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Literature Study: Using Schoology LMS in Physics Learning at Schools in Indonesia

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Abstract
Education in Indonesia has moved towards a broader digital approach. Information and communication technology development has encouraged many schools and educational institutions to look for new ways to integrate technology into teaching. One way is by utilizing a Learning Management System (LMS). One of LMS platform that is quite widely used is Schoology. This research aims to find out how Schoology is used in physics learning in schools in Indonesia. The method used in this research is Systematic Literature Review (SLR), namely by finding, selecting, and synthesizing studies submitted for a specific question by following a systematic, transparent, and iterative process. Researchers chose 14 articles sourced from Google Scholar for analysis. These articles are grouped into certain groups to simplify the analysis process. This research found that the use of Schoology is quite good in facilitating physics learning in schools. However, Schoology should not be used for all learning activity, but educators must play an active role so that students can still understand the material presented. Therefore, the learning method that is suitable for using Schoology in physics learning is the blended learning method.

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1. Introduction

Technological developments have had a huge impact on various areas of life, one of which is science and education. The development of science and technology which is increasingly focused in the current era has a positive impact on these two aspects, namely learning can combine and adapt with technology so that many learning facilities can be carried out using technology [1]. From this, it follows that science, mathematics, and technology will play a significant role in the future and that everyone should, to some extent, be proficient in these areas [2]. Technology, especially the internet is very useful for online learning [3].

Educational technology is a systematic process including the environment, people, tools and systems, organizations, processes and ideas [4]. According to [1], technology can transform teaching by providing educators and students with professional content, resources, and systems to help them improve their teaching and personalize their learning. Rapid advances in technology have also made it possible to build classrooms with digital devices, such as computers and smartphones, increasing student engagement and motivation, and speeding up the learning process. One way is by utilizing a Learning Management System (LMS).

A Learning Management System (LMS) is a web-based software application technology used to plan, implement, and assess certain learning processes [5]. LMS allows educators to manage classes online with the help of the internet without having to meet face to face. Ref [6] suggest that teaching materials or physics learning media should include e-learning or mobile learning components. According to the idea, LMS has features that can meet user needs in conducting learning and delivering learning materials, as well as making it easier to access reference sources, carrying out assessments in online exams, and being able to carry out the assignment collection process using this LMS application can provide good feedback as well as making communication possible using discussion forums, mailing, or chat. It empowers educators to create collaborative and engaging learning environments, breaking down geographic barriers, and enabling seamless communication between learners, educators, and parents. The flexibility of LMS really allows educators and students to access it anytime, anywhere and using various electronic devices such as laptops, smartphones and tablets [7]. Currently, there are many online learning applications and platforms that offer various interesting features for students and teachers to maximize learning. One of LMS platform that is quite widely used is Schoology.

In recent years, education in Indonesia has experienced a major transformation, especially in efforts to utilize technology in learning. The use of Schoology in physics lessons in Indonesian schools is a response to technological developments and the need for more modern learning approaches. Schoology is a Learning Management System (LMS) platform designed for use in a variety of educational environments, from elementary schools to universities. According to Irshad, Schoology is one of the most popular e-learning platforms. Schoology is a powerful and versatile LMS that has gained widespread recognition for its ability to enhance the teaching and learning experience in a variety of educational settings. With Schoology's interactive features, educators can collaborate not only with their students but also with other teachers, coaches, and parents of students [8].

