# LMS–supported science blended learning design workshop as an effort to improve learning quality for science teachers

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# LMS-supported science blended learning design workshop as an effort to improve learning quality for science teachers

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**Abstract.** This workshop aimed to prepare science teachers making advantages of technological advances by using Information and Communication Technology (ICT) to improve quality of learning process. With the COVID-19 pandemic that occurred suddenly, science teachers were strongly encouraged to use of LMS (Learning Management System). Research method selected were descriptive quantitative to describe a phenomenon, event, and incident that occur factually and accurately of science learning quality during the outbreak. There were 25 participants involved. This research applied percentage descriptive analysis to examine whether participants successfully in designing LMS that meet minimum criteria. The results of interviews and questionnaires distributed before workshop showed that more than 50% of the trainee teachers only used Whatsapp to carry out online learning in the last semester. Some teachers also don't know the characteristics of LMS, so they think that Whatsapp is also one of the LMS. Workshop done online via zoom meeting, divided into three meetings. Online consultation was provided as well to monitor teachers' progress in designing LMS content. After workshop implementation, 88% of the participants were proficient in making LMS, they were able to filled it with learning activities such as discussions, presentation materials, and evaluation.


## 1. Introduction

In recent years, online learning or e-learning has been widely researched and carried out. Generally, e-learning that is implemented comes from a software package that is specifically created to serve online learning or often called LMS (Learning Management System), for example, Google Classroom, Moodle, Schoology, and Edmodo. In other terms it could be known as web-based educational system. Each LMS has its own features and advantages. LMS chosen for designing science blended learning class because it offers so many features, from managing course content to creating assignments and evaluation to reach learning outcome [1]. Besides, the installation system is easy, lightweight, does not require high computer or laptop specifications, affordable, easy to use so that considered as innovative educational platform [2-3]. Research on the use of ICT in the learning process revealed satisfaction in LMS or web-based instructional system from both teachers and students' opinion [4-7].

   Science is a study of nature phenomenon it involves students' hand-on and mind-on activities. Thus, a full online learning is not enough to help students mastering science concept. Physical activity such as lab activity are required also learning from COVID-19 pandemic and future educational goal that stress technology integration, it is recommended that a combination of online and direct learning that is

blended/ hybrid learning as an ideal science learning design. Blended learning was chosen because it has the advantage that there are still face-to-face activities where the teacher can provide feedback directly. Meanwhile, time constraints and