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Implementation of Blended Learning Model Using the Schoology Application

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Abstract.
Implementing blended learning requires media facilitating various online learning tools, one of which is Schoology. Opening extensive learning resources for students allows teachers to switch from teacher-centred learning to student-centred learning. Schoology is a learning management system that allows teachers to interact with students through various interesting features. Teachers can display teaching materials, discussions through questions and answers, and collection of assignments. Mathematics, a subject that requires various graphic illustrations, diagrams, and visualizations, is very suitable to be taught through Schoology. Teachers can help students understand various mathematical concepts by taking advantage of the various learning features provided by Schoology. Schoology allows communication between teachers and students to be more interactive because the platform is similar to social media. Teachers can create virtual classes to carry out online learning at home so that students are trained to act actively and independently in learning. Based on research and data analysis shows that there are differences in learning outcomes between students who use school learning media and students who use conventional methods, there is a positive and significant influence of Schoology learning media on learning outcomes, and there is a positive and significant influence on learning motivation on learning outcomes.

Keywords: Blended Learning, Schoology, Mathematics, Teachers, and Students

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1. Introduction

The problems that arise in life and society are increasing. The development of science and technology is closely related and cannot be separated from the development of the underlying disciplines, one of which is mathematics. Such thinking skills are needed in problem-solving, which is part of mathematical literacy. This is one of the prevalent factors for the new learning orientation called student-centered learning. One of the implementations of student-centered learning is the existence of blended learning-based learning, a form that combines face-to-face and online learning. Development in the field of education has been regulated in Law Number 20 of 2003 Article 3 concerning the National Education System. It mentions that national education functions in developing one's abilities in the context of educating the nation's life, aiming to

develop students' potential to become useful human beings. Due to the importance of mathematics in the 21st century, mathematics lessons are given to all students (mathematics for all students). Through mathematics, students can learn how to think creatively and mathematically. Based on the 2013 curriculum currently in effect in Indonesia, students' critical and creative thinking needs to be improved. One of them is through mathematics lessons at school. It is hoped that if students' creative thinking skills increase,

According to the NCTM, the objectives in the mathematics learning process are mathematical abilities: problem-solving, reasoning and proof, communication, connection, and representation (8). The description shows that the ability to solve mathematical problems is one of the abilities that students in mathematics lessons must possess. The challenges of education that continue to be dynamic require a transformation of the mindset of teachers who continue to be competitive with various communication equipment, the internet, and other data media. Online education is a teaching and learning interaction process that uses the internet network and does not require students to meet the teacher directly. Based on the type of device, online education is divided into e-learning and m-learning. E-learning is education that is carried out using electronic devices such as PCs or laptops via internet network access. On the other hand, m-learning is education provided by using gadgets or other portable features. The two types of education can meet each other. However, e-learning is best used when the teacher wants expertise and an in-depth description of a concept to his students, whereas instant m- learning is used when the teacher provides a simpler module and requires faster reactions. Online education using e-learning usually uses the web to access, so it requires an internet network, but itcan also take the form of an intranet or extranet network.

Improving literacy skills and higher-order thinking skills is attempted through innovative mathematics education. Innovative mathematics education is based on selecting educational approaches, models, and procedures that can accommodate technological growth for millennial students. With eLearning, there is no interaction in the educational process. The teaching and learning process requires a system that can carry out the process in two directions. Feedback is needed so that learning outcomes are better and perfect. E- Learning and Blended Learning can bea solution to overcome learning problems in Indonesia in terms of smoothing learning in Indonesia. E-Learning procedures are still being implemented in the learning system in Indonesia and are about to carry out the transformation to Blended Learning. The Blended Learning model combines educational advantages that are tried face-to-face and virtually. Cheung&

Hew explain Blended Learning as a mixture of face-to-face and online learning. The term Blended Learning consists of 2 words: blended and learning. On the other hand, learning has a universal meaning, namely learning, thus at first glance it means a pattern of education that has a mixing factor or a combination of one pattern with another (9). From this definition, it is said that Blended Learning is a mixture of conventional education with online experience to create an efficient, effective and flexible education. Etymologically, the term Blended Learning consists of 2 words: blended and learning. On the other hand, learning has a universal meaning, namely learning, thus at first glance it means a pattern of education that has a mixing factor or a combination of one pattern with another. From this definition, it is said that Blended Learning is a mixture of conventional education with online experience to create an efficient, effective and flexible education. Etymologically, the term Blended Learning consists of 2 words: blended and learning. On the other hand, learning has a universal meaning, namely learning, thus at first glance it means a pattern of education that has a mixing factor or a combination of one pattern with another. From this definition, it is said that Blended Learning is amixture of conventional education with online experience to create an efficient, effective and flexible education.