Education in Indonesia has moved towards a broader digital approach. Information and communication technology development has encouraged many schools and educational institutions to look for new ways to integrate technology into teaching. Schoology is one of platform to facilitating this transformation. The Covid-19 pandemic has forced most schools in Indonesia to switch to distance learning. Due to its many benefits, including the ability for students to participate in learning at any time and from any location, online learning is a viable option for education during the Covid-19 epidemic [9]. Online learning techniques have replaced traditional classroom instruction in schools and colleges [10]. Physics is a science that is classified into facts, concepts, principles, laws and theories, most of which are abstract [11]. Presenting abstract and difficult subject information in an engaging manner that students can understand is one of the issues faced in the field of education [12]. Schoology has become one option for managing online learning, allowing physics teachers to provide materials, assignments, and exams online to their students. Schoology is a website that combines e-learning and social networking [13]. Schoology allows physics teachers to manage learning materials more efficiently. They can upload materials, assignments, and other resources so students can access them easily. This reduces reliance on printed materials and allows students to study on their own schedule. Despite distance learning, Schoology facilitates interaction between teachers and students. Physics teachers can communicate with students through messages and forums, provide feedback, and answer student questions online.

Implementation of Schoology platform in physics lessons in Indonesian schools reflects the adaptation of education to the digital era and the increasing need for technology-based learning. Based on this background, the researcher intends to conduct a literature study to find out how the Schoology platform is used in physics learning in schools in Indonesia, as well as what the weaknesses and strengths of the Schoology platform are in supporting learning.

2. Methods

The method used in writing this article is a Systematic Literature Review (SLR). The purpose of a Systematic Literature Review (SLR) is to find, select, and synthesize studies submitted to a specific question by following a systematic, transparent, and iterative process [14]. The research was carried out by analyzing the results of previous research regarding the use of Schoology in schools in Indonesia. Researchers searched for articles related to the use of Schoology and the use of Schoology in physics learning with the help of Google Scholar. From the various articles that appeared, the researcher finally selected 14 articles that were relevant to the topic to be discussed. Then, researchers grouped the articles into certain groups.

3. Results and Discussions

Schoology is a Learning Management System (LMS) platform designed for use in a variety of educational environments, from elementary schools to universities. According to [15] Schoology is one of the most popular e-learning platforms. Previous research regarding the use of Schoology in schools in Indonesia was searched using Google Schoolar. Based on searches via Google Scholar, in the last five years, around 6,060 articles were recorded discussing the use of the Schoology platform in learning, the several articles in the last few years that specifically discussed the use of Schoology in teaching physics. Table 1 shows several articles related to using the Schoology platform that we chose to analyze.

Table 1. Research Data and Findings

No	Article Title	Research Findings
1	Application of Schoology-Based E-Learning Media to Improve Activities and Learning Outcomes on Business and Energy Material in Class XI SMA N 10 Jambi City [16]	Online student activity on Schoology media (students studying online outside of class hours/at home) does not experience an increase in activity and even tends to decrease due to technical and non-technical factors
2	*E-Learning with* Schoology as a Physics Learning Supplement for Material on Elasticity and Hooke's Law [17]	The quality of e-learning with Schoology is very interesting, easy, very useful, and effective to use as a learning supplement
3	Development of Blended Learning Tools Based on a Learning Management System on Dynamic Electrical Material [18]	Learning is divided into three main activities, namely online -face-to-face - online, where online activities are carried out using Schoology
4	Development of Blended Learning Tools Based on a Learning Management System (LMS) with an Inquiry Learning Model on Static Electricity Material [19]	In the device created by researchers, the use of Schoology is combined with a virtual laboratory
5	Schoology-Based E-Learning Development on Impulse and Momentum Material to Train Digital Literacy [20]	Schoology features used in e-learning are grouped using folders
6	The Effect of Implementing Schoology-Based Blended Learning on Students' Critical Thinking Abilities [21]	Schoology was used in 4 out of 8 meetings
7	The Effect of Blended Learning on High School Students' Critical Thinking Ability on Temperature and Heat Material [22]	Schoology is used at the end of every face-to-face learning as reinforcement for material and assignments
8	*Learning Cycle*5E Using Schoology-Based E-Learning on Elasticity and Hooke's Law [13]	In discussions and assessments, e-learning utilizes Schoology's image and video insert features. Schoology can also link directly to PhET Simulation as a form of virtual simulation or virtual practicum

