



## **The Effect of Online Learning Using Schoology on Student Learning Outcomes in Momentum and Impulse Matter**

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### **ABSTRACT**

This study intends to ascertain the impact of Schoology-based online instruction on students' learning outcomes in momentum and impulse matter. A non-equivalent pretest-posttest control group design using a quasi-experimental methodology was adopted. All of the second-semester students in X class Science MAN 1 Medan make up the study's population. Purposive sampling was utilized to choose the study's sample. The test utilized consists of 20 questions with multiple choices about momentum and impulse matter, all of which have been validated by the validator. According to the findings, the control class's pre-test average value is 50.67, whereas the experiment class is 51.83 on average. The two classes' data are found to have equally distributed normal and homogeneous distributions in the tests for normality and homogeneity. The findings revealed that using Schoology for online learning had a significant impact on student learning outcomes in physics subjects.

**Keywords:** online learning, learning media, Schoology, learning outcomes

### **INTRODUCTION**

The current outbreak of a sickness brought on by the coronavirus, also known as Covid-19, has frightened the entire world. On March 11, 2020, the World Health Organization (WHO) proclaimed the covid-19 pandemic a global pandemic. When Covid-19's origin was first discovered to be in Wuhan, it didn't take long for it to begin spreading quickly over the world. Indonesia has been affected by the virus's global spread. Some rules have been put in place as a result of the Covid-19 epidemic to break the chain of the virus's dissemination. Every nation must make a difficult decision when deciding how to avoid the spread of Covid-19 because social isolation has a bad impact on all facets of life, including schooling.

The policy regarding working from home is detailed in the Circular Letter of the Minister of State Apparatus Empowerment and Bureaucratic Reform (PAN & RB) Number 50/2020 Concerning the Second Amendment to the Circular Letter of the Minister of PAN & RB Number 19/2020 Concerning Adjustment of the Work System of the State Civil Apparatus to Prevent the Spread of Covid-19 in the Environment of Government Agencies. Due to the elimination of all in-person learning activities, including learning classes, seminars, and anything else, many parties are unhappy with the government's choice to

mandate pupils to study at home. Instead of requiring students and teachers to physically interact, these activities are moved to online learning. Online learning is the instruction that is delivered both synchronously and asynchronously via the internet, giving students the chance to engage with learning resources, educators, and peers.

The use of online learning and the quick advancement of current technology go hand in hand. Today's educational information technology systems offer a broad, quick, effective, and efficient scope of information delivery to various regions of the world. Technology that supports learning activities and communication theory both advance in tandem with information technology.

Students and teachers must connect digitally or in person for online learning to take place. Online learning resources are therefore required for its implementation to bridge this. Online learning resources are one of the methods that educators use to speed up the learning process, particularly in distant learning. Numerous educational platforms are available, including WhatsApp Groups, Google Meet, Google Classroom, Zoom Meeting, YouTube, Email, Edmodo, and more. As a result, it is anticipated that some of the online learning tools will assist students in achieving and improving their learning outcomes during the epidemic. Learning media, according to Hamid et al. (2020), is an intermediary or introduction between the source of the information and the recipient of the message, igniting thoughts, feelings, attention, and volition so that learning is encouraged and involved.

Learning outcomes are the effects of learning activities on an individual that manifests as impressions and cause them to change. Achievement differs from "learning outcome" in terminology. Learning outcomes also include factors that help pupils develop their character, although learning achievement is typically tied to aspects of knowledge (Arifin, 2016). Changes in behavior that are the result of learning outcomes can be influenced by some factors, including internal factors that are related to influences that come from within the individual, such as motivation, interests, talents, intelligence, attitudes, feelings, and other personal factors, and external factors that are related to influences that come from without the person, such as facilities and infrastructure, the environment, society, and so on.

### **Problem of Research**

Weak learning processes are one of the issues that the education sector is currently dealing with. Students are not motivated to develop their thinking abilities during the learning process because their brains are forced to memorize and store a variety of information without being required to comprehend it or apply it to the real world, causing them to stop thinking until the learning is complete. Physics is one of the sciences that has a direct connection to technology. Physics is a branch of science that comprises information in the form of facts, theories, guiding principles, and laws that are derived from scientific research and experimentation. Because teachers can give pupils factual examples using technology, the distribution of physics educational materials is directly tied to technology. Teachers can also assign homework using technology as a medium. With physics teaching resources, students can thus learn more.