Among the various online education platform options that can be accessed via the web, there is the Learning Management System platform, which is a technology that provides the teaching needs of teachers by creating and providing learning resources, monitoring activities, andcalculating student performance according to teaching objectives. Among the many online education platform options, Learning Management System (LMS) is a technology that provides the teaching needs of teachers in creating and providing learning resources, monitoring activities, and calculating student performance according to teaching objectives. Currently, LMS is widely used by teachers and instructors and gets positive reactions to the features and ease of access it has. The use of data technology-based educational media can also improve students' mathematical literacy skills and metacognition, one of which is the Schoology media. The use of technology in the form of social networks such as Schoology has many benefits, namely being a learning tool for students without being limited by time and place, and creating a meaningful and fun learning atmosphere. Based on this, the use of Schoology media can help students to improve their mathematical literacy skills. and produce a meaningful and exciting learning atmosphere. Based on this, Schoology media can help students improve their mathematical literacy skills and produce a meaningful and exciting learning atmosphere. Based on this, the use of Schoology media can help students to improve their mathematical literacy skills.

Schoology is a learning management system platform that combines LMS concepts and social networking features (17). The qualities possessed by Schoology are universally divided into 3 parts, namely courses, which are a means to create subject classes, groups are a means to create study groups, and resources, which are places to upload learning resources. On the course menu, the teacher can make questions in various formssuch as multiple options, short entries, matching, true and false, and explanations and is equippedwith equation typing tools, mathematical symbols, and photos (7).

According to Gibson ability is an individual's capacity to carry out various tasks in a particular job (13). In essence, the individual's ability is composed based on 2 levels of factors: intellectual ability and physical ability. Then Wahyudi revealed that case-solving ability is an action to solve cases or processes that use the power and benefits of mathematics to solve cases, which is also a method of solution innovation through case-solving terms (4). This understanding implies that when the individual can complete a case, then the individual can achieve a new ability. In global education, especially for students, a problem will be faced if the learning materials use questions or questions related to story questions and related to everyday life. Students' mathematical problem-solving abilities are emphasized in thinking about how to solve problems & process mathematical information. Solving mathematical problems will help students improve their analytical skills and use them in different situations (2). Problem solving also helps students learn about facts, skills, concepts & principles through an overview of the implementation of mathematical objects and the relationships between these objects. There are several indicators of case resolution that can be considered based on:

Identify the adequacy of data for solving cases

Make a mathematical example based on a situation or everyday cas

Choose & apply strategies to solve math problems & or outside math,

Explain or interpret the synchronous using the original conflict, and check the correctness of the output or answer.

2. Method

The method used in this article is to use qualitative research method. The characteristics of students analyzed in this study include student learning patterns, student learning independence, students' cognitive abilities, and students' ability to operate gadgets/the internet. The procedure in this study consists of 3 terms, namely:

1. Define Stage (Defining)

The purpose based on the defined term is to determine the conditions of the learning device developed. This term consists of four steps, including:

1. Front-end Analysis Stage, front-end analysis needs to be carried out to determine the desired base case in the development of learning tools. In this term, it is influenced by the base case and continued by using a synchronous analysis of relevant learning theories, resulting in a description of the relevant student learning patterns.
2. Student Analysis, The student analysis phase is carried out by examining the characteristics of students so that the learning tools developed are in sync with the characteristics of students. The characteristics of students analyzed in this study include student learning patterns, student learning independence, students' cognitive abilities, and students' ability to operate gadgets/the internet.
3. Concept analysis is the basis for setting learning objectives. Concept Analysis is carried out to select and detail the concepts to be taught. The concept of the material is structured in a structured manner, and then the concepts are detailed.
4. Task Analysis: The task is expected to choose the functions needed in learning. The description of the task is obtained through the identification of the expected skills. These skills will be developed in learning.
5. Formulation of Learning Objectives The formulation of learning objectives is expected to select learning objectives and indicators of achievement of learning output competencies to be achieved based on the learning tools developed.
6. Design Phase (Design)

In this term, a draft lesson plan and teaching materials were designed. In this term, several steps are taken, namely:

1. (a) Preparation of the Test In terms of preparation of the test, the researcher arranges an individual test in the form of a competency test presented in Schoology. The individual tests were arranged synchronously using the indicators that had been influenced. If students can do individual tests using both, the learning objectives have been achieved classically.

