Discovery Learning Model and WEB-Based Interactive Media: Its Impact on Student Academic Performance

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Abstract: *The improvement of the quality of education for the younger generation is greatly influenced by effective and innovative education. This study aims to analyze the impact of the application of the Discovery Learning model combined with web-based interactive media on students' academic performance in the era of digital learning. The study used a quantitative approach involving 38 tenth-grade students as samples. Data was collected through pre and post-tests of the model and media application, then statistically analyzed. The results showed a significant increase in the average student score from 50.92 (pretest) to 85.52 (posttest). Hypothesis testing showed a significance value of 0.000 (< 0.05), confirming that the combination of Discovery Learning and web-based media is effective in improving student academic performance. This model encourages students to be more active, independent, and engaged in the learning process, while web-based media creates an interesting, interactive, and easily accessible learning experience. Therefore, this combination is highly recommended for use in modern education to improve overall educational quality.*

Key Words*: Discovery Learning, Web-Based Interactive Media, Academic Performance*

Introduction

A quality young generation is largely produced by education. Technology is needed in education to facilitate effective learning. A number of factors related to education, including media, techniques, and learning objectives, have a significant impact on how well students learn. To make it easier for teachers to distribute teaching materials to students, appropriate media and methods are needed. Teachers need to have the ability and opportunity to make learning interesting to achieve this achievement. As a teacher, you are expected to have access to resources and learning models that will help you in teaching in the digital era like today. Here, the value of teacher preparation lies in their ability to apply their knowledge and understand learning models that are interesting and in accordance with the character of today's students to improve the quality and effectiveness of learning, which ultimately increases student Academic Performance.

The selection of the right learning model greatly influences the success of a learning process. The method used by teachers systematically is intended to prepare comfortable and enjoyable learning conditions and support the smooth running of the learning process and achieve learning success (Iwantoro, Rahmat, S., & Haris 2022). Discovery learning involves

students where students are given a problem to then solve the problem by doing several things such as experiments, collecting data, analyzing and drawing conclusions. The discovery learning learning model focuses on students being active in finding problems and solving problems (Yustia, D. M., Megasari, D. S., & Wilujeng 2023). This discovery learning learning model involves students' ability to search and investigate systematically, critically, logically analytically and then formulate their own findings or what has been obtained. The discovery learning learning model is one of the learning models that can develop or improve student learning outcomes in the cognitive domain. This is reinforced by (Ramadhani 2021) the discovery learning learning model has been proven to be effective and has an influence on student learning outcomes.

Finding knowledge more actively is something that students must do as part of the discovery learning approach. According to (Borthick. A.F & Jones 2000) discovery learning requires participants to identify problems and solutions, find relevant materials, develop solution methods, and practice the chosen approach. The selection of an appropriate learning model is expected to facilitate the achievement of learning objectives and improve the quality of learning. In addition, it is also intended to obtain the highest learning outcomes so that students' enthusiasm for learning will increase. The learning process is an important part of education, and teachers are key players in improving academic standards. Teachers need to reorient the learning process in such a way that it is more student-centered than teacher-centered. In addition, they should also utilize technology more optimally, especially in teaching and learning activities to suit what today's students are interested in, namely everything digital. Student-centered learning is expected to improve the teaching and learning process because it can motivate students to produce their own knowledge (Ratnadewi & Arini 2018).

Currently, the use of technology as a web-based and mobile learning model in this era is effectively used to combine both face-to-face and online learning Inoru Nian Alfita, et al (2024). In this digital era, technology is needed for effective learning. One element that may affect the effectiveness of the education process is learning resources. (Syaiful Bahari Djamarah Dan Aswan Zain 2020) define learning media as all forms of media that can be used as a channel for messages to achieve learning goals. Interesting media increases students' interest, attention span, and learning abilities. Web-based learning media is expected to be a learning solution to make it easier for students to achieve their desired goals. The characteristics of website-based learning are as follows: 1) Interactive, 2) Independence, 3) Accessibility, 4) Enrichment will help overcome the learning challenges faced more efficiently, which will ultimately contribute positively to improving student Academic Performance (E. Januarisman 2016).

The main challenges in implementing discovery learning are creating a supportive learning environment, adequate resources, and trained teachers to facilitate an effective learning process. In addition, there is still a need for strong empirical evidence regarding the effectiveness of Discovery Learning to improve understanding of concepts in various fields of

study (Deti, Nazwa Anzani 2024). Teachers are still minimal in utilizing technology in learning, especially in developing countries, based on the (UNESCO 2020), less than 40% of teachers worldwide have adequate digital skills to integrate technology into their teaching. (Bank 2019) also shows that many teachers feel less confident in using digital tools, and tend to use traditional teaching methods. A similar thing was conveyed by (Sella Arifenika Putri 2024) The lack of utilization or use of teaching media used by teachers effectively and innovatively, so that the learning process has not run optimally which can affect students' cognitive aspects. The selection of the right learning media is a major factor in optimizing students' cognitive aspects.

Of course, this is contrary to the current conditions where students now tend to like and are comfortable with digital things including in their learning. In addition, one of the learning models that is relevant to the current curriculum demand is innovative and student-centered learning. Based on this explanation, this study has the main objective of finding the effect of implementing the discovery learning model and web-based interactive media on student Academic Performance in the digital learning era. It is hoped that this study can contribute to efforts to improve the quality of learning in this digital era.