However, direct field observation reveals that students only memorize the physics formulas that the teacher has taught them. Because of this, students find it difficult to apply physics concepts when they run across real-world issues. Consequently, because they are unable to apply physics principles in daily life, student learning outcomes are less desirable. Additionally, teachers still don't use media very much. Because professors don't innovate in the classroom, pupils get bored and less motivated to learn, which reduces the significance of what they learn about physics.

According to the results of the survey given to 55 students at MAN 1 Medan, 78.2% of them believe that they feel normal while learning physics (less interested). While the Minimum Satisfaction Criteria is 75, about 45.5% believe that the value attained is less than adequate (between 50 and 70). When the teacher just teaches the content, about 78.2% of the pupils think as the teacher does. Additionally, 67.3% of students believe that teachers hardly ever use supplementary materials in class.

As a result, learning in schools has not been operating efficiently. Many educators or learners lack the skills to use media and information technologies to support the learning process. To help students achieve better learning outcomes, teachers incorporate media in their lessons. This is pertinent to some research on the use of learning media, including Mustakim (2020), Azizah (2019), Noviana & Solichin (2021), and Aryaningrum (2016), which demonstrate the beneficial effects of online learning and the usage of online media on student learning outcomes. Ulfaida & Pahlevi (2021), Sinaga (2020), and Nurmaulidina & Bhakti (2020) research also demonstrate how the usage of online media can boost student attention and learning outcomes.

Research According to Mahzum, et al. (2020), Instagram can help students become more motivated to learn physics because of the findings and analysis of data based on the value range of the motivation level score. During the Covid-19 epidemic, Qusthalani's research (2021) discovered that using SAC-based learning material helps raise learning outcomes and student learning inventiveness.

## **Research Focus**

The limitations in this study are more based on the usage of Schoology media as a supporting medium for learning physics, based on the issues that have been raised. The "Effect of Online Learning Using Schoology on Student Learning Outcomes in Physics Subjects" will be the main subject of this study. The substance of momentum and impulse is the study's material limitation.

Because e-learning has been shown to facilitate the teaching and learning process, several parties now offer learning facilities through this medium. Of course, it is envisaged that students will be able to receive complete services through the use of the LMS (Learning Management System) model, enabling them to master every lesson that will be provided in the form of an application.

This is consistent with studies by Yana & Adam (2019), Haeruman et al (2021), Syukur & Kusuma (2021), and Putra et al (2020), which found that the use of LMS helps facilitate learning. This is because the use of an LMS facilitates learning for both students and

teachers since it can be accessed at any time and from any location without being constrained by time or space.

Schoology is one of the technological tools that aids and is widely used in physics education. It allows teachers to provide teaching materials as well as organize and evaluate the learning process as a tool that supports online learning. Furthermore, one of the most important advantages that the platform can provide, according to the platform's creator, is the ability to know the individual needs of students in such a way that the teaching-learning process is more in line with the needs of students (Garcia, et al, 2018).

This is consistent with the study by Afriyanti, et al. (2018), which found that school websites are a very helpful learning tool. Students can participate in online learning utilizing their laptops, cellphones, or computers. Schoology at the same time can encourage collaboration and involvement in learning between other students so they can learn together outside of the classroom. According to Setiawan & Aden (2020), the use of blended learning methods with Schoology can enhance students' academic performance. Yana & Adam (2019) also discovered that students' learning outcomes improved when they used Schoology's Blended Learning platform, as seen by the 8.24 difference between the average score of their pretest and posttest learning outcomes.

## **METHODOLOGY OF RESEARCH**

### **General Background of Research**

This study was carried out at MAN 1 Medan in East Bantan, Williem Iskandar Street No.7 B, Medan, North Sumatra. The second semester of the academic year 2021/2022 was used for this study.

Quasi-experimental research, which is used in this study, aims to determine whether something forced on the subject—in this case, the student—has an effect. A non-equivalent pretest-posttest control group design was used for this research. Two types of samples were used in the investigation, and they received various treatments. There are experiment classes and control classes in this study. The two classrooms did not receive the same treatment; specifically, the experiment class would receive online learning using Schoology whereas the control class would receive online learning without the use of any learning media.

