

# Learning Model with LMS as an Innovation to Facilitate the Implementation of Learning from Home

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## ABSTRAK

Belajar dari rumah terjadi karena adanya pandemi Covid-19. Meski dilakukan dari rumah, kualitas pembelajaran harus tetap terjaga. Penelitian ini bertujuan untuk menganalisis pengaruh penggabungan model pembelajaran dengan LMS terhadap peningkatan kemandirian dan hasil belajar siswa. Penelitian ini menggabungkan media LMS dalam hal ini Schoology, model blended learning, dan model pembelajaran inkuiri terbimbing dalam satu paket. Penelitian ini menggunakan desain pretest and posttest control group design. Kelompok kontrol menggunakan google classroom dan google meet. Kelompok eksperimen menggunakan kombinasi model pembelajaran dengan LMS. Ditemukan bahwa rata-rata kualitas kemandirian belajar kelompok eksperimen lebih tinggi daripada rerata kemandirian belajar kelompok kontrol. Demikian pula prestasi belajar kelompok eksperimen memperoleh nilai yang lebih besar dari rata-rata prestasi belajar kelas kontrol. Perpaduan model pembelajaran dengan LMS efektif meningkatkan kemandirian belajar dan hasil belajar siswa dalam situasi belajar dari rumah.

## ABSTRACT

Learning from home occurs due to the Covid-19 pandemic. Even if it is done from home, learning quality must be maintained. This study aims to analyze the effect of combining learning models with LMS to increase student learning independence and outcomes. This research combines LMS media, in this case, Schoology, blended learning model, and guided inquiry learning model in one package. The study used a pretest and posttest control group design. The control group used google classroom and google meet. The experimental group used a combination of the learning model with LMS. It was found that the average quality of the learning independence of the experimental group was higher than the mean of independence in the learning of the control group. Likewise, the learning achievement of the experimental group obtained a value greater than the average learning achievement of the control class. The combination of learning models with LMS effectively increases independence in learning and student learning outcomes in learning situations from home.

## 1. INTRODUCTION

Learning from home occurs due to the Covid-19 pandemic. Even if it is done from home, learning quality must be maintained (Jamieson et al., 2021; X. Wang et al., 2021). Even during the Covid-19 pandemic, the corporate and industrial world's demands continue to grow. The business world and the industrial world need graduates with the ability and expertise (Amankwah-Amoah et al., 2021; Caiazza et al., 2021). The capabilities and expertise in question must, of course, be met by universities as human resource printing machines. Learning from home can still meet the needs of the commercial and industrial worlds, as long as learning activities are conducted effectively and using appropriate teaching models and media (Ramen Antonov Purba, 2021; Verawardina & Jama, 2018).

The computer field possesses the capability and competence that the corporate and industrial worlds require. The rapid development of technology has also influenced the computer field. Programmers or people who can build information systems are highly sought after and needed. To become a good and capable computer programmer, several courses must be mastered well by students, one of which is

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algorithms and programming courses (Huang et al., 2021). Algorithms and programming teach the steps to build an information system in a structured and gradual manner. Algorithms and programming courses teach how to build information systems using symbols. Therefore, algorithms and programming courses must be mastered and understood well by students in order to be able to become reliable and capable programmers (Salleh et al., 2021).

Initial observations through communication to several lecturers at several universities with computer study programs complained about student learning outcomes in algorithms and programming courses that did not meet expectations. The value obtained by students, the average is meager. In doing the assignment, the student's answer did not hit. Students cannot study independently or independently. They are still hoping for explanations and instructions from the lecturer. Even though face-to-face has not been allowed due to Covid-19, in these observations, it was found that the lecturer delivered the material using only WhatsApp media. In addition to delivering material, giving assignments, collecting assignments, even exams, they also use WhatsApp. WhatsApp is a one-way medium. It cannot accommodate two-way communication in real-time. We have to wait for each other. After one party has finished carrying out the activity, then the other party can respond (Mundiri et al., 2021). WhatsApp could not be used as a teaching medium that requires creativity and communication (Bork-Hüffer et al., 2021). Because WhatsApp is stand-alone, it cannot be operated simultaneously in one group at the same time. WhatsApp more ideal for sharing material, not discussing the material (Simui & Ferreira-Meyers, 2021). As a result of its qualities in relation to social media. To discuss the material, they have to look for other media, not by using WhatsApp. Students will not succeed in becoming programmers if there is no change. Therefore, it is necessary to find and agree on the proper media for learning, especially in algorithms and programming, which are essential to improve students' abilities and expertise if they want to become qualified information system programmers.

