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# The Implementation of a Learning Management System for Improving Teacher Knowledge and Skills in MTs. Teladan Medan

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**Abstract:** The implementation of community service (PKM) aims to improve teachers' ability to teach by applying the website-based learning management system (LMS) application at MTs. Teladan Medan is the location of the dedication that has been done. The application that had been developed was a contribution to PKM partners to helped the school conduct learned management, especially in implementing online learned. PKM activities were carried out through several activities, namely: socialization, training, and assistance in the used of the website-based learned management system (LMS) application that had been developed for several 16 teachers. The instruments used in the form of questionnaires, pretests, and posttests were distributed before and after the training. Based on the results of the activities carried out, there was an increase in teacher knowledge about integrated learning technology using the learning management system application, with a score of 75.65%, and an increase in teacher skills in using or applying the learning management system application, with a score of 80.47%.

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## Introduction

The Covid-19 pandemic that emerged in recent years has significantly impacted various areas of life, including education and its implementation (Fonna et al., 2022). Learning solutions in various schools are implemented through distance learning or online learning. The learning process which carried out at MTs. Teladan Medan has implemented online learning, especially during the Covid-19 pandemic. Through the Ministry of Education and Culture regulations, the government has prohibited face-to-face learning and ordered distance learning through Minister of Education and Culture Circular Letter No. 4 of 2020 (Joko & Relisa, 2021). Based on this policy, schools must innovate in the implementation of learning. After the Covid-19 pandemic case entered the new normal period, the online learning process at MTs. Teladan Medan is still being implemented. It happens due to government policies implementing a hybrid learning system (Sumardiana et al., 2022). Hybrid learning is carried out by combining online learning and face-to-face learning (Makhin, 2021).

The biggest challenge in online learning is changing students' habits, which were initially well-received due to students' interest and enthusiasm for learning from home (Hakim, 2022). As time goes by, they will do the same daily activities, making them feel bored. In addition, the quality and quantity of subject matter taught by teachers in certain

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subjects can be reduced. Implementing online learning can be more complex by applying appropriate learning methods to delivering subject matter, which is generally done face-to-face. Applying inappropriate methods can make it difficult for students to absorb learning material on certain topics. Therefore, learning management is a solution that can be applied to the learning process to support the achievement of predetermined learning objectives, especially during the Covid-19 pandemic.

The learning process can be carried out efficiently, effectively, and motivatingly when learning management is carried out properly. Management is a process that is applied to achieving organizational goals by implementing various activities: planning, organizing, leading, and controlling (Adri et al., 2021). The definition of learning management is an effort to control learning activities based on learning principles to achieve predetermined learning objectives to create effective, efficient, and productive learning that begins with determining learning strategies and planning and ends with giving an assessment (Andiani & Fitria, 2021).

Students who receive learning in the classroom will find it easier to implement learning management. Meanwhile, this process will be carried out for students who receive online learning by implementing a system of sharing teaching materials and ending with assignments. It also happens in online learning implemented in MTs. Teladan Medan. In face-to-face learning, teachers gradually provide subject matter to make it easy for students to understand. In contrast, teachers will have problems related to good learning assessment and management in online learning. Online learning will be a big problem when the teacher only orders students to do homework and does not explain the subject matter provided. Besides that, the development of student learning in schools can have a negative impact. Teachers, as facilitators in the implementation of education, should be able to make several innovations so that students can be actively involved in the learning process (Prawanti & Sumarni, 2020).

There are several other online learning problems, such as the user's lack of knowledge about information technology, learning can become boring, and assessments that can generally be done in a person becoming impracticable. These problems can make learning less effective and efficient due to the obstacles that occur (Suryapermana, 2016). The application of technology, information, and computers (ICT) in learning today is not new (Ramadhani et al., 2021). Based on the problems previously described, the principles of learning management in education can awaken a downturn considered sleeping and dreaming (Erwinsyah, 2017). The application of online learning based on a learning management system (LMS) is a solution that can be implemented to achieve the set learning objectives.

