carried out remotely due to the impact of the Covid-19 pandemic. The researcher raised this title with the aim of finding out whether the course "Electronic Measuring Instruments and Measurement Systems" using the NHT (Number Head Together) cooperative learning model is effective when taught remotely using the Google meeting application. So to find out more whether the course "Electronic Measuring Instruments and Measurement Systems" is effective if it is taught through online learning compared to face-to-face. Based on these problems,

Method

This study uses the Classroom Action Research (PTK/CAR) method because it is considered effective in increasing the use of media in learning. This method involves lecturers as researchers in class or in collaboration with other people, by designing, implementing, and reflecting on actions in a participatory manner with the aim of improving the quality of the learning process through certain action cycles (Cezarotto et al., 2022).

Classroom Action Research types are people who are directly involved in the research process from the beginning to the research report (Putra, 2023). During research planning, researchers are always involved and continue to monitor, record, collect and analyze data, and report research results (Cappa et al., 2022). PTK is carried out using a cycle that includes planning, implementing, evaluating, and reflecting. If the expected success criteria have not been met, the cycle will continue, and if it has been reached, the cycle will stop.

Research design

In this study, two cycles were held, in which each cycle included the planning, action, observation and reflection stages (Muawanah et al., 2022). The steps that are held in each cycle are:

1. Planning
   Planning is the most important stage in conducting research. Doing everything must be based on planning. At this stage the researcher explains what, why, when, where, by whom and how the action will be carried out.
2. Implementation
   Implementation of the action is the implementation or application of the contents of the design, namely carrying out actions in class according to the plans that have been prepared at the planning stage.
3. Observation
   Observation is an observation activity carried out by observers. At this stage, the implementing teacher records little by little what happened in order to obtain accurate data for improvement in the next cycle. Observations were made during the implementation of the class action by taking notes, recording, documenting the symptoms that appeared during the implementation of the action.
4. Reflection
   In this stage, the researcher tries to find things that are satisfactory because they are in accordance with the design and carefully identify things that still need to be improved. If the action research is carried out through several cycles, then in the final reflection, the researcher submits the next research plan. Reflection should reveal the obstacles in the first stage and their shortcomings so that in the next stage they can improve action research.

Data analysis technique

In this study using descriptive qualitative analysis techniques. This analysis technique is used to analyze the success rate of students after the teaching and learning process for each cycle is carried out by giving test questions at the beginning of learning (pretest) and at the end of each cycle (posttest). Descriptive analysis is used to calculate the size of the concentration of student learning outcomes data.

1. Mastery Learning Outcomes: From the data that has been collected in each cycle analyzed descriptively with statistical calculations to see the percentage of progress that occurs as a whole. The formula for calculating the percentage of completeness of learning outcomes is used the following formula:

$$P = \frac{\sum siswa\ tuntas\ belajar}{\sum keseluruhan\ siswa} \times 100\%$$

2. Student Learning Outcomes: Descriptive analysis is used to calculate the size of the concentration of student learning outcomes data. The data obtained from the results of the pretest and posttest were analyzed to determine student learning outcomes. The amount of increase before and after learning is calculated by the simple normalized gain formula. The increase in activity results and student learning outcomes was analyzed using the normalized gain score (Marcella et al., 2022) with the formula:

$$g = \frac{S_{pos} - S_{pre}}{S_{maks} - S_{pre}}$$

Information:
g   = normalized gain
S_pre = pretest score
S_pos = post-test scores
S_max = ideal maximum score

Results and Discussion

Results

This study aims to explore how the learning process and the level of effectiveness of using the Google Meet application in the course of Electronic Measuring Instruments and Measurement Systems. In this study, researchers applied the

NHT (Number Head Together) cooperative learning model to improve student achievement. The NHT type cooperative learning model is a group learning approach in which students are placed in a group and interact, share, and receive information from other group members without any separation (Yulianto et al., 2023); (Pohan et al., 2022). This research consisted of two cycles, where each cycle involved several stages, including planning, implementing, evaluating, and reflecting.