Method

This study uses a quantitative approach. According to (Sugiyono 2015), quantitative research methods can be interpreted as research methods based on the philosophy of positivism, used to research certain populations or samples, sampling techniques, data collection using research instruments, quantitative/statistical data analysis with the aim of testing the established hypothesis. This quantitative study aims to determine whether the use of discovery learning with the help of web-based interactive media has an effect on student Academic Performance. The researcher used 38 students in grade X as samples for this investigation. through collecting information through test methods, and observations, namely through the posttest given. The test used aims to determine the extent to which the use of the discovery learning model combined with web-based interactive media affects student Academic Performance. The study was conducted at one of the SMAN in Bojonogoro. The selection of the research location and sample has been through consideration and meets the criteria in accordance with scientific principles. the collected data is processed statistically so that it can be interpreted properly.

Results and Discussion

The purpose of writing this article is to find the effect of the application of the discovery learning model and WEB-based interactive media on student Academic Performance in the digital learning era. The data and information obtained from the test results are as follows. The results of the 10th grade student exams for the 2024–2025 academic year were used in this study as initial data. More details in Table 1 below.

Table 1. Initial Data Description

N		Minimum	Maximum	Sum	Mean	Std. Deviation
Pretest	38	45,00	70,00	1935,00	50,9211	13,44937
Valid N (listwise)	38					

From the data above, it can be seen that the value of class X before the application of the discovery learning model and web-based interactive media, the minimum value of students was 45 and the maximum value was 70, while the standard deviation was 13.449 and the mean or average value of students was 50.92. For the final data, the posttest findings of class X students who received discovery learning model and web-based interactive media were used as the final data used in this study and can be seen in table 2 below:

Table 2. Final Data Description

N		Minimum	Maximum	Sum	Mean	Std. Deviation
Posttest	38	70,00	91,00	3250,00	85,5263	6,85659
Valid N (listwise)	38					

It can be seen from the data in table 1.2 that the students' scores after using the discovery learning model and web-based interactive media, the initial standard deviation which was originally 13.449 became 6.856, and the mean or average score of students which was originally 50.92 became 85.52. While for the hypothesis test, the sig. (2-tailed) value was obtained 0.000 with a significance level of 0.05. So that 0.05> 0.000 then H0 is accepted and Ha is rejected. The statement above can be concluded that the use of the discovery learning model and web-based interactive media has an effect on Academic Performance. Students feel that they are learning new things through teaching and learning activities with the discovery learning model. Students who use this strategy improve their academic performance because they become more involved and active learners in the process.

With the help of using web-based interactive media, the discovery learning model can influence student Academic Performance, encourage greater student participation in the learning process, and involve all students equally regardless of status. Students' interest in learning can be aroused and increased by using this web-based interactive learning media, of course this will have an impact on their learning outcomes. (Bayhaqi Syahrul Bahrudin1, Fatikhatun Nikmatus Sholihah, Muchamad Rahman Bagus Tohari 2024) stated in the results of the study that students' cognitive learning outcomes increased after using the discovery learning model. The use of the discovery learning model combined with web-based learning media is highly recommended in the implementation of the learning process because using the discovery learning model combined with web-based learning media can teach students to improve their critical and scientific thinking skills to solve a problem. (Adellia Putri

Puspitasari, Admaja Dwi Herlambang 2017) also suggested that schools make the discovery learning model assisted by audio-visual media an alternative strategy applied to improve the quality and effectiveness of learning activities. In addition, the discovery learning model combined with web-based learning media can help students remember a concept or information that they have discovered themselves. (Deti, Nazwa Anzani 2024) also agree with this statement, in their research they stated that discovery learning can significantly increase students' understanding of concepts and critical thinking skills

Other findings from this study indicate that interactive web-based learning media is effective, this can be seen from the positive increase in student Academic Performance. According to students, web-based applications are very easy to use anywhere and anytime and are fun. This is supported by (Inoru Nian Alfita, Aliiya Khaerunisa Indah Sari, Ahmad Ghozali Al-Maghribi Iskandar, Athifa Dihyan Calysta, Hamdan Bagus Ainurohman Waliwalidaiya, Cahya Pramitha, Yusmans Trio Utomo, Syifa Maulidina 2024) Based on the research that has been conducted, the use of web-based and mobile learning applications can be concluded as an effective learning platform. Students who are active and enthusiastic in this study are also because according to them this kind of learning is new to them. This finding is also in line with the results of research by (Harding 2024)The media (web) also succeeded in creating student-centered learning by involving them in learning activities and the use of the media has a positive impact on the success of learning which is marked by the high enthusiasm of students in learning and has an impact on their Academic Performance

Conclusion

This study shows that the application of the Discovery Learning model combined with web-based interactive media significantly improves student Academic Performance. Based on the results of data analysis, there was an increase in the average score of students from 50.92 in the pretest to 85.52 in the posttest. Hypothesis testing shows a significance value (sig. 2-tailed) of 0.000 (<0.05), which supports that this model is effective in improving student Academic Performance.

The use of discovery learning allows students to be more active, involved, and independent in the learning process, while web-based interactive media contributes to creating an interesting, accessible, and enjoyable learning experience. This combination encourages a significant increase in learning interest, critical thinking skills, and conceptual understanding. In addition, this study supports the results of previous studies that confirmed the effectiveness of Discovery Learning in improving conceptual understanding and critical thinking skills. Web-based interactive media has also been shown to have a positive impact by creating student-centered learning, increasing their participation, and enthusiasm for the learning process. This learning model is highly recommended to be applied in the context of modern learning because it not only improves student learning outcomes but also involves them in the learning process more comprehensively and enjoyably

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