### **Subject of Research**

The population of this study comprised all 315 students from the 9 classes that made up class X MIA in MAN 1 Medan. In this study, purposive sample approaches were used for sampling and determination. This is because devices are required as supporting infrastructure while utilizing Schoology to aid learning. Accordingly, class X Science 1 has all pupils having gadgets, while class X Science 4 has some students without gadgets. Accordingly, class X Science 1 served as the experiment class and class X Science 4 served as the control class for the sample that was taken. Since there are 30 students in total throughout both classes, 60 students make up the entire sample.

## Instrument and Procedures

A learning outcomes test with 20 multiple-choice questions on momentum and impulse matter served as the study's testing tool. Three experts—two physics lecturers and one physics subject teacher—tested the student learning results using a content validity test to determine their validity. In addition to the validity of the contents, empirical validity has also been carried out on students of XI class in MAN 2 Medan Model.

There are experiment classes and control classes in this study. Online instruction will solely be delivered in the control class without the use of any learning tools, whereas online instruction will also be given in the experiment class utilizing Schoology. Students are required to complete pre-test questions before studying, and they are then given post-test questions after the course. When using Schoology for online learning, differences in learning outcomes between experiment and control courses are used as markers of student learning success.

## Data Analysis

The data from the study findings are gradually examined following the analysis's purpose, which is to test hypotheses. For hypothesis tests, normality and homogeneity tests must be performed on the data to be investigated. Using the outcomes of the pre-test and post-test of the experiment class and the control class, perform an independent sample t-test to evaluate the hypothesis. Data analysis was done using normality tests, namely the Liliefors test and homogeneity test after the pre-test data had been collected. A two-tail t-test was then used to ascertain the starting skill of the students in the two sample groups. Additionally, in experiment classrooms, the subject content was taught online through Schoology, whereas in control classes, it was not. To ascertain the impact of Schoology-based online learning on student learning outcomes, a post-test utilizing a one-tail t-test can be used to compare the differences in final findings.

## RESULTS AND DISCUSSION

Data on student learning outcomes in the areas of impulse and momentum material physics are included in the study. These data are divided into two categories: 1) online learning with Schoology, and 2) online learning without Schoology. The average pre-test and post-test results of students can show in Table 1.

**Table 1.** Average pre-test and post-test results of experiment class and control class

| <b>Class</b> | <b><i>Pre-test</i></b> | <b><i>Post-test</i></b> |
|--------------|------------------------|-------------------------|
| Experiment   | 51.83                  | 81.67                   |
| Control      | 50.67                  | 66.67                   |

The average pre-test score of students in the experiment class before receiving therapy was 51.83, according to the research data in Table 1. Additionally, the control class's pre-test average was 50.67. Standard deviations are 13.99 and 11.65, respectively. The majority of the

students in the experiment class and the control class scored similarly on their pre-tests on average. This is because neither the experiment nor the control classes received any medical attention.

The experiment class then used online learning with Schoology after receiving treatment, while the control class used online learning without Schoology. After using Schoology for online instruction, students in the experiment class' average post-test score was 81.67, compared to 66.67 in the control class. with 8.94 and 10.20 standard deviations. This demonstrates that the experiment class's average post-test score is higher than the control class's average pre-test score. The student learning results have improved in both groups, but in the experiment classes, the average score has met the minimal completeness standard. The average student learning outcome score in the control class has grown in the meantime, but it is still below the required level for all pupils.

Schoology-based online learning is a great way to meet the problems of modern education, particularly in the study of physics. The use of Schoology-equipped online learning can reduce time and space restrictions. Students can access resources, complete tasks, and practice answering questions on the Schoology application by using its materials, quizzes, and assignments features. Schoology, a platform with numerous helpful features, is used for online learning. Students can use these elements to increase their knowledge by using them. Learning will therefore be more enjoyable and students will understand concepts more readily, which will impact student learning results.

The control class received treatment without utilizing Schoology whereas the experiment class received online learning support using Schoology. A pre-test was administered to both classes before the various treatments. The experiment class's pre-test results yielded an average score of 51.83. Additionally, the control group scored on average 50.67 points. The average pre-test scores of the experiment class and the control class were compared, and there were not many significant differences between the two classes' scores. The hypothesis test results from the pre-test using a two-tail t-test with a  $\alpha = 0.05$ , obtained  $t_{count} < t_{table} = 0.348 < 2.002$ , it indicates that before receiving treatment, the beginning skill level of the students in the experiment class was the same as the initial skill level of the students in the control class.