The learning management system (LMS) is essential to the learning process, especially online learning. The application is needed to achieve learning objectives. It is done because the resources in the form of teachers, students, media, and other learning tools are directed at achieving optimal learning goals (Musdalifa & Panu, 2019). There are numerous approaches to developing an online learning system, one of which is to use the LMS application for learning. The LMS application is software that has functions: creating learning materials; managing learning activities and their results; and facilitating interactions between teachers and students, teachers and teachers, and students and students. LMS applications can support various activities, such as administration, delivery of learning materials, assessment (assignments or quizzes), tracking and monitoring, collaboration, and communication or interaction (Landeros & Fuentes, 2016).

In the learning process, the teacher's role is vital in determining the quality and quantity of learning. Teachers must think about and plan to learn well to increase their

  

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students' learning motivation. The teacher also acts as a learning manager, where the teacher acts as a facilitator who seeks to create effective learning conditions, develop lesson materials, and improve students' ability to understand lessons to achieve learning goals. Teachers' lack of understanding of managing learning can cause students' learning outcomes to fall short of expectations. This condition is caused by the limited information and knowledge obtained during learning. So efforts are needed to improve teacher understanding and skills in learning management. One effort can be made to provide training in good learning management.

Based on the previous explanation, a learning management system needs to be implemented in order to increase the effectiveness of online learning at MTs. Teladan Medan. Online learning at this school can less monitor student activity and needs to provide direct assessments to students. Teachers have difficulty managing learning, like face-to-face learning. As a good teacher, teacher should be able to understand the learning management process and be able to apply it to the material provided. The solution that can be implemented is to develop and implement a learning management system (LMS) and provide training to teachers so that the implementation of online learning can be carried out correctly.

## Method

The implementation method for this PKM activity includes steps that are carried out systematically and continuously, namely:

**1) Confirm with the school**

This activity included preparation and coordination between the PKM team and partner schools regarding the activities to be carried out. The preparations included compiling a schedule of activities, determining the place of implementation, determining the media used, and determining material requirements.

**2) Dissemination of the benefits and importance of LMS applications**

Conduct coaching and direction on technology-integrated learning and the application of a website-based learning management system that is designed and developed through outreach and mentoring of educational training-based community partnership programs. Furthermore, the material would be delivered by education, and IT experts to make teachers in partner schools believed that the program being implemented was indeed useful for them so that it could be delivered and practiced correctly. Increasing the competence of teachers is one of the main targets of this activity, to improve the quality of learning so that learning activities can be carried out and run well and effectively according to the targets and achievements to be achieved.

**3) System requirements analysis**

This activity is a step taken in analyzing the things needed and determining the system's specifications to be built. The specification includes the components required at the start of the system's construction until the system can be implemented. In addition, these specifications are carried out to determine the inputs needed in the system, the outputs to be produced, and the processes needed to process these inputs to produce a goal according to the target. In this activity, the PKM team would determine system requirements based on the available LMS and the needed of teachers in partner schools. The PKM team would conduct an interview and guidance process with education and it experts regarding developing a website-based learned management system application.

  

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**4) System planning**

This activity was carried out after analyzing system requirements has been fulfilled. The PKM team carried out this process to obtain a clear picture of the system built based on analyzing system requirements and thinking about how to build the system. *System design* is a phase that requires design expertise for the computer elements used in the system to be built, namely, the selection of the equipment used and the programming language for the system. The system design used in building LMS applications, namely:

a) The database design describes a collection of data that will be stored on storage media to store input data and process the data into the output on the system.
b) The process design describes the work process of the system to process the input data into output data by utilizing the functions that have been designed.
c) The Interface design describes the part of the application that can be used by the user and can be seen on the monitor screen when the application is run.

**5) System (application) creation**

This stage is the realization of the design of a learning management system's appearance on a website. In this process, system development was carried out using applications, namely Bootstrap, PHP, and MySQL, by programmers. The system is based on a pre-arranged design and can be accessed from electronic devices (computers and smartphones).

**6) System evaluation**

This activity was carried out to test the system that has been built. The evaluation phase included two parts, namely, the evaluation of the results of the system trial and the analysis of the trial. The results of the system trials aim to see all the functions of the components contained in the system that has been built, and the analysis of the system trials aims to conclude from the trial results. Testing of the system was carried out in several stages that have been prepared beforehand. The test used black box testing techniques, where the application would be tested by conducting various experiments to prove whether the components in the system that have been made are following the stated goals (Pramudita, 2020). In addition, testing of the learning management system application would also be carried out by educational experts and IT experts for validation of system visualization, system functions, and system decision-making. The PKM team would analyze the results of these tests to determine whether improvements should be made or published.

