

Improving Biology Learning with the Use of Blended Learning

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ABSTRACT

Blended learning is a learning strategy that combines two or more strategies or learning models to achieve expected student learning outcomes. This research aims to evaluate and improve the effectiveness of Biology learning through the application of the Blended Learning method. This research uses a descriptive approach with qualitative methods. The research results show that the application of Blended Learning in Biology learning has a positive impact on student engagement, understanding of Biology concepts, and development of science process skills. Students involved in Blended Learning demonstrate higher levels of participation through online discussions, collaborative projects, and use of online resources. Biology learning materials presented in the form of videos, simulations and virtual practicums increase students' accessibility and motivation for independent exploration. Additionally, the use of Blended Learning allows for a personalized approach tailored to individual students' needs, by monitoring their progress and adapting learning materials. Student communication and collaboration have also been shown to improve through discussion forums and online interactive activities, creating a dynamic and mutually supportive learning environment.



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INTRODUCTION

Education is considered one of the basic human needs, because through the educational process, a person acquires the knowledge, values and skills needed to develop and contribute to society (Ilham, 2019). The main goal of education is to create individuals of quality and character, who have a broad view of the future, are able to achieve the expected goals, and can adapt quickly and precisely in various environments. Education is the foundation for building personality and shaping a person's mindset so that they can play an active role in the development and progress of the nation (Mustakim, 2011).

One real effort to achieve educational equality is through the 9-year compulsory education program. This program aims to ensure that every child has equal access and rights to basic education. By requiring nine years of study, it is hoped that educational opportunities can be enjoyed by all levels of society, regardless of economic, social or geographical background (Nanggala, 2020). Equitable education through this program is expected to reduce educational disparities between regions and between sub-districts, open up equal opportunities for all children to develop their potential, and thus, create a society that is more inclusive and equitable in fulfilling the right to education (Hakim, 2016).

Learning is basically a process of adding new information and abilities so that students can learn more easily and with pleasure, including Biology subjects. When Biology is still considered a subject that is poorly understood and boring by most students, it is necessary to consider learning strategies that can provide a fun and memorable learning experience (Emda, 2011). The choice of learning strategy should be adjusted to the characteristics of students and the latest developments. The development of information and communication technology (ICT) has also made a major contribution to the world of education, changing the learning process from the conventional face-to-face model to a more open and modern educational approach (Ritonga, 2017).

Biology learning places its focus on providing students with direct experience, so that they can develop the process skills needed to explore and understand nature and the biological events around them (Salu, 2015). These process skills include the ability to observe using all the senses, formulate hypotheses, use tools and materials correctly and pay attention to work safety, ask questions, interpret data, and communicate findings. Thus, biology learning basically aims to equip students with various skills needed to understand, analyze and solve various biological problems (Astuti, 2019).

However, in reality, there are still many students who have difficulty understanding biology material because they use inappropriate learning strategies. Lack of student participation in the learning process and less than optimal learning outcomes are the impact of learning strategies that have not been able to motivate students optimally (Surayya et al, 2014). Therefore, it is necessary to develop learning strategies that are more effective and focus on empowering students so that they can be more actively involved in biology learning, so that the learning goal of producing students who understand and are skilled in biological concepts can be better achieved (Rahmawati et al, 2022).

Biology learning material is rote material with too much material but limited learning time. Therefore, biology learning must use a learning model that activates students so that the material presented will be easy to understand (Halisah, 2018). A model is a systematic procedure for organizing learning experiences to achieve certain learning goals, and functions as a guide for learning designers and teachers in planning teaching and learning activities (Riyadi, 2015). The learning model must be appropriate to student needs. One of them is the Blended Learning learning model.

Blended Learning refers to biology learning that combines or combines face-to-face education and internet-based education (online). Blended Learning is a type of education that combines classical teaching (face to face) with online teaching (Pasaribu, 2020). Blended Learning combines aspects of website/internet-based education, streaming video, synchronous and asynchronous audio communication with traditional (face-to-face) education. The blended learning procedure is a procedure that uses two approaches at once. In other words, this procedure uses an online system as well as virtual face-to-face via video conference. So, even though students and teachers carry out Indonesian language learning remotely, they can still communicate with each other (Nisa & Hakim, 2022).

