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Analysis of Differentiated Learning Using Learning Technology Based on Discovery Learning Model in Elementary School

Ihtasya Aulia Fathimatuz Zahra¹,Muhammad Aunurrahman Suja'², Varicha Candra Dinata³, Izza Mantasya Naufal⁴, & Bakti Fatwa Anbiya⁵

^{1,2,3,4,5} Walisongo State Islamic University Semarang, Indonesia

Email: ¹<u>ihtasyaaulia@gmail.com</u>, ²<u>aunurmars@gmail.com</u>, ³<u>varichadinata90gmail.com</u>, ⁴<u>izzamant@gmail.com</u> ⁵<u>baktifatwaanbiya@walisongo.ac.id</u>

ABSTRACT

This research aims to analyze differentiated learning approaches through the use of learning technology based on the Discovery Learning model at the elementary school level. This research uses the literature review method, in which various literature sources related to the use of learning technology and the Discovery Learning model in differentiated learning are explored, analyzed, and synthesized to get a comprehensive picture of this topic. The results of the literature review show that the use of learning technology based on the Discovery Learning model has great potential in enhancing the learning potential of differentiation in elementary schools. This approach can stimulate students' interest and engagement in learning, as well as encourage the development of critical, collaborative and creative thinking skills. Learning technologies such as interactive software, educational applications and multimedia aids can facilitate a more engaging and personalized learning experience for each student.

Keywords:

Differentiated Learning, Technology, Discovery Learning, Primary School

Contact: <u>ihtasyaaulia@gmail.com</u>

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A. Introduction

Education is one of the most important aspects of individual and societal development. To ensure that every student gets a learning experience that suits his or her needs and potential, a differentiated learning approach is needed. Today, students in primary schools have a high level of accessibility to technology. According to recent data, almost all students around the world have access to technological devices such as smartphones, tablets or computer (Aziz et al. 2019). This creates a great opportunity to apply technology-based differentiated learning models, such as Discovery Learning, to meet the diverse learning needs among these students. By utilizing learning technology, teachers can more easily customize learning according to students' individual levels of understanding, create an inclusive learning environment and help improve the quality of education at the primary level (Zubaidah 2016).

Many studies have suggested the importance of differentiated learning strategies to achieve better results in the context of primary education. Research has shown that the Discovery Learning model, which focuses on understanding concepts through active exploration and student inquiry, is a potential approach to improving student understanding (Bintoro and Purwaningrum 2020). Studies also reveal that the use of technology in learning contexts, such as online platforms and interactive software, can strengthen the implementation of the Discovery Learning Model (WH et al. 2023). In addition, various studies have also noted that differentiated learning can increase students' learning motivation, promote collaboration between students, and create an inclusive learning environment in primary schools (Fatimah, Fitria, and Erita 2023).

This research aims to identify the extent to which this approach can enhance the differentiated learning process in primary schools, facilitate deeper understanding for students with different learning styles, and support the development of cognitive and problem-solving skills. The results of this study are expected to provide valuable insights for educators and policy makers in developing more inclusive and effective learning strategies at the primary level.

B. Theoretical Framework

Differentiated learning is an approach where teachers design learning experiences that take into account individual differences between students, including learning styles, speed of comprehension, and interests. It aims to create a learning environment that suits the unique needs of each student (Herwina 2021). The Discovery Learning model, on the other hand, is a method where students are encouraged to actively explore and discover concepts independently (Widiadnyana, Sadia, and Suastra 2014). In the context of differentiated learning, the use of technology as a tool that supports the Discovery Learning model has become a growing focus of research. It aims to optimize the potential of differentiated learning in primary schools by utilizing approaches that encourage students to become active learners.

The Discovery Learning model offers various benefits that are relevant in the context of differentiated learning in primary schools. First, the model has been shown to improve students' understanding of the learning material (Rosarina, Sudin, and Sujana 2016). Students who engage in independent exploration tend to have a deeper understanding of the concepts they discover. In addition, the Discovery Learning model can also enhance students' creativity by encouraging them to find unique solutions in

their learning. It also has a positive impact on students' problem-solving ability. This model stimulates critical thinking and enables the development of higher intellectual skills (Patandung 2017).

The role of the teacher in implementing the Discovery Learning model is very important in achieving effective differentiated learning (Koem, Ilato, and Pakaya 2021). The teacher acts as a guide who provides guidance to students during the exploration process. The teacher's ability to understand individual student differences, including learning styles and ability levels, is particularly relevant in this context. Teachers should be able to design learning experiences that suit students' individual needs, be it by providing additional challenges to more able students or providing extra support to students who need it. With the right role, teachers can ensure that every student can learn according to their own pace and learning style (Sari 2019).