Direct observations at the Politeknik Unggul LP3M, a management program in informatics and computerized accounting, where both study programs study Algorithms and Programming courses, did not meet expectations. Qualifications or the ability to study independently are also meager. Politeknik Unggul LP3M for a minimum score to pass the course, a minimum of 60 or grade C. Based on academic observations, the average student of 167 students, only 52 passed, or not up to 50%. When the research was conducted, the students who compiled the final project, one of which was an information system, of the 189 students of the management of informatics and computerized accounting study program who were about to graduate, only 78 students had good information system products and met the criteria. At the Politeknik Unggul LP3M, several lecturers teach algorithms and programming courses. Lecturers teach using Google Classroom and Google Meet. Collect assignments and assign assignments with Google Classroom, to communicate and discuss with Google Meet. The issue is that neither of these two modes of instruction is accompanied with adequate learning models. So that learning remains centered on the lecturer. Students still only listen and carry out instructions from the lecturer without asking questions and exploring information related to the teaching materials discussed. Lecturers also do not try to make students think independently and develop knowledge individually. Enjoy when teaching and discussing. Learning media must be supported by a suitable learning model to maximize the results (Putri & Sunaryanto, 2021). Learning media that is not combined with any learning model would only focus on the teacher (Fitriyana et al., 2021). As a result, learning outcomes and student independence are not sharpened. The suitable learning media combined with the right learning model will produce the right product (Ariyanto et al., 2021). Impact on academic success and development of learner independence in studying. Therefore, research must be carried out to find suitable learning media and the right learning model to solve the problems faced.

Learning conditions from home are ideally implemented with online learning media. Many of the media used in this case fall into the Learning Management System (LMS) category. One of the ideals is to use Schoology. Some features suit its needs. Schoology is effectively used as a learning medium to meet the demands of the industrial revolution 4.0 era (Sibuea et al., 2021). Because in Schoology, there are features for giving assignments, collecting assignments, online attendance, sharing materials, and features for face-to-face discussions. Previous research used Schoology and proved to be effective as a learning medium (Salah & Thabet, 2021). Other study used Schoology as a learning medium during the Covid-19 pandemic (Pritasari et al., 2021). They are proven effective in improving student learning outcomes. For an effective learning model for online learning, namely Blended Learning. There are previous study that comparing blended learning and non-blended learning, the result is that blended learning is more effective (de Brito Lima et al., 2021). Because of the online context in blended learning, it does not exist in other models. Another study conducted as a literature review related to blended learning. It was found that online capacity can easily be combined with other models, making blended learning very ideal in implementing online learning (Eggers et al., 2021). Other study also using blended learning in learning English. The result is that

with blended learning, student scores are better. Not only that, the ability of students to develop problems given to them in the form of assignments is more assorted (Hu et al., 2021).

They are learning models such as blended that can be used to hone individual learning patterns, specifically, the guided inquiry approach of learning. The guided inquiry learning model emphasizes the activities of students maximally seeking and finding, meaning that the inquiry approach places students as learning subjects (Herawati et al., 2021; Lee et al., 2021). The guided inquiry learning paradigm directs students to seek for and discover something that will be questioned, with the expectation that this will result in a confident attitude. The guided inquiry learning model develops intellectual abilities as part of the mental, as a result in inquiry learning, students are not only required to master the lesson, but students are also allowed to use their potential in the implementation of learning (Kurniawan et al., 2021; Ong et al., 2021; Tanti et al., 2021).

This research will combine Schoology, blended learning, and guided inquiry in one package. It is essential to research considering that until now, it is still the Covid-19 pandemic. It is essential to research because learning from home is still ongoing. It is critical to conduct research because the commercial and industrial worlds place a premium on the abilities and expertise of university graduates. It is essential to research because algorithms and programming are essential subjects. It is essential to be researched because until now, when searching, and there has been no research that combines Schoology, blended learning, and guided inquiry, especially for algorithms and programming courses. It is hoped that the results of this study will be a learning innovation with the characteristics of learning from home (Kwangmuang et al., 2021).

This research is urgent because lecturers and students need learning media that are packaged with suitable composition, especially the combination of the technology used and the learning model. So that the presence of this research will make learning more significant, and the learning outcomes that students get are also good. In addition, students' learning independence will also be honed, which makes their mindsets more creative and communicative in addressing the problems given and faced by them. This study will look at the effect of the combination of learning models with LMS whether it is appropriate to facilitate the implementation of learning from home. This research will be beneficial in learning situations from home caused by Covid-19 but will be very useful in the future when unusual situations occur, such as natural disaster situations or the presence of a virus that is endemic globally.