The application of Blended Learning provides encouragement for students to understand the material more quickly and be more active in the learning process, so that they can improve

their learning outcomes (Usman, 2018). This approach also encourages students to develop independent learning abilities by using various resources to expand their knowledge. With Blended Learning, students have the opportunity to build knowledge naturally and apply it in everyday life (Darma et al, 2020).

Even though it has advantages, Blended Learning also has weaknesses, especially related to the need for a variety of learning media. This makes implementation difficult if facilities and infrastructure are inadequate. Apart from that, the unequal distribution of facilities available to students, such as computer equipment and internet access, is also a challenge. However, Blended Learning still has advantages, such as learning that takes place independently and conventionally, increasing the effectiveness and efficiency of learning, and increasing accessibility. With Blended Learning, students can more easily access learning materials.

METHOD

This research adopts qualitative methods, especially literature study methods, to collect in-depth technical information. Through the process of reading, researching, studying, understanding, analyzing, and collecting information from various literary sources and related regulations, this research embraces the library study method as the main approach in data collection (Moleong, 2014). The research method chosen is the literature review method, where information and data are obtained through exploration of previous articles or research results that are considered valid, especially those sourced from references such as international journals and related books. This approach allows researchers to detail their understanding of the research topic by referring to findings and concepts that have been developed in previous scientific literature.

RESULT AND DISCUSSION

Blended Learning Learning Model

Basically, this learning method is becoming more popular as the spread of Covid-19 continues to increase. The epidemic that has spread not only in Indonesia but in many countries around the world means that schools cannot carry out face-to-face learning. The world of education has been greatly impacted where students cannot come to school. As a result, learning was stopped because the teacher could not explain the material as well as in class. However, this blended method could be a solution in implementing online learning or PJJ (distance learning).

Graham (2006), explains blended learning in a simpler sense. He explained that this is a learning that combines online and offline or traditional learning. Meanwhile, Dwiyogo (2018) explained that the blended learning model is learning that is combined or mixed in nature. This method comes by mixing face-to-face learning with technology-based learning. Students can also access and follow the learning either online or offline. Then the learning model has similarities with e-learning. According to Derbel (2017), blended learning is a mixed system that combines two components and methods at once. The combination of these methods is e-learning and multimedia. Meanwhile, the learning implemented is in the form of virtual classes, streaming videos, online animated texts, and so on. All of these methods are presented using traditional learning methods found in the classroom.

Blended Learning Model learning has several characteristics. Some of the characteristics of blended learning are as explained below:

Combining Various Delivery Methods

The first characteristic of this method is the combination of various conventional or offline learning models with online learning, which is actually not a new method, but is a complement to online learning or e-learning methods. The main focus in this combined

learning is to develop independent learning abilities in students. They are expected to be able to take the initiative in the learning process, be responsible for their participation, and complete the tasks given. This approach emphasizes giving students responsibility for managing their own learning, creating a more independent and proactive learning environment.

Combination of Direct Teaching

The Blended Learning method, basically, is a form of computer-based learning. This indicates that the implementation utilizes a technological approach by combining various face-to-face learning sources. The media used in this method include cell phones, computers, video conferencing, and so on. By combining these technologies, Blended Learning creates a holistic learning experience, where interactions between students and learning materials can be carried out more flexibly and variedly. This approach not only leverages the advantages of face-to-face learning, but also integrates the potential of technology to provide a learning experience that is more dynamic and responsive to students' individual needs.

A Combination of Effective Teaching Methods and Learning Styles

By implementing the combined learning method, it is hoped that students will be increasingly motivated to carry out various learning activities independently. The existence of this method provides encouragement for them to take initiative in the learning process, stimulates independence, and increases their sense of responsibility for their own learning. Apart from that, this method opens up opportunities for students to ask questions easily through discussion forums, both to teachers and fellow students. Collaboration in this discussion forum can enrich their understanding through exchanging ideas, solving problems together, and supporting an interactive learning atmosphere. Thus, the combined learning method not only provides intrinsic motivation to students, but also builds a learning community that supports and interacts with each other.