**7) Application usage training and assistance**

The training was carried out after the partner schools have participated in the socialization process and the LMS application has been issued. After the teacher received socialization and counseling regarding the application of technology-integrated learning, the activity continued with training on applying a website-based learning management system guided directly by the PKM Team. In implementing training and mentoring, these activities would be carried out directly through interactive dialogue. The results of training and mentoring from using the LMS application would be measured by providing assessment instruments to determine improvements related to teacher knowledge and skills in applying to learn using the LMS and improving teacher teaching abilities.

**8) Activity evaluation**

This activity was carried out to evaluate improvements related to teacher knowledge and skills in applying to learn using the LMS application that has been built and to improve teacher teaching abilities. The evaluation results of these activities were used as the basis for the final report on the PKM activities carried out between the PKM team and partner schools,

  

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namely MTs. Teladan Medan. Activity evaluation was also an essential part of determining whether the program that had been carried out achieves the goals and targets set previously.

## Result and Discussion

The service conducted aims to develop and implement a website-based learning management system in MTs Teladan Medan, which is the location of the service that has been carried out. System development was carried out using the R&D method, which aims to develop and test the benefits and effectiveness of the products being developed, including technological products, materials, organizations, methods, and tools (Dalimunthe et al., 2021). The system development carried out can be described as follows:

### 1) Results of system requirements analysis

At this stage, the results obtained are explained based on an analysis of the system's needs to be developed. These results were obtained by providing several questions or statements through a questionnaire regarding online learning, which had been carried out so far in partner schools. The conclusions obtained indicate that using LMS was something new for teachers. The results of the questionnaire distribution stated that around 75% of the teachers agreed to use the LMS application in the implementation of learning and were willing to study the application. In addition, the PKM team would collect initial data regarding teacher knowledge and skills in using the LMS application. This process was carried out to determine the increase in teacher knowledge and skills after the PKM activities.

### 2) System design results

At this stage, the steps taken to fulfill the substance of the application to be developed would be explained. The PKM team and partner schools would agree that the application to be built has several features tailored to the school's needs. The application requirements used as a guide in the design of the developed system include the following: (1) can be accessed via a computer or smartphone; (2) has login and registration features that can be used directly by the user; (3) has facilities for sending messages between users; (4) has features for distributing teaching materials that can be viewed or downloaded by system users; (5) has features for sharing other learning tools that can be viewed or downloaded by system users; (6) can carry out management related to the assignments given to students; (7) can carry out management related to exams given to students; and (8) can obtain an assessment directly and download it to be reported to the school principal. After the design was completed to obtain agreement, the PKM team designed databases, system processes, and interfaces that described all the desired features.

### 3) System development results

These stages are the steps in system development necessary to implement all designs that have been made and translated into a website-based programming language.

#### a) System testing results

The display results of the developed LMS application products can be seen in Figures 1–3, as follows:

  

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**Figure 1. Admin Dashboard**


**Figure 2. Teacher Dashboard**


**Figure 3. Student Dashboard**

The results of the black box testing that was carried out by the PKM team stated that the features contained in the system had successfully run according to the initial design and their respective functions. The next stage would be product validation to determine the level of acceptance of applications developed by IT and education experts.

**b) LMS application product validation results**

Product validation assessment was carried out using LMS application validation instruments obtained from experts, hereinafter referred to as "validators. Determination of the validity value of the LMS application uses the following equation 1 (Listiawan, 2016):

$$P = \frac{\sum X}{\sum X_i} \text{x} 100\% \quad (1)$$

Where: P = percentage of LMS application validation, ∑X = total score validators, and ∑Xi = total highest score.

The validation criteria used can be seen in Table 1 below (Arikunto, 2021).