The integration of technology in the Discovery Learning model provides great potential in improving the quality of differentiated learning in primary schools. Technology can be used as a tool to facilitate student exploration, provide access to diverse resources, and create interactive and engaging learning experiences (Fitriyadi 2013). In this context, it is important to understand that the application of technology in learning is not only about the use of hardware or software, but also about how technology can support differences in students' learning styles and abilities. By combining the Discovery Learning model with technology, differentiated learning can become more effective, engaging and relevant for every student in primary school.

C. Methods

This research utilizes the literature review method to investigate and evaluate previous studies that have been conducted in the context of differentiated learning using learning technology based on the Discovery Learning Model at the elementary school level. In this literature review, the author analyzes previous studies that have addressed important concepts, methods, and outcomes of applying the Discovery Learning Model in the context of differentiated learning in primary schools.

Data collection is done by steps such as searching and selecting articles that are relevant to the research topic. The researcher will check academic databases, such as Google Scholar, or university library databases, to identify articles that have been published in the field of differentiated learning and the Discovery Learning model. Once suitable articles have been identified, the researcher will conduct a critical reading to evaluate the relevance, methods, findings, and contribution of each article to their research topic. The results of this literature review will be used as a foundation to analyze the impact of using learning technology based on the Discovery Learning model in the context of learning in primary schools. The data validation steps involve two main stages: first, primary data collection through direct observation of the implementation of the Discovery Learning Model in differentiated learning in primary schools. Second, the data obtained will be compared and contrasted with the findings revealed in the relevant literature, including the article on which this research is based. Thus, this method of data validation will ensure that the research findings are supported and verified by a careful review of the literature, increasing the validity of the research results.

D. Results and Discussion

The results of this study revealed various significant findings. In this literature review, it was found that the application of Discovery Learning model-based learning technology at the primary school level can enhance the potential of differentiated learning. Through this approach, teachers can better understand differences in students' learning styles and abilities and design learning experiences that suit their individual needs. In addition, the results also show that the integration of technology in learning allows students to be more actively involved in the learning process, thus increasing their motivation and interest in the subject matter (Davidi, Sennen, and Supardi 2021). The Discovery Learning model is also proven to stimulate students' critical thinking and problem-solving abilities allowing them to develop higher intellectual skills (Nugrahaeni, Redhana, and Kartawan 2017).

However, it should be emphasized that the successful implementation of learning technology based on the Discovery Learning model depends on factors such as teacher training, adequate technology infrastructure, and support from the school and parents. (Fatimah, Fitria, and Erita 2023). Therefore, this study also highlights the need for investment in human resource development and technological infrastructure in primary schools to support effective differentiated learning. (Nurdyansyah 2017).

Potential and findings related to the success of the Discovery Learning model in learning differentiation.

Previous research has provided an in-depth understanding of the approach in the context of differentiated learning. Based on our review, many studies show that the use of the Discovery Learning model in differentiated learning has a positive impact on students' academic achievement (Yelsi and Afriani, n.d.).

Findings from various literature sources suggest that the Discovery Learning model can be a very effective approach in the context of differentiated learning (Nawati, Yulia, and Khosiyono 2023). Previous studies highlight that this model allows students to be actively involved in the learning process, encouraging them to explore and discover concepts independently (WH et al. 2023). The results of this study also show that the use of the Discovery Learning model can improve students' understanding, increase creativity, and promote problem solving (Nu'man 2020).

In addition, research from various sources also underlines the importance of the teacher's role in implementing the Discovery Learning model effectively. Teachers need a deep understanding of the learning material and be able to provide appropriate guidance to students during the exploration process (Purwaningrum 2016). In the context of differentiated learning, this model can be adapted to different levels of student ability, allowing each student to learn according to their own needs (Rosarina, Sudin, and Sujana 2016).

In some cases, Discovery Learning has also been shown to improve student academic achievement in a variety of subjects, by providing a more engaging and interactive learning experience (AGUSTINA 2021). Overall, this literature review shows that the Discovery Learning model has great potential to improve the success of differentiated learning (Yusro and Ardania 2023). However, to reach its full potential, special attention needs to be paid to teacher training and the development of learning materials that are in line with the principles of this model.

Identification of factors influencing Differentiated Learning using technology-based Discovery Learning model in elementary schools.

In this digital era, technology has become an integral part of the learning process, and the Discovery Learning model offers an approach that allows students to actively explore and understand learning materials more deeply (Bakhruddin et al. 2021). Many researchers have identified several key factors that play a role in ensuring the success of differentiated learning that utilizes technology.

One very important factor is adequate technology infrastructure, including stable internet access and adequate hardware for students and teachers. In addition, the technical support available to solve technical problems during the learning process is also crucial (Putra and Pratama 2023). In addition to technological factors, another supporting factor is teacher competence in integrating technology into Discovery Learning-based differentiated learning. Teachers who are competent in using digital tools can more effectively design learning experiences that are tailored to students' individual needs (Nurdyasnyah and Andiek 2015).