   (b) Media Selection is crucial so students can easily understand the material being taught. It is expected that the selection of the perfect media so that the learning objectives can be achieved. The media chosen in this development

research is Schoology using the reason that Schoology is an LMS that is very relevant and supportive in learning mathematics and is very complete in features compared to other LMS.

(c) Format selection In compiling learning tools that include lesson plans and teaching materials, researchers first study the format of lesson plans that are compatible with the curriculum applied to schools, namely the 2013 curriculum or K-13.

(d) Initial Design The initial design for the development of this learning tool makes draft I of learning tools in the form of lesson plans and teaching materials that will be packaged in Schoology along with research instruments that will be validated and reviewed by the lecturer and mathematics teacher.

2. Development Stage (Development)

The development stage aims to make draft II of RPP learning tools and teaching materials that will be packaged in Schoology and have been revised from expert input. The activity in this term is an evaluation of the validator.

1. (a) Assessment of Design Experts, learning tools draft I RPP and teachingmaterials that have been designed in the design term will be evaluated by the experts/validators. Experts/validators are people who are competent and understand the preparation of mathematics learning tools, for example, blended learning based on Schoology. Experts/validators will provide suggestions and input to improve the lesson plans and teaching materials that have been designed. Suggestions and inputs based on experts/validators will be used as the basis for revising draft I which will later make learning tools for draft II.

2. Disseminate Stage (Spreading)

The dissemination stage aims to disseminate the RPP learning tools and teaching materials that have been finalized. The dissemination stage in this study was only carried out with a limited distribution using the sharing of lesson plans and teaching materials packaged in Schoology for mathematics teachers.

The stages of data analysis in this study include validity tests, reliability tests, test difficulty levels, and classical estimation tests including 1) normality test; 2) multicollinearity test; 3) homogeneity test. Then the hypothesis testing was carried out using the related t-test & multiple linear regression analysis.

3. Result and Discussion

The mathematical education feature of the Schoology-based blended learning model for training self-regulated learning is considered ”valid”. This matter comes from the evaluation of 4 validators who create an average value of total validity of lesson plans of 4.52 which is listed in the type of ”very valid”, and the average value of the total validity of teaching materials of 4.48 which is listed in the type of ”very valid”. The results of this study indicate that the learning media of Schoology is better than conventional learning media. Schoology learning media can improve student learning outcomes (10). Supporting research conducted by Yana & Adam shows that there is an increase in student learning outcomes using the LMS Schoology platform (18). Furthermore, Ulfa research shows that E-learning's application using Schoology media can improve student learning outcomes (16). Based on the study results, it can be concluded that the use of Schoology learning media affects students' learning outcomes. The mathematical problem-solving ability data obtained in this study were the students' initial & final test & N Gain data. N Gain data is data on increasing students' mathematical problem-solving abilities in the experimental class and control class. The data were then analyzed using narrative & inferential analysis. The pre-test, post-test, and N Gain data found that the population was a population that was not normally distributed. Then the Mann-Whitney non-parametric test was carried out. Teachers can control what activities are contained in it, including education and team updates. In this research, the educational features of the blended learning RPP model were raised, & teaching materials were packaged in Schoology. This research aims to describe the process of development, validity, & practicality for the development of a Schoology-based blended learning education model to train independent learning skills. Information analysis used is field note analysis, the validity of educational features, & analysis of the practicality of educational features. The results of the educational development of a Schoology-based blended learning mathematical model to train independent learning skills are considered easy by experts using ”A” evaluations which are educational features that can be used without improvement. In the new normal era, education in high school penetrates normal education, so the impact is expected to be implementing an education system that can integrate online and offline education but always practice health protocols. Online education is education that is tried to use the internet as a result teachers & Students do not need to meet face to face in the educational process. On the other hand, offline education is education outside the network that does not use internet access. One model of education that can be applied

