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The Effect of Discovery-Based Blended Learning towards Learning Performance of High School Students in Linear Motion

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Abstract: This study aims to determine the effect of the application of the video-assisted discovery learning model that is implemented with blended learning on the concept of straight motion in high school. This research was conducted at SMA Negeri 1 Kabila using the experimental method and the One-Group Pretest-Posttest Design. This design has a pretest before being given treatment and a posttest after being given treatment. From the N-gain test data, the average pretest value is 5.30 and the posttest average value is 76.30. The normalized N-gain value is 0.75 in the high category. Hypothesis testing on the data obtained t_{count} of 58.13 while the value of t_{table} at a significance level of 5% is 2.03452. Thus $t_{count} > t_{table}$ So it can be concluded that there is an effect of student learning outcomes after the application of the discovery learning learning model assisted by video implementation of blended learning on the concept of straight motion in high school

Keywords: blended learning, discovery learning, high school students.

Abstrak: *Penelitian ini bertujuan untuk mengetahui pengaruh penerapan model pembelajaran discovery learning berbantuan video yang diimplementasi dengan blended learning pada konsep gerak lurus di SMA. Penelitian ini dilaksanakan di SMA Negeri 1 Kabila dengan menggunakan metode eksperimen dan desain One-Group Pretest-Posttest Design. Desain ini terdapat pretest sebelum diberi perlakuan dan posttest setelah diberi perlakuan. Dari data uji N-gain didapatkan nilai rata-rata pretest yaitu 5,30 dan nilai rata-rata posttest 76,30. Nilai N-gain yang ternormalisasi adalah 0,75 dalam kategori tinggi. Uji hipotesis pada data diperoleh t_{hitung} sebesar 58,13 sedangkan nilai t_{tabel} pada tingkat signifikansi 5% sebesar 2,03452. Dengan demikian $t_{hitung} > t_{tabel}$ Sehingga disimpulkan terdapat pengaruh hasil belajar siswa setelah diterapkan model pembelajaran discovery learning berbantuan video implementasi blended learning pada konsep gerak lurus di SMA*

Kata kunci: *pembelajaran blended, pembelajaran discovery, siswa SMA.*

▪ INTRODUCTION

The impact of government policies on education regarding Covid-19 disease forces educators and students to be able to adapt. Learning activities that were originally carried out in schools by meeting face to face with students have now turned into an online or virtual learning system. Online is an acronym in the network, according to KBBI , which means connecting through computer networks, the internet, and so on. So activities for educators and students are now carried out online, including when giving assignments. Online learning applied in schools makes students carry out learning activities without direct teacher assistance. So that it makes it difficult for students to understand the material given due to the absence of the teacher in supervising and explaining the material.

An efficient learning process means that learning is getting the best results in accordance with the expected goals. Education is an effort made by adults in carrying out

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student self-development activities so that they become complete human beings in accordance with predetermined goals . Education can help humans raise their dignity compared to other uneducated humans. Physics is an important subject part of natural science which studies natural phenomena that occur to be used as newly acquired so that it can be implemented in everyday life.fact, Physics is a subject that is considered difficult and less attractive to some students in schools because the teaching is done in a monotonous and boring way which makes students forget easily and are less active in the learning process, besides that it is not uncommon to have to solve problems with formulas in the process. This is what makes the subject of physics one of the subjects that are less attractive to students.