Teachers and Parents Have the Same Role

The next characteristic of combined learning is the equally important role of teachers and parents in supporting the learning process. This method is the optimal choice and solution to increase effectiveness and efficiency in teaching and learning activities. Active involvement from teachers and parents helps create a more responsive and interactive learning environment. Blended learning also strengthens the appeal of interacting within a learning context, building strong collaboration between schools and families. In addition, this method provides learning facilities that are sensitive to differences in students' psychological characteristics, ensuring that learning approaches can be adapted to their individual needs. Thus, blended learning not only creates close involvement between teachers and parents, but also offers flexibility in accommodating students' psychological diversity to create an inclusive and supportive learning environment.

After understanding the characteristics, now what benefits can you get by implementing the combined learning method? Some of the benefits are:

More Flexible. This method allows students to learn at their own pace.

Effective Learning Outcomes. Combining various teaching methods from blended learning has been proven to be able to improve student learning outcomes.

Increasing Student Interaction and Involvement. By utilizing technology when studying, it will be easier for them to be involved in learning activities.

Benefits of Blended Learning, Can Increase Learning Satisfaction . This is because from the start they already understand what the learning flow is like. The students understand what is expected of them and the conditions for achieving the goals and final assignment.

Student Participation Becomes More Active. In offline or traditional based learning , students

tend to be passive when participating in learning. One reason is because the learning that takes place in the classroom is teacher- centered.

Saves costs and time. The blended learning model allows teachers and students to save more time and money. This means that teachers can save on paper usage because learning activities can be carried out paperless .

Using Blended Learning in Biology Learning

In learning Biology through the face-to-face method, direct interaction between the teacher and students in the classroom provides advantages but also has several disadvantages. One of the main disadvantages is limitations in space and time, which often leads to the use of the lecture method as the main approach. This method, although effective in conveying material, can cause students to feel bored because many biology lessons are abstract. Several studies show that students' lack of understanding of abstract biological concepts is caused by the use of inappropriate learning models and strategies. In many cases, the lecture method is dominant, causing isolated biological concepts and students are only asked to memorize information without deep understanding. As a result, students can feel bored and frustrated in learning, and less able to recognize the relevance of biological concepts in real life. Therefore, there is a need for a more holistic learning strategy, such as combining or collaborating various learning methods, including the application of blended learning, to increase students' understanding and make biology learning more interesting and relevant to everyday life (Desy, 2017; Lashley, 2014).

The targets for using Blended Learning in Biology learning can be formulated to achieve a number of goals that cover aspects of student learning and development. The following are several forms of goals that can be identified:

Increasing Student Engagement

The application of Blended Learning in Biology learning aims to increase student involvement by utilizing a combination of face-to-face and online approaches. This goal is measured through the level of student participation in online discussions, active contributions in collaborative projects, and student activeness in using various online resources. Online discussions give students a platform to interact and share ideas, while collaborative projects develop teamwork skills. Students' activeness in exploring online resources reflects their interest in exploring the material. Through this approach, Blended Learning not only creates variety in learning, but also empowers students with greater control over the learning process, creates a dynamic environment and stimulates student interest in learning Biology.

Increased Understanding of Biological Concepts

Prioritizing increasing understanding of Biology concepts, the main goal of using various online materials, such as learning videos, simulations, and virtual practicums, involves efforts to create a more in-depth and interactive learning experience. By utilizing learning videos, students can explore Biology concepts visually, facilitating their better understanding. The use of virtual simulations and practicums allows students to directly engage in experiments and observations without the physical limitations of a laboratory. This goal not only creates flexibility in learning, but also arouses students' curiosity, enriching their understanding of Biology material. Through this approach, it is hoped that students can better internalize Biology concepts, stimulate their interest in natural sciences, and build a strong foundation of understanding.