  

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**Table 1. LMS Application Validation Criteria**

| No. | Percentage (%) | Validation Criteria |
|---|---|---|
| 1 | 76-100 | Valid |
| 2 | 56-75 | Valid enough |
| 3 | 40-55 | Invalid (Revised) |
| 4 | 0-30 | Invalid (Revised) |

The assessment is given based on responses from the validator with choices from each questionnaire statement, namely: strongly agree (SS), agree (S), quite agree (CS), disagree (KS), and disagree (TS), with the highest score weighting down to the lowest, namely: 5, 4, 3, 2, and 1.

The ratings obtained from IT experts can be seen in Table 2 below.

**Table 2. Validation Results from IT Experts**

| No | Name | Total Rating | Rating Result | Decision |
|---|---|---|---|---|
| 1 | Validators 1 | 95 | 82.61% | Valid |
| 2 | Validators 2 | 91 | 79.13% | Valid |

In Table 2, the results of the LMS application validation test by IT experts obtained an average score of 80.87%. Thus, the criteria for the developed LMS application are included in the "valid" category.

**Table 3.Validation Results from Education Experts**

| No. | Name | Total Rating | Rating result | Decision |
|---|---|---|---|---|
| 1 | Validators 1 | 92 | 80.00% | Valid |
| 2 | Validators 2 | 89 | 77.39% | Valid |

In Table 3, the results of the LMS application validation test by education experts obtained an average score of 78.70%. Thus, the criteria for the developed LMS application are included in the "valid" category.

**4) LMS application implementation results**

After the validation stage was carried out, the next stage was implementing the product to see the level of practicality of the product that has been developed for teachers participating in PKM training. The equation used in determining the level of product practicality is determined by using equation 2 as follows (Putri, 2015):

$$P = \frac{f}{N} \text{x} 100\% \quad (2)$$

Where: P denotes percentage product practicality, f denotes score acquisition, and N denotes maximum score.

The practicality criteria for LMS application products can be seen in Table 4 below (Putri, 2015):

**Table 4. Product Practicality Criteria**

| No. | Percentage (%) | Validation Criteria |
|---|---|---|
| 1 | 80% < P ≤ 100% | Very Practical |
| 2 | 60% < P ≤ 80% | Practical |
| 3 | 40% < P ≤ 60% | Quite Practical |
| 4 | 20% < P ≤ 40% | Less Practical |
| 5 | 0% < P ≤ 20% | Impractical |

The results of the product practicality level obtained from the application of the LMS can be seen in Figure 4 below.

  

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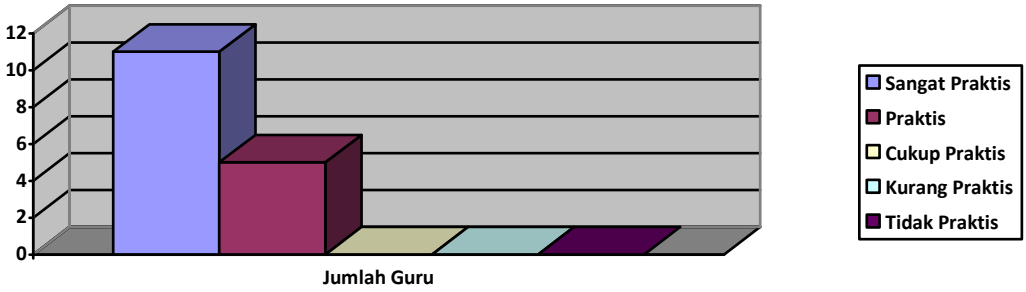


**Figure 4. Number of Teacher Responses to the Practicality of LMS Products**

In Figure 4, the practicality test results of the LMS application products from 16 teachers obtained an average percentage of 82.06% and can be categorized as "Very Practical." The practicality of the product that has been tested uses three aspects of assessment, namely: aspects of ease of use of website-based applications, aspects of display and menu clarity, and aspects of efficient use.