The selection of appropriate learning models and learning media in the learning process is one of the success factors in learning. The learning model that teachers usually apply in schools is generally only teacher-centered, so that in the process learning activities become boring for students. students become easier to forget the material and it is difficult to understand the material because in the process students are not active or passive. So in this study the researchers used discovery learning learning models with video learning materials as learning media which according to Sudjana in Sumarsono (2017) educational teaching aids are tools that can be absorbed by the eyes and ears with the aim of helping teachers to teach students' learning process more effective and efficient. Video as a learning media is very effective as a support in the learning process because videos can provide a different learning experience by displaying phenomena that previously could only be explained in words but with videos they can be described in detail. In addition, the selection of video (Audio Visual) as a learning medium can make it easier for students to understand the material because videos can be studied without any time and space restrictions. So students can study anywhere. This is in accordance with one of the uses of learning media according to Pakpahan (2020:58) that the use of learning media in the teaching and learning process is to overcome the limitations of space, time and senses. This is also supported by the research conducted by Yusmawati et al. (2022) the results of the study show that the discovery learning model with audio-visual and games has a significant difference to the overall science learning outcomes. With the advantages of using video as a learning medium, researchers use it in a discovery learning model which in the process of this learning model focuses more on students to play an active role in learning, reduce students' dependence on teachers, and explore various sources of information. So that students will be motivated in the learning process. Besides that, searching for information yourself will last longer.

The following are some studies regarding the application of the discovery learning model, namely research conducted by Nurlaela, L. et al. (2019). The results of the research show that the discovery learning model can improve the ability of teachers to manage learning, student activities, learning outcomes of creative thinking skills, and student responses. . In a study conducted by Dina, H. et al. (2019), the results showed that the improvement in communication skills and mathematical disposition of students who were taught using the discovery learning model was better than those taught using the conventional approach. This is also supported by further research conducted by Gunawan et al (2020) the results obtained that the application of the discovery learning method in the development of teaching materials has a positive impact on students' understanding of concepts. In addition, according to Hajar, s. et al (2020) in their research after the

discovery learning model was applied, learning motivation became better and learning outcomes increased compared to the problem solving learning model.

Blended learning as a learning situation that is currently applied has a positive impact on learning according to research conducted by Jovan, G. et al (2020) that the application of blended learning has a greater impact on student retention compared to the conventional learning process. This is also supported by the results of research conducted by Utami (2018) that blended learning is effectively applied in learning. The selection of discovery learning as a learning model that will be used in blended learning is very appropriate because in the process this learning model focuses more on students to play an active role in learning. This is supported by research conducted by Lorico, L. et al (2021) in his research that he considered that the DLPCA strategy they applied was very effective in blended learning. Which in this strategy has similarities with the discovery learning learning model which focuses on students to be more active in learning.

In the process, the steps of the discovery learning model according to the Ministry of Education and Culture in (Susana, 2019) are as follows: (a) stimulation, at this stage students are faced with something that causes confusion, then proceed not to give answers so that the desire to investigate arises. alone. Teachers can start learning activities by asking questions, recommending reading books, and other learning activities that lead to the preparation of problem solving, (b) problem statement, provides an opportunity for students to identify as many problem agendas as possible that are relevant to the lesson material. Then one of them is selected and formulated in the form of a hypothesis (temporary answer to the problem question), (c) data collection, students are given the opportunity to collect various relevant information, read literature, observe objects, interview sources, conduct their own trials and so on, (d) data processing, according to Shah in Susana (2019) data processing is an activity to process data and information obtained by students either through interviews, observations, and so on, (e) verification, students carry out an investigation to prove whether or not the hypothesis set earlier with alternative findings, linked to the results of data processing, generalization, based on the results of the verification, students formulate formulated principles that underlie generalization. Students must pay attention to the generalization process which emphasizes the importance of mastering the lesson on the broad meanings and rules or principles that underlie one's experience.

▪ METHOD

This research was conducted at SMA Negeri 1 Kabila for the Academic Year 2021/2022 for one month. The samples used were students of SMAN 1 Kabila class XI IPA. The sampling technique in this research is using *cluster random sampling technique.* According to Sugiyono (2015:118) *cluster random sampling* is a technique of taking random sample members from the population without regard to strata and the population is considered homogeneous. In this case the random is the class of the population. And the sample selected in this study was class X IPA 1 with 34 students. The research used the experimental method. Experimental method is a research method used to determine the effect of the treatment given to the subject under controlled conditions (Sugiyono, 2015: 107).