The experiment class and the control class received different treatments after the pre-test, and during the learning process, and were then given a post-test to compare the two classes. The average learning outcomes of the students in the experiment class were 81.67, whereas they were 66.67 in the control class, according to the post-test data of the two classes. The experimental class's post-test or learning outcomes average score is higher than the control class's post-test or learning outcomes average score.

The average post-test results of the experiment class and the control class differed significantly, demonstrating the considerable impact of Schoology-based online learning. The pre-test and post-test values were evenly distributed according to the results of the normality and homogeneity tests for the two samples, where  $L_{count} < L_{table}$  and came from a homogeneous population. Hypothesis test results from the post-test using one tail t-test with  $\alpha = 0.05$ , obtained  $t_{count} > t_{table} = 5.282 > 1.671$  indicates  $t$  that there are differences as a result

of Schoology's online learning's impact on students' learning results. The findings indicated that adopting Schoology for online learning had a substantial impact on students' learning outcomes. This is seen by the variance in the post-test average value increases between the two classes as well as the findings of the hypothesis test.

The findings of this study are corroborated by some earlier studies, including Utami et al. (2017), which demonstrate that learning through E-Learning using Schoology significantly affects student learning outcomes. Research by Gaol & Sirait (2019) found that there were significant differences due to the influence of blended learning using Schoology on student learning outcomes on work and energy topics at SMAN 1 Perbaungan. Syamsunir and Agussalim (2021) found that there was an influence of Schoology media on the learning outcomes of Basic Programming for X-Class Students of SMK Negeri 2 Sidrap. Research by Zb, et al (2020) shows that there is a significant influence of Schoology-based e-learning with the help of WhatsApp groups on student learning outcomes during the COVID-19 pandemic. Najia, et al (2021) found that there were significant differences in student learning outcomes using the Schoology-assisted flipped classroom learning method.

According to the study's findings, adopting Schoology for online learning has a significant impact on student learning outcomes because it allows students to utilize their smartphones to get the information they need without having to concentrate on what the teacher is saying. Additionally, it enables interaction between instructors and students as well as between friends at any time, or any place, so that learning is of the highest possible quality. According to data on student activities in classes that utilize Schoology, students are more excited and engaged in their learning than they are in classes that do not. Each class is enthusiastically engaged by the students, who are passionate and comfortable asking questions and expressing their thoughts.

According to research by Ulva, et al. (2020) and Purwitasari, et al (2019). Ulva, et al. (2020) discovered that using Schoology media in e-learning can improve class X students' motivation and academic performance. According to Purwitasari et al. (2019), the use of Schoology-assisted blended learning can boost student engagement and academic success. This can be seen from the percentage of student learning activity scores that have increased in each cycle, namely 51.08%, 52.08%, and 62.74%. The average score of the student's learning achievement test from cycle to cycle is 52.19; 85.16 and 95.54 of which 96.86% of students scored above the minimum completion criteria at the end of the cycle.

## **CONCLUSIONS**

Schoology-based online learning has a considerable impact on student learning outcomes, according to research findings derived from data analysis and hypothesis testing. Because Schoology allows for online learning, students may use their Android devices to obtain the information they need without having to concentrate on what the teacher is saying, which has a positive impact on student learning results. Additionally, it enables anytime, anywhere contacts between friends and professors to improve the quality of learning. Because Schoology can handle significant technical advancements during the Industrial Revolution, employing it for online learning can be used as a

strategy for organizing teaching, delivering instruction, and improving teaching quality. 4.0 by introducing technology-enhanced learning.

Since Schoology can be accessed anywhere, at any time, with no time restriction, it can be utilized as an alternative to traditional classroom instruction for teachers who want to learn both inside and outside the classroom. Advice for teachers: get accustomed to utilizing Schoology, especially when the instructor is unable to complete the lesson in class so that students can continue studying even in the absence of the instructor. And as a recommendation for the following researchers, it would be preferable to use Schoology for online learning with other subject matter or classes so that this research is more inclusive.

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