during the non-pandemic period of COVID-19 is for example the procedure for inquiry education, on the other hand, there is one model of education that can be applied to the new normal & One way to improve students' scientific literacy skills is blended learning using a STEM approach. Blended learning is a combination of face-to-face education and online education. Blended learning education in this new era uses online media using multimedia both synchronous & asynchronous. Synchronous education is a form of education that uses direct interaction between students & teachers all use online forms such as conferences & online conversations. On the other hand, asynchronous is a form of education that indirectly uses an independent learning approach. Back& interpret inspirations & the interpretation results are synchronous virtual & asynchronous independent Blended learning is education that combines or combines face-to-face education & online education. From these various objectives to the many privileges when using blended learning model education. The blended learning education model is a combination of direct education using technology-based education such as the internet to achieve optimal educational goals.

The hope is that students are always active & able to create educational procedures that are suitable for themselves. Sentot Kusairi conveys that there are many advantages of blended learning when applied compared to using e-learning, m-learning, as well as conventional education(5). Some research also shows that implementing blended learning is more efficient than e-learning or conventional education. The results of research conducted by Andi Saparuddin Nur show that education using a blended learning model has a big impact & opportunity to share positive consequences in the form of increased skills in self-regulated learning. The comparison in this research is the media used in blended learning & educational features raised. Blended learning is a mixture of educational excellence that is tried face-to-face & virtually. Moebs & Weibelzahl define Blended learning as mixing online & face-to-face rendezvous on an integrated educational activity (6). Blended learning also means using an alternative method that combines exclusive face-to-face rendezvous in traditional & online pedagogy to achieve educational objectives.

The online education system, classroom training, & on-the-job experience will keep the valuable experience for themselves. Purtadi conveys that Blended learning is a mixture of various educational media to produce optimal educational activities for a particular audience. The term blended itself means that traditional education is supported using other electronic formats. Purtadi defines Blended learning as the use of highly efficient training solutions applied in a coordinated way to achieve the desired educational goals. Educators/teachers as educators need to continuously learn for life to

enhance their services to students entrusted to them for learning. One way to improve services that educators/teachers can do at this time is to use blended learning. As a solution according to the battle earlier, the word Blended learning was born. What is Blended Learning? Why does Blended learning need to be implemented? This is in line with using six elements of 21st-century learning, namely 1) emphasizing the main subjects (Core subject knowledge); 2) emphasizing the development of learning skills; 3) using the 21st-century sense of learning to develop learning skills; 4) teach students in the context of the 21st century; 5) teach 21st-century content; & 6) using a 21st-century assessment that measures 21st-century skills. Literacy in the 21st century means how to use knowledge and skills in the context of modern life (14). In the context of the life of educators/teachers, this means how educators/teachers as those who are educationally literate (Science), that is how to inquire about how to teach students (Science), use consideration and try to integrate 21st-century skills into the teaching and learning process (Science). perfect for students living in the 21st century. Developing courses based on Blended learning goes hand in hand with the unique challenges of technology, learning tactics, new ways of communicating, and assessment.

Blended learning is learning that combines or mixes face-to-face learning and online learning. The objectives according to the use of blended learning are 1) supporting the development of students in the learning process, 2) providing opportunities for teachers and students to learn independently that is effective, efficient, and continuously growing, and 3) increasing the flexibility of setting study schedules for students using combines face-to-face & online learning. Of these various objectives, there are many advantages when using blended learning examples. The blended learning model is a collection of personal learning using technology-based learning, such as the internet, achieves maximum learning goals (3). The hope is that students are always permanently active and can find a suitable learning method for themselves. The teacher only acts as a mediator, facilitator, and friend who can build a safe environment for student knowledge training. Blended learning will strengthen conventional learning examples through the development of educational technology (1).