9	*The effect of blended learning settings on students' critical thinking skills in physics* [23]	Schoology is used by students to discuss topics studied before class starts
10	Development of E-Learning Material on Newton's Laws to Improve Critical Thinking Skills for High School Students [24]	Facilities from the Schoology Very supportive for writing text, formulas, and images and can facilitate assessment in physics learning
11	Use of Schoology LMS in High School Physics Learning Static Fluid Material During the Covid-19 Pandemic [25]	Student participation was classified as very good but was not in line with student participation in discussions. Students tend to have difficulty conveying their questions in written form
12	E-Schoology Development of Vibration and Wave Materials to Improve Critical Thinking Skills of Junior High School Students [26]	At each meeting, there are materials, discussion forums, and learning media in the form of text, images, videos, and animations. Several meetings include virtual practicums
13	*The Effect of Blended Learning Model (BLM) on Student Achievements: A Meta-Analysis* [27]	The use of Schoology media can increase student activity, can improve student learning achievement and critical thinking abilities
14	Development of E-Learning Media with Schoology Based on Multi-representation for Students [28]	*E-learning with* Schoology it is used as teaching material to overcome time constraints in the classroom and can increase understanding of other concepts and representations

3.1. Schoology as a Learning Management System (LMS) for Physics Learning in Indonesia

LMS is software or platform designed to manage the teaching and learning process, including creating and managing curricula, delivering and organizing training materials, assessment tools, interactive activities within user communities, and reports on student activity and learning progress [29]. The use of several LMSs even allows parents or guardians of students to monitor their children's learning activities and can facilitate interaction between parents of students and teachers who teach [30]. One LMS that can facilitate this is Schoology.

In physics learning, the use of Schoology as a learning management system (LMS) has been widely researched. Despite the fact that there are numerous advantages to utilizing a digital learning management system (LMS), the results indicate that there are internet network issues that hinder LMS learning, which slows the delivery of material to students [31]. According to research [18], [19] LMS Schoology is used for blended learning activities in physics learning. Research regarding the use of Schoology LMS in physics learning was also carried out by Fridayokoon static fluid material at the high school level during the Covid-19 pandemic. In his research, student participation was classified as very good, but it was not in line with student participation in discussions. Students tend to have difficulty conveying their questions in written form.

Some students were also late in submitting assignments due to technical problems, namely not being able to convert .jpg format to .pdf. Problems like this require educators to provide teaching materials that stimulate students to express their opinions.

3.2. Schoology as e-Learning for Physics Learning in Indonesia

E-learning is a teaching and learning facility that includes the use of information, computers, and technology to improve communication in distance learning [32]. Currently, there are many LMS that facilitate creating e-learning according to needs, one of which is Schoology. The first article related to using Schoology as e-learning for physics learning is an article written by Aminoto.

In his research, Irregularities were found in the form of differences in the results of observations in the field with the graphs displayed by Schoology. In field observations, student activity showed a significant increase, while in the online activity graph from Schoology, there was a decrease in the peak of the graph (peak activity). Several possible causes are first, the teacher's weakness/delay in posting interesting discussion material; second, some students are still tempted to open other sites at the same time when accessing the schoology.com site; third, students experienced technical problems with internet access as happened during cycle II of meeting 2 when the PLN electricity went out so the school WiFi was not active. This may also be because at that time human knowledge about technology was not as high as it is today.

Some research related to Schoology as e-learning began to show good results. The quality of e-learning with Schoology is very interesting, easy, very useful, and effective to use as a learning supplement [17]. Schoology features used in e-learning can be grouped into folders based on meetings that can be filled in materials, discussion forums, and learning media in the form of text, images, videos, and animations [26]. In its application, using Schoology does not hinder learning, because it is easy to access using each electronic device [20]. To make discussions and assessments more interesting, we can take advantage of Schoology's image and video insert features. Schoology can also link directly to PhET Simulation as a form of virtual simulation or virtual practicum [13], [26]. Schoology's facilities are also very supportive for writing text, formulas, and images and can facilitate assessments in physics learning [24]. E-learning Schoology can be used to overcome time constraints in class and be able to increase understanding of concepts and other representations [28]. By using Schoology-based e-learning, it is easier for students to learn independently without having to meet face-to-face with educators, and can improve students' abilities in operating electronic devices and the internet [17].