## 2. METHOD

The research used a pretest and posttest control group design (Xu et al., 2021). With the experimental group and the control group. Control group using Google Classroom and Google Meet. The experimental group used a combination of the learning model with LMS. For the number of samples, two classes were taken, namely one class for control with 35 students, then one class for experiment with a total of 36 students. Then for the variables, there will be independent variables and dependent variables. The research procedure was carried out by testing the material to be tested, analyzing the components to be tested, validating these components, carrying out a pretest to the control group and the experimental group, ending with a posttest. The sample selection is made randomly. With a procedure consisting of two sequences, the first order determines the population groups, and the second-order determines the sample groups. Collect data was done by testing (pretest, posttest) and filling out a form containing questions. Analyzing the data is done by testing the validity, reliability, normality, uniformity, hypothesis, and gain. Then an instrument was designed to obtain data, as shown in Table 1.

**Table 1.** The lattice of independence instruments in learning

Component	Parameter	Grid points	Grid accumulation
Initiative in learning	Formulas in learning	1-6	7
	Focus Attention	7-11	5
	urge	12-15	3

## 3. RESULT AND DISCUSSION

### Result

As for the characteristics of the research subjects, there are groups of students who are divided into two groups, namely the control group and the experimental group. Where the control group uses Google Classroom and Google Meet and the experimental group uses a combination of learning models with LMS. To collect data from research subjects, it was done by testing (pretest, posttest) and filling out a form

containing questions. To analyze the data, the validity, reliability, normality, uniformity, hypothesis, and gain tests were carried out. Each of the existing steps will be used as a process stage as part of the goal in order to obtain research results. The aim of the research is to see the effect of the combination of learning model with LMS whether it can be regarded as an innovation and whether it is used to facilitate the implementation of learning from home. The description of each steps referred as follows. To begin, the normality test was performed using the reference shapiro wilk parameter sig 0.05 on the pretest composition. The composition of the pretest distribution is said to be expected if the sig is more significant than 0.05. The composition of the distribution is called abnormal if the sig value is less than 0.05. The accumulated pretests for independence in learning and learning outcomes are presented in [Table 2](#).

**Table 2. Acquisition of Independence Pretest and Learning Achievement**

Component	Group	Kolmogorov-Smirnov			Shapiro Wilk		
		Statistics	df	Sig	Statistics	df	Sig
Learning Outcomes	Control	0.179	35	0.006	0.952	35	0.126
	Experiment	0.190	36	0.002	0.918	36	0.011
Independence in Learning	Control	0.110	35	0.200	0.945	35	0.081
	Experiment	0.108	36	0.200	0.955	36	0.145

From [Table 2](#), it can be seen that the accumulation of the reference test value for a significant parameter of 0.05 shows normality in which the distribution of the pretest composition of learning achievement is entirely normal, while the composition of the independence pretest in the experimental group learning is not normally distributed. For the control group, the distribution was normal. To the uniformity test of independence in learning, the variance uniformity test is used. The accumulated gains were 1.123 and 1.766. According to the reference, it is less than or equal to 0 is acceptable. Thus the composition of the independence pretest in learning can be said to be uniform. The accumulation of the uniformity test of learning achievement tested with Levene is presented in [Table 3](#).

**Table 3. Pretest Accumulation of Independence Uniformity**

Component	Group	Amount	sd	sd^2	Levene Statistic	F <sub>value</sub>	F <sub>table</sub>	Sig
Independence in Learning	Control	1498	12.542	157.31	3.09	1.123	1.766	0.54
	Experiment	1520	11.832	140	2.59			

For the pretest uniformity test, the experimental and control group learning achievement using Levene was found to be sig at 0.54, where this number is more than 0.05. Thus the composition of the initial learning outcomes is categorized as uniform. Next, based on the acquisition of the posttest of independence in learning and the learning achievement of the combination of learning models with LMS, it was found that the following quantitative results would go through the hypothesis stage. Previously, normality and uniformity tests were carried out first. Requirements to obtain the type of statistics as the next stage of analysis carried out a normality test. It was carried out with the Shapiro Wilk test through the posttest component of independence in learning and learning outcomes of the combination of learning models with LMS to the experimental group. The control group uses the same model, but only with Google Classroom and Google Meet. The accumulated acquisitions are presented in [Table 4](#).