Sentot Kusairi revealed that there are many advantages of blended learning when applied compared to using e-learning, m-learning, as well as conventional learning. Several studies also explain that the application of blended learning is more effective when compared to e-learning or conventional learning (5). The advantages of the application of blended learning are: 1) students are free to view material independently and utilize materials that are already available offline, 2) students are free to discuss using students or teachers outside of face-to-face learning hours at school, 3) teachers

can manage & control students' learning activities outside of face-to-face learning hours at school using good, 4) teachers are free to add material & enrichment via the internet. Willem thinks that blended learning is a combination of 2 learning activities, face-to-face and online, effectively fostering students' independence. In line with Whipp & Chiarelli's observation output, students who take the online learning process can better adapt to aspects of self-regulated learning. Adaptation is in the form of adjustment and self-regulation which is better by changing learning goals and can determine effective strategies for learning. Based on some of the opinions & research of the experts above, it is stated that the level of self-regulated learning abilities of students is directly proportional to the effort to apply blended learning.

The results of research conducted by Andi Saparuddin Nur informs that learning using blended learning examples has a great impact and has the opportunity to have a positive effect on the form of increasing self-regulated learning abilities. The difference in this study is the media used in blended learning and the learning tools developed. There are several studies on blended learning related to using mathematics subjects at various levels of education. Therefore, to see in what material, using what media, and at which level of education the example of blended learning has a greater impact, the researcher conducted a meta-analysis of the data based on previous studies. The analysis was carried out thoroughly on previous studies regarding the effects of blended learning on various levels of mathematics learning. As for the previous research period that was analyzed for no more than the last 5 years, this was done so that the data taken was more accurate. Before data analysis, This study puts a literature review on examples of blended learning in mathematics learning. Then, identification is carried out on the level of education, material, media, and dependent variables that are appropriate to apply using blended learning examples. Based on the description above, this research was carried out in the hope of finding a way to apply perfect examples of learning in online learning during this covid-19 pandemic can make maximum learning outcomes or goals so that the purpose based on this research is to find out the impact of using blended learning examples on learning mathematics. The specific objectives are to find out 1) at what level the use of blended learning models has a major impact on mathematics learning; 2) In what materials and examples of blended learning have a high impact on mathematics learning; 3) What media has a high impact when used using examples of blended learning in mathematics learning; 4) On the dependent variable what is the use of blended learning examples in learning.

4. Conclusion

Based on the results of this research, it is concluded that the blended learning educational model can share the effect and increase the mathematical problem-solving skills of students who use the Blended Learning model better than those who use conventional education on mathematical problem-solving skills, namely the final achievement results. Mathematical problem-solving skills of students who use the Blended Learning model are better than students who use conventional education. There is a comparison of learning outcomes between students who use Schoology education media and students who use conventional educational media. There is a positive and significant influence of Schoology education media on student learning outcomes. There is an influence of student creativity on student learning outcomes. There is a positive and significant influence on learning motivation on student learning outcomes.

The mathematical education feature of the Schoology-based blended learning model for training self-regulated learning is considered ”valid”. This matter comes from the evaluation of 4 validators who create an average value of total validity of lesson plans of 4.52 which is listed in the type of ”very valid”, and the average value of the total validity of teaching materials of 4.48 which is listed in the type of ”very valid”. The learning outcomes of students who use the flipped classroom education procedure with the help of Schoology are better than those who do not use the flipped classroom education method with the help of Schoology. The activities of students who use the flipped classroom education method with the help of Schoology classically create a fairly active type.

This research shows that Schoology education media is better than conventional educational media. The use of Schoology as an educational medium can improve student learning outcomes more than the use of conventional educational media (11). For Purba et navy, it was stated that E- learning-based Schoology media contributes more to improving student learning outcomes, especially in the human reproductive system module compared to conventional media (15). The influence of Schoology education media on students' learning outcomes. Based on the research of Supianti, it is informed that there is a significant comparison of student learning outcomes in the use of educational media Schoology & conventional educational media (12). Research results show that the use of Schoology education media is better than conventional educational media because it can improve student learning outcomes. This research shows that Schoology education media is better than conventional educational media. The next study from Ulfa stated that the implementation of E-learning using Schoology media

could improve student learning outcomes (16). Supporting the research carried out by Yana& Adam informed that there was an increase in student learning outcomes using the LMS Schoology platform (18). Based on the research results, it can be concluded that the use of Schoology education media affects students' learning outcomes more and more.

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