3.3. Schoology as Blended Learning Tool in Physics Learning

Blended learning is a learning method that combines face-to-face learning (offline) with online learning that uses technology (high technology such as television, internet and low technology such as email via voice and conferences) and integrates various materials in the teaching and learning process [33], [34]. Blended learning is also used to describe other blends, such as combining different teaching methods, pedagogical approaches, and technologies [35]. Apart from that, in physics learning, the term blended learning can also be used in practical activities, namely combining direct practicum with virtual practicum [36].

Several studies use Schoology as a tool to facilitate blended learning in physics learning. According to [18], for learning physics with a scientific approach, the face-to-face-online type seems more suitable. However, due to the long time required for inquiry, face-to-face activities can be less than optimal, so researchers try to combine types of blended learning which are also adapted to the characteristics of the material, namely by using an online face-to-face-online format. Several studies also utilize the use of Schoology as a blended learning tool.

On research [23] Schoology is used by students to discuss topics studied before class starts. From online discussions, it is known that most students are more confident in expressing their ideas. According in research [22], Schoology is used at the end of each face-to-face learning as reinforcement for material and assignments. The material presented is in the form of videos, images, and text. After the student completes the assignment given, the student will upload the answer and then be given a score by the teacher. Meanwhile, in research [21], Schoology was used in 4 out of 8 meetings, namely by providing videos and asking students to provide hypotheses with discussion in the comments column. Apart from images, videos, and text, Schoology also facilitates a link feature that can be used to include online learning media it; as in research [19] which combines Schoology with virtual laboratory links.

Based on the findings above, the use of Schoology in physics learning is quite good. Schoology can facilitate physics learning materials which usually contain lots of pictures, graphs, and equations, because in Schoology the material can be published in file form and grouped in folders [20], [24]. Schoology also facilitates a link feature, which is very useful in learning physics, especially for linking pages containing simulations or virtual practicums according to the needs of the material you want to present. This is in line with research [13], [19], [26]. Meanwhile, the image and video insert feature in the discussion and assignment columns can also help students understand the meaning of the questions they are looking for answers to.

The physics learning process should not only use Schoolology, educators must play an active role so that students can continue to understand the material being studied. The blended learning method is very suitable to be applied in using Schoology, according to research [18], [19], [21]–[23], [27]. The use of Schoology if it is not accompanied by an active teacher role at times when learning becomes less effective, such as in research [25] which states that student participation is not in line with student participation in discussions. The use of Schoology as an LMS or e-learning should be accompanied by an active role for educators, for example by providing learning materials directly in the classroom. Educators can also increase the interaction process on the Schoology page by providing teaching materials and discussion topics about interesting physics material for students to complete.

4. Conclusion

The use of Schoology is quite good in facilitating physics learning in schools. Some of the advantages of Schoology which are useful for facilitating the physics learning process are that the material can be presented in the form of files and folders, making it easier to present physics material which contains lots of pictures, graphs and equations. Apart from that, there is a link feature that can be used to directly refer to learning media in the form of videos or virtual laboratory pages. This really helps the physics learning process, especially if in conditions where it is not yet possible to carry out activities in a real laboratory. However, these advantages do not necessarily make Schoology the perfect suggestion for facilitating physics learning. Some physics materials have characteristics that are difficult to understand, so the use of Schoology features in the learning process must be accompanied by the active role of educators in providing information related to the material being studied. Educators should continue to provide verbal explanations regarding the material being taught. Therefore, the learning method that is suitable for using Schoology in physics learning is the blended learning method.

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