Cycle 1

Based on the results of observations in cycle 1 using the NHT (Number Head Together) cooperative learning model where the N gain obtained in cycle 1 was 0.31. (Kasman & Suhartini, 2022) if the value of the N gain criterion obtained is $0.30 \leq$ N-gain <0.70 then in improving student learning outcomes it can be categorized in the Medium category. In the first cycle of the pretest, it can be seen that in the pretest, none of the students had completed the KKM. In the post-test, it was found that 15 students achieved KKM scores.

According to (Puspita, 2023) scores that exceed the KKM of more than 55% have experienced an increase in the learning process using the zoom meeting application. Based on the classical completeness obtained in cycle 1, it is 46%. Indicators of success in the learning process where if the minimum number has reached 75% of the total number of students participating in the learning process has reached KKM (70) then learning can be said to be effective. So that in cycle 1, the N gain obtained was still in the medium category and the classical mastery obtained had not reached an effective level in online learning using the NHT (Number Head Together) cooperative learning model. So that in cycle 1 it is still necessary to proceed to the next cycle because the indicators of success have not been achieved.

Cycle 2

Based on the results of observations in cycle 2 with the same learning model, namely cooperative NHT (Number Head Together) type. In this 2nd cycle, N Gain was obtained at 0.70. According to (Ntobuo et al., 2023),if the N gain criterion value obtained by N-gain ≥ 0.70 then the increase in student learning outcomes can be categorized in the high category. Then in cycle 2, there were 6 students who obtained pretest scores according to the KKM standard, while in the posttest as many as 29 students in the complete category reached KKM. (Fitriani et al., 2022) said that the results of the research met the indicators of the effectiveness of learning biology, namely 90% active indicators in learning.The classical completeness obtained in cycle 2 is 90%. Indicators of success in the learning process have reached 75% of the total students participating in the learning process. This is also disclosed by (Alfiana & Iswari, 2022), that KKM (70) can be said to be effective. The results of the previous analysis showed that the use of the NHT (Number Head Together) online class cooperative learning model in the Electronic Measuring Instruments and Measurement System course could improve student learning outcomes and completeness. So the indicators of the success of this research have been achieved so that this research no longer needs to be continued to the next cycle.

Discussion

The Numbered Head Together (NHT) cooperative learning model is a cooperative learning model that emphasizes individual and group responsibility for understanding the material being studied so that students play an active role in the learning process which has an impact on increasing student learning outcomes (Darmuki et al., 2023); (Chang et al., 2022). The learning process uses the Google meeting application in the course of electronic measuring instruments and measurement systems using two cycles. The first cycle uses the NHT (Number Head Together) cooperative learning model where in the first cycle there are still some deficiencies that cause this learning model to be ineffective so it still needs to be continued to cycle 2. Then in cycle 2, several improvements are implemented based on the deficiencies found in cycle 1,

The effectiveness of distance learning from student learning outcomes by using the Google meeting application in the Electronic Measuring Instruments and Measurement System course of the NHT (Number Head Together) type of Cooperative learning model in increasing the effectiveness and student learning outcomes. This can be seen from the increased student learning outcomes, with the average N gain in cycle 1 being 0.31 in the medium category. In the pretest in cycle 1, there were no students who met the complete criteria according to the KKM standard. Then the post-test revealed that 15 students had completed the KKM score. Furthermore, in the post-test, the classical percentage obtained in cycle 1 was 46%. Then the average learning result N gain has increased in cycle 2 is 0.70 which is included

in the high category. It is known that there were 6 students who obtained pretest scores reaching KKM and in the posttest as many as 29 students who had completed achieving KKM. Whereas in the post-test the percentage of classical completeness obtained was 90%.

Conclusions and Suggestions

Conclusions

Based on the results of research that has been conducted in the Department of Electronic Engineering Education, Faculty of Engineering, Makassar State University regarding the effectiveness of distance learning using the Google meeting application in the course of Electronic Measuring Instruments and Measurement Systems using the NHT (Number Head Together) cooperative learning model, information was found that cooperative learning type NHT (Number Head Together) using the google meeting application Effectiveness to use and can improve student learning outcomes.

Suggestions

1. Students should be more active and participate in online class activities.
2. Lecturers create a conducive learning atmosphere so students don't get bored with one learning model.

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