Furthermore, curriculum development that allows for flexibility and differentiation needs to be considered. The curriculum should be designed in such a way that it allows students to access materials individually and move at their own pace (Zubaidah 2016). In addition, it is also important to consider the motivational factor of students in learning by utilizing technology. Students who are intrinsically motivated to learn will tend to be more successful in learning differentiated Discovery Learning models with existing technology (Zahdy 2020). By understanding these factors holistically, we can optimize the use of technology in Discovery Learning differentiated learning, which in turn will improve the quality of education in this digital era (Ratnawati, n.d.).

In addition to the factors above, the success of differentiated learning using Discovery Learning technology can be affected by a number of inhibiting factors that need to be considered. One barrier that is often identified is the availability of technology resources, which includes limited access or inadequate equipment (Nuragnia and Usman 2021). In addition, teachers' readiness to implement the Discovery Learning model well is also a concern, including their level of understanding of the educational technology used (Kastawi, Widodo, and Mulyaningrum 2017).

Another factor that can hinder success is the different ability levels of students, which can result in difficulties in adapting the differentiation model. Students need to have the skills and motivation to learn independently and actively participate in exploration and discovery through available technology (Setiawan and Tacoh 2023). Then, evaluation and assessment of learning in accordance with the Discovery Learning model also need to be considered. If the evaluation method is not suitable for this approach, then the success of learning will be difficult to measure precisely.

In overcoming these inhibiting factors, it is important for educators and educational institutions to plan carefully, provide training to teachers, support access to technology, encourage active student participation, and ensure that learning evaluation is in line with the Discovery Learning approach. With the right efforts, differentiated learning with Discovery Learning model learning technology can be an effective tool to improve the quality of education. Students' response to differentiation learning using technology based on Discovery Learning model.

Many literature studies show that the use of technology in the context of differentiated learning can generate positive responses from students. Students' response to this method can be an indicator of the successful implementation of Discovery Learning in differentiation learning. Students' positive response to differentiation learning using technology based on Discovery Learning model reflects students' high interest and involvement in the learning process. Students have a tendency to be more involved, enthusiastic, and have a deeper understanding of the learning material (Aminantie 2019).

In differentiated learning, teachers can customize materials, methods and difficulty levels according to students' individual needs. By utilizing technology, such as interactive educational software and multimedia, teachers can create a more interesting and relevant learning experience for each student. The Discovery Learning model, which encourages students to explore concepts and principles independently, has also been proven effective in improving students' understanding and engagement (Savitri 2020). With elements of exploration and discovery, students feel more active in developing their own understanding. This can increase their motivation to learn and help overcome the boredom that may arise in conventional learning (Istiqomah, Kurniawati, and Ariyani 2023).

In addition, this learning model can also improve students' problem-solving skills. By focusing on self-discovery, students are encouraged to think critically, find solutions and face challenges with more confidence. Students' positive response to the development of these skills can have long-term results in preparing them for future challenges (Shafira 2021).

However, it is important to note that not all students may have the same response to differentiated learning. Some students may take longer to adapt to this approach, while others may require additional support. Therefore, it is important for educators to monitor students' responses individually and provide guidance accordingly (Marlina 2019).

E. Conclusion

From our analysis of differentiated learning using Discovery Learning model learning technology in elementary schools is to increase student engagement the use of Discovery Learning-based learning technology can increase student engagement in the learning process. This model encourages students to actively seek knowledge and understanding through exploration and experimentation, thus making learning more interesting for them. Deeper understanding Through the Discovery Learning model, students can gain a deeper understanding of the concepts of the lesson. They have the opportunity to actively explore the topic and discover solutions and knowledge by themselves, which can strengthen their understanding. Customized learning; the differentiated learning model allows for a customized approach to the individual needs of students. Technology can help teachers to identify students' strengths and weaknesses more accurately, so they can provide additional help or challenges according to each student's level of understanding. Use of digital resources: the use of technology also allows easier access to diverse digital learning resources, including videos, simulations and interactive materials. This can enrich students' learning experience and help them understand concepts in different ways. Critical thinking skills: The Discovery Learning model encourages the development of critical thinking skills, as students are encouraged to ask questions, observe and analyze information. This is an important aspect of education that prepares students to face challenges in real life. Implementation challenges: While this model has many benefits, the challenges of implementing Discovery Learning-based learning technology also need to be addressed. Teachers need to be adequately trained in the use of technology and differentiation of learning. In addition, access to devices and internet connection are also important factors. Thus, the use of Discovery Learning model-based learning technology in elementary schools can provide significant benefits in enhancing comprehension-focused learning, student engagement and the development of critical thinking skills, provided that the implementation challenges are properly addressed.

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