Development of Science Process Skills

Aiming at developing students' science process skills, this goal focuses on the application of

Blended Learning to improve aspects of observation, hypothesis generation, experimentation and data analysis. By utilizing virtual practicums or online scientific exploration projects, this approach allows students to be directly involved in experimental activities, even though they are not in the physical laboratory environment. Virtual practicums provide opportunities for students to observe and apply science concepts in practical contexts online, while scientific exploration projects strengthen critical skills such as hypothesis generation and data analysis. This goal encourages students to not only understand scientific theories, but also develop practical abilities that are important in the development of deep and integrated science process skills.

Increased Accessibility of Materials

The use of Blended Learning in the context of Biology learning has a specific target to increase the accessibility of learning materials. The main focus is ensuring that students can access learning resources independently, without being limited by time or location restrictions. Through the use of various online materials, such as learning videos, digital modules, and other online resources, Blended Learning creates flexibility that allows students to learn at any time and from anywhere. This goal responds to individual student needs, provides broader access to Biology learning materials, and facilitates learning that is more independent and tailored to each student's level of understanding. Thus, the use of Blended Learning aims to bridge the access gap and provide equal learning opportunities for all students, regardless of geographic constraints or learning time.

Personalization of Learning

The application of Blended Learning in a learning context aims to provide a more personalized learning experience that suits students' individual needs. Key goals include using technology to monitor students' progress in real-time, allowing for a more responsive approach to their level of understanding. With progress monitoring tools in place, teachers can identify areas where students need additional support or further explanation. This allows for customization of learning materials or approaches, creating an environment where students can learn at their own pace. By aligning the curriculum and learning methods with individual levels of understanding, Blended Learning provides the possibility of achieving more optimal learning outcomes, motivating students to take an active role in the learning process, and stimulating the development of their potential personally and academically.

Improved Communication and Collaboration

The goal of Blended Learning is directed at improving communication and collaboration in the learning environment. By utilizing Blended Learning, interaction between students and teachers, as well as between fellow students, can be enhanced through various online platforms such as discussion forums, collaborative projects, and interactive activities. Online discussion forums provide a space for exchanging ideas, solving problems together, and discussing learning materials. Collaborative projects engage students in group activities, building cooperation skills and expanding their understanding through collaboration. Online interactive activities, such as quizzes or collaborative simulations, create an environment where students can learn together. By integrating Blended Learning in the learning process, this goal aims to create a dynamic learning atmosphere, build a mutually supportive learning community, and strengthen communication networks between students and between students and teachers. Through more intensive and collaborative interactions, Blended Learning has the potential to provide a richer learning experience and build students' social skills.

CONCLUSION

The use of Blended Learning in Biology learning has had a positive impact with various targets being pursued. This approach embraces a combination of face-to-face and online learning, creating a learning experience that is more dynamic, responsive, and tailored to students' individual development. By increasing student engagement through online discussions, collaborative projects, and active use of online resources, Blended Learning creates an environment that stimulates active participation and deep understanding of Biology concepts. The goal of increasing students' understanding of Biology concepts involves the use of a variety of online materials, such as learning videos, simulations and virtual practicums. This gives students more flexible access to learning materials, motivates independent exploration, and develops a more comprehensive understanding. The application of Blended Learning also aims to develop students' science process skills through virtual practicums or online scientific exploration projects. This approach presents a practical element in Biology learning without being limited by the physical limitations of the laboratory. The goal of increasing the accessibility of materials creates equity in education, ensuring that students can access materials at any time and from anywhere. This flexibility helps overcome geographic and time constraints, creating more equitable learning opportunities. The implementation of Blended Learning is also directed at providing a more personalized learning experience, tailored to students' individual needs. By monitoring student progress and adjusting learning approaches, teachers can better respond to students' levels of understanding, creating an environment where students can learn at their own pace. The goal is to increase communication and collaboration between students and teachers, as well as between fellow students, creating a dynamic learning community. Through discussion forums, collaborative projects, and online interactive activities, Blended Learning stimulates positive interactions, builds social skills, and strengthens connections between students and educators.

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