This study was conducted to see the difference between student learning outcomes in one experimental class after the application of the *discovery* using the learning

outcomes test instrument. The validity of the test contains questions that have been validated with a test reliability value of 0.73 and is included in the high criteria. One-Group Pretest-Posttest Design. In this design, there will be a pretest before being given treatment and a posttest after being given treatment. Moreover, according to Sugiyono (2015: 110) the treatment can be known to be more accurate, because it can compare with the situation before being treated. Data analysis techniques used are normality test, hypothesis testing and N-gain test . The statistical test used in the normality test of the Kolmogorov smirnov The n-gain test is carried out to determine the extent to which student learning outcomes have increased by calculating the pretest and posttest scores using the n-gain formula. After the calculation, the results obtained are then interpreted based on the criteria as in Table 1 below:

Table 1. N- gain criteria

Index	Criteria
g > 0.70	High
0.30 < g < 0.70	Medium
g < 0.30	Low

▪ RESULT AND DISSCUSSION

This research was conducted at SMAN 1 Kabila using 1 class as the research sample, namely class X IPA 1 with the aim of learning models discovery learning on student learning outcomes on the concept of straight motion. Learning activities are carried out in three meetings for three weeks, with a time classification of two hours (2x40 minutes). At the time of the study, the researcher acted as a facilitator in providing guidance for students in understanding the concepts of straight motion, uniform straight motion and uniform straight motion by using learning videos as a medium in learning with the results of student scores as follows.

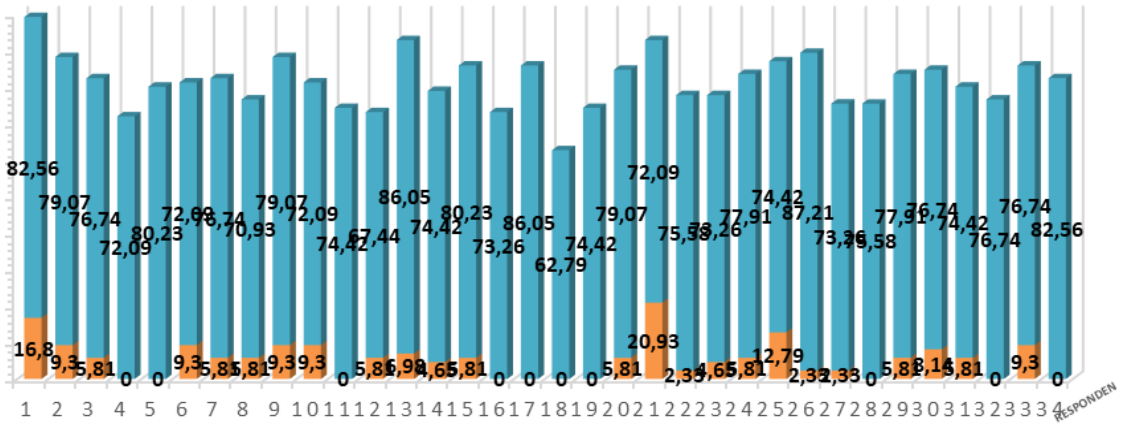

Figure 1. Students learning outcomes at pretest (orange) and posttest (light blue)

The effect of improving student learning outcomes by applying the discovery-assisted blended learning, it is necessary to carry out data processing and analysis of pretest and posttest using the normalized n-gain test in order to obtain an average score of student learning outcomes with a value of The average learning outcome obtained in

the posttest 76.30 while the average value in the pretest is 5.30, meaning that the posttest value is higher than the pretest value, so that there is an increase in student learning outcomes. While the normalized value of n-gain is 0.75 and is included in the high category and it is known that the results of the pretest and posttest are $L_{count} < L_{table}$ at the significant level = 0.05. This shows that the data from the pretest and posttest are normally distributed. To test the hypothesis using the paired t-test formula. The results of the calculation of hypothesis testing using paired t-test were obtained t_{count} of 58.13 while the value t_{table} of 5%; df = 34(34-1) obtained by 2.03452. Thus $t_{count} > t_{table}$ means that there is an effect on student learning outcomes after the application discovery learning with video-assisted implementation of blended learning on the concept of physics.