**Table 4. Posttest Accumulation of Independence Uniformity and Learning Achievement**

Component	Group	Kolmogorov-Smirnov			Shapiro Wilk		
		Statistics	df	Sig	Statistics	df	Sig
Learning Outcomes	Control	0.112	35	0.200	0.962	35	0.256
	Experiment	0.121	36	0.200	0.959	36	0.206
	Control	0.120	35	0.200	0.961	35	0.244
Independence in Learning	Experiment	0.155	36	0.029	0.954	36	0.145

It can be seen in [Table 4](#) that the sig value is 0.05, showing the normality of the posttest independence in learning and the overall learning achievement of the two groups in the normal category. T-test was conducted to see an effect between the two groups when a learning model and LMS were given. The accumulation is presented in [Table 5](#).

**Table 5.** Accumulated t Test of Independence and Learning Achievement

Component	Group	Amount	SD	SD <sup>2</sup>	t <sub>value</sub>	t <sub>table</sub>	dk
Learning Outcomes dependence in Learning	Control	1553	11730	137.59	9.101	1,994	69
	Experiment	2632	10436	108.91			
	Control	2103	14.318	205.02	0.611	1,994	69
	Experiment	2261	15.829	250.56			

As shown in Table 5, the acquisition of the t-test for hypothesis 1 with dk = 69 and a sig value of 0.05 is possible. It can be concluded that H01 is not acceptable and Ha1 is acceptable. Where the mean of independence in the learning of the experimental group acquisition is greater than the mean of independence in the learning of the control group. Table 5 also shows the acquisition of the t-test of hypothesis 2, where dk is 69 with a sig value of 0.05. It can be concluded that H02 is acceptable and Ha2 is not acceptable. Where the average learning achievement of the experimental group is more significant than the average learning achievement of the control class.

**Discussion**

This research combines Schoology as LMS, blended learning, and guided inquiry in one package. The research will look at the effect of the combination of learning models with LMS whether it is appropriate to facilitate the implementation of learning from home. The study results show that the combination of learning models with LMS, which has a neat and exciting multi-component composition, can then be operated efficiently to make students motivated and motivated. The composition contained in the combination of the learning model with the LMS makes students interested in learning, arouses curiosity, and has the desire to combine the course material with being discussed, correlated with past learning in order to foster mastery of lecture material, making the focus of student learning interested in responding to fundamental developments. Moreover, it has usefulness, where lecturers are obliged to prepare teaching resources that come from various sources by the teaching materials (Campillo-Ferrer & Miralles-Martínez, 2021; Hazelton et al., 2021; F. H. Wang, 2021). These exciting combinations and variations make students' desire to learn increase. Even have an interest in discussing learning on another day. Such conditions are perfect for efforts to achieve maximum learning outcomes by what has been determined and expected. The presence of a combination of learning with LMS shows that the correct selection of learning models with technological media users will significantly impact student learning outcomes (Phurikultong & Tuntiwongwanich, 2021; Ramadan et al., 2021; Saekawati & Nasrudin, 2021). The suitability of the combination of models with LMS technology will positively impact the learning journey as the results of the study showed that by using a combination of models with LMS, the experimental group had better results than the control group. Where the mean for independence in learning, the experimental group scored higher than the control group.

Based on the cases that occurred in the field during the initial observations of the study, it was found that learning occurred only in one direction—resulting in student learning outcomes and independence in learning in Algorithm and Programming learning, not in line with expectations. Of the 167 students, only 52 passed, or less than 50%. Of the 189 students of the management of informatics and computerized accounting study program who will be graduating, only 78 students have good information system products and criteria—proving that the learning model and learning media must be with the right and cognate composition. After changing the learning model and learning media, there was a significant change in student learning outcomes and independence in learning. When testing is part of the research, the experimental group gets scores and percentage scores that are higher and better than the control group. Its means that the changes made produce a good response and composition of results (R A Purba, 2021). The LMS was built, and the chosen learning model succeeded in changing the previously lousy situation for the better (R A Purba et al., 2019).

The results show that the combination of learning models with LMS opens space for students to make observations, make designs, mobilize, validate, review instructions and materials, investigate correlations, convey, discuss and prove existing conjectures (Firdaus et al., 2021; Ramen A Purba et al., 2021). Implementing a combination of learning models with LMS allows students to independently browse the literature related to the problem or case assigned to find a solution, where a time limit has been determined for completion. The presence of a combination of learning with LMS can ignite students' enthusiasm in honing their mindset and insight. It has an impact on the attitude of independence in learning. That is, students dare to explore their abilities without relying on lecturers' explanations (Li et al., 2021; Wong & Cheah, 2021). In the Algorithm and Programming course, developing a mindset and insight is very important for creative and innovative results. It can be seen from the composition of the experimental group learning outcomes, which are higher than the control group. It proves that in algorithms and programming

courses, the combination of the model with LMS has succeeded in exploring students' spirit and training their mindset and insight.