Based on the results obtained from Figure 4, it is stated that the developed website-based LMS application is convenient for use in MTs. Teladan Medan supports online learning. Implementing the LMS application was done through training in the LMS application developed at MTs. Teladan Medan. The activities carried out during the PKM training activities can be seen in Figure 5, as follows:

**Figure 5. Training Activities**

  

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**5) Results of the evaluation of training activities**

Evaluation was the final stage of a series of PKM activities that have been carried out. At this stage, the PKM team would carry out the data collection process by providing several questions after the activity was carried out to determine indicators of achievement of PKM activities. The result of the PKM activities carried out was an increase in teacher knowledge and skills regarding the use of the LMS application, as measured by calculating the level of effectiveness of the PKM activities that have been carried out. The equation to find out the increase in teacher knowledge and skills from the training carried out can be used to find the percentage of effectiveness criteria using equation 3 below (Indreswari et al., 2014).

$$P = \frac{PS - PR}{NIQ - PR} x100\% \quad (3)$$

Where: P = percentage of training effectiveness (%), PS = average posttest value, PR = average pretest value, and NIQ = highest score.

The calculation results obtained from equation 3 will then be converted using Table 5 to find out the categories of increased knowledge and skills that occur (Risna et al., 2019).

**Table 5. Percentage and Category of Improvement**

| No. | Percentage (%) | Category |
|---|---|---|
| 1 | [illegible]6.66% | Effective |
| 2 | 33.33% < P < 66.66% | Effective enough |
| 3 | [illegible]3.33% | Less effective |

Based on the results of calculations using equation 3, the percentage results and categories of increasing teacher knowledge regarding training in the use of the LMS application are obtained as shown in Table 6 below.

**Table 6. Results of Increased Knowledge of Teachers**

| No | Information | Score | Results |
|---|---|---|---|
| 1 | Posttest value | 39.69 | 75.65% |
| 2 | Pretest value | 85.31 | |
| 3 | Enhancement | 45.63 | |
| 4 | The highest score | 100 | |

In Table 6, the results show that the teacher's knowledge has increased after participating in PKM activities by 75.65%. These results indicate that the increase in teacher knowledge regarding the LMS application is included in the "effective" category. The percentage results and categories for improving teacher skills related to the use of the LMS application before and after the PKM activities that occurred can be seen in Table 7 below.

**Table 7. Results of Increasing the Skills of Teachers**

| No | Information | Score | Results |
|---|---|---|---|
| 1 | Posttest value | 32.81 | 80.47% |
| 2 | Pretest value | 86.88 | |
| 3 | Enhancement | 54.06 | |
| 4 | The highest score | 100 | |

In Table 7, the results show that teacher skills have increased after participating in PKM activities 80.47%. These results indicate that the increase in teacher skills in using the LMS application is included in the "effective" category.

Based on the results of the data analysis that has been carried out, the PKM activities that have been carried out have succeeded in increasing the knowledge and skills of teachers in partner schools regarding the LMS application that has been developed. These outcomes were the foundation for teachers to apply their knowledge and skills to the LMS application

  

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developed during the online learning process. This activity involved ongoing training and mentoring. Through these activities, training and mentoring in using the learning management system developed will not just stop but can be practiced and used in implementing the learning curriculum.

## Conclusion

Based on the results of community service activities (PKM) that have been carried out, various findings can be obtained in developing and implementing a website-based LMS application with valid and practical categories. The percentage of LMS application validation assessment by IT experts obtained an average score of 80.87%, so the result category was "valid." The results of the LMS application validation assessment by education experts obtained an average of 78.70%, so the result category was "valid." In the practicality level assessment obtained from the teacher's response, the assessment results obtained 82.06% in the "Very Practical" category.

The PKM team has conducted community service programs such as socialization, training, and assistance using the LMS application following the planned targets. Based on the results obtained, the PKM activities that have been carried out effectively increase partner school teachers' knowledge regarding the LMS application by 75.65%; it can be concluded that the PKM activities effectively increase partner school teachers' knowledge regarding the LMS application. In addition, improving teacher skills in using the LMS application increased by 80.47% after the activity.

## Recommendation

In addition to needing good learning management, the other most crucial thing that teachers must apply in the learning process is the application of good learning strategies. The application of learning strategies and management are two essential things that must be mastered by the teacher in the learning process, especially during the Covid-19 pandemic. Applications developed make it easier for teachers to monitor learning activities carried out by students, but the learning process must follow the teacher's direction. The teacher, as the facilitator, must prepare everything needed in learning so that all learning objectives that have been set can be achieved well, including the needs in teaching materials delivered with a suitable strategy applied to students.

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