This study aims to determine the effect of the application of the discovery learning on the implementation of blended learning on the concept of straight motion in high school. This research was carried out at SMA Negeri 1 Kabila for the Academic Year 2021/2022 in class X IPA 1. The study used an experimental method with the research design used was One-Group Pretest-Posttest Design. In this design there is a pretest before being treated and a posttest after being treated in the form of an essay test. Data analysis techniques used are normality test, N-gain test and hypothesis testing. Based on the data that has been obtained, the researcher analyzed the data on the pretest and posttest was found that the average value of the pretest 5.30 and the average value of the posttest 76.30. Meanwhile, the normalized N-gain value is 0.75 and is included in the high category. From the data, it can be seen that there is a significant increase between pretest before being given treatment and posttest after being given treatment.

Success in achieving the goal of improving student learning outcomes is certainly influenced by various factors, one of which is the selection of the right learning model and learning media, so researchers choose discovery learning as a learning model and video as a learning medium in conveying the concept of straight motion. This is the same as the previous research conducted by Putri (2017) with the research title "The Influence of the Discovery Learning Model on Student Motivation and Physics Learning Outcomes of MAN Bondowoso Students". The results of this study are learning motivation and student learning outcomes increased in the experimental class. Nurulhidayah et al., (2020), in a study entitled "The Influence of the Discovery Learning Model Using PhET Simulation Media on Students' Understanding of Physics Concepts". As for the research using the experimental method with a quasi-experimental. The results of his research stated that the use of discovery learning using PhET simulation media had a very significant effect on understanding physics concepts at SMAN 10 Palembang. Juniarti & Gustiana (2019), in a study entitled "The Influence of the Discovery Learning Model on Understanding Mathematical Concepts". Using this type of quasi-experimental research. In his research, he only used the posttest. The result of this research is that there is a significant difference between the experimental class and the control class. So it can be concluded that the discovery learning learning model can improve student understanding which continues with increasing student learning outcomes. Uskenat & Adelia (2021), in a study entitled "Application of discovery learning models to light materials to improve student learning" with the results of research on student cognitive achievement in the high category. This is also supported in research conducted by Sukmanasa et al (2020). In his research, the results obtained that the application of theDiscovery Learningincreases student activity in every aspect studied, namely, learning outcomes, cooperation, self-

confidence and motivation. So it can be concluded that the discovery learning model can increase student motivation and also improve student learning outcomes.

According to Briggs in Rahman (2018) learning media is a form of physical means to convey learning information. The means that can be used can be through books, videos, and others. In this study, researchers used video as a learning medium, video as a learning medium is very effective as a support in the learning process because videos can provide a different learning experience by displaying phenomena that previously could only be explained in words but with videos they can be described in detail. This is based on the notion of learning media according to Sudjana in Sumarsono (2017: 2) educational aids are a tool that can be absorbed by the eyes and ears with the aim of helping teachers make the student teaching and learning process more effective and efficient. So that researchers use video as a medium in learning by using the syntax of the discovery learning learning model. After the normality test is done, then the hypothesis test is carried out. After testing the hypothesis on the data obtained t_{count} of 58.13 while the value t_{count} of 5% with df = 34(34-1) obtained by 2.03452. Thus $t_{count} > t_{table}$ indicated that there is an effect on student learning outcomes after the application of the learning model of discovery learning assisted by the implementation of blended learning videos on the concept of physics.

▪ CONCLUSION

Based on the analysis of the research data, it can be concluded that the application of the discovery learning video-assisted implementation of blended learning on the concept of straight motion in high school has an effect on student learning outcomes. this can be shown by the significant difference in student learning outcomes before and after the application of the video-assisted discovery learning model that is implemented with blended learning. discovery learning as a learning medium on the concept of straight motion makes learning more systematic and directed. The selection of video as a medium for learning the concept of straight motion makes it easier for teachers to explain phenomena in physics in detail. For further research, it is necessary to continue the use of video media in other materials.

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