The learning conditions initially used media and learning models, but in reality, the models and media used were not appropriate, so they did not significantly impact the learning process. Lecturers teach algorithms and programming courses using Google Classroom and Google Meet. Collect assignments and assign assignments with Google Classroom, to communicate and discuss with Google Meet. There is no variation in the learning activities carried out. Similar conditions were also found in other college learning journeys. The learning outcomes are not in line with expectations. Everything works, but no results are in line with expectations. So that changes were made, and the changes made turned out to present a better learning situation, and the results achieved were also better. It is proven that in all stages of the research that are the research components, the experimental group that uses a combination of learning models with LMS media has better and higher achievement than the control group. A common thread can be drawn that the combination of models carried out in the future can also be implemented in other universities (Jalinus, 2021; Krismadinata et al., 2019).

The results showed that the combination of the learning model with LMS enabled students to communicate in the form of discussions related to the acquisition of a literature review with classmates and draw conclusions from the results of the discussion to classify the results of the discussion. This composition positively impacts the combination of student abilities (Ambiyar, Verawardina, et al., 2021). On the one hand, it increases in terms of learning achievement. On the other hand, it also increases the realm of independence in learning. Through a combination of learning models with LMS, students are trained to master the critical points of learning voluntarily, in this case, related to Algorithm and Programming courses. No longer waiting for clues, but able to develop the given instructions. So the lecturer does not need to explain, again and again, just once, and students can immediately draw the essence of the explanation and develop it (Ambiyar, Waskito, et al., 2021; Yunita et al., 2021). The research that the author does is in line with the research conducted, but in its implementation, the author's research, the lecturer can streamline time because the development of learning carried out through the prepared media is complete. So that students can quickly understand what they are asked to do.

The research process carried out found the points and parts that differed from this research from previous research. The research was conducted using a learning model combined with an LMS device designed and built by itself with a website-based programming language. The appearance of the LMS has been adjusted to the essence of using LMS technology. In the LMS that was built, the colors chosen were attractive and friendly to the eye. Modules are easy to access. To collect tasks is also not difficult. When doing the learning, access is also effortless with an attractive appearance. It is proven that there are no difficulties experienced by lecturers and students in the LMS testing process when learning is carried out. The syntax in the selected learning model is embedded in the LMS media that is built. The implementation of pre-test and post-test is also carried out by involving the media that has been built. Not only that, the implementation of the quiz, midterm exams, and end-of-semester exams can also be done from the LMS media that was built. Media for discussion is also available in the LMS that was built. The combination composition that has been done has been combined in one package, in the LMS media that has been built.

As for the initial basis for conducting research, the Algorithm and Programming courses are introductory courses necessary to build students' skills and abilities in information systems programming. In the initial observations at several universities and direct observations at the Politeknik Unggul LP3M, students' learning achievements did not match expectations, and students' independence in learning was very low. The way to change the existing results is through research with a combination of learning models with LMS. It turned out to be very significant in increasing student independence and learning achievement. Thus, the combination of learning models with LMS can be used as a solution in learning situations from home due to Covid-19. It is also sure that it is very significant for learning in natural disasters and other abnormal situations (R A Purba et al., 2019).

The study results prove that the combination of learning models, one of which is the insertion of a guided inquiry model, makes learning media contain compositions that encourage student's enthusiasm and motivation to learn. The presence of technology based on blended learning further strengthens the guided function contained in the resulting learning media and is seen from the increase that occurred both for independence in learning and student learning outcomes. There is a significant difference between the experimental and control groups (Asmoro, 2021; Nurlaila & Lufri, 2021). Thus, it is hoped that this media can be a solution to increase learning independence, and student learning outcomes in Algorithm and Programming courses can be fulfilled. Based on the research conducted, combining Schoology as LMS, blended learning, and guided inquiry in one package increased independence in learning and improved student learning outcomes. Thus, the combination of the learning model with the LMS is appropriate to facilitate learning from home.

#### 4. CONCLUSION

Following the stages of research that have been carried out, it can be concluded that the combination of learning models with LMS effectively increases independence in learning and student learning outcomes in learning situations from home. Based on research results, it is proven that after using a combination of learning models with LMS, students' independence in learning and learning achievement of experimental group students increased, higher than the control group. Student responses to doing learning with a combination of learning models with LMS strongly agree with using a combination of learning models with LMS. The positive student response will further support learning from home and learning with other abnormal conditions. For further research, if it wants to develop, it can research on affective and psychomotor aspects. In order to be able to use learning media, in this case, an LMS that is built to the maximum, it takes a good internet data connection. In addition, before using learning media or carrying out learning, some instructions must be read first so that learning activities can run well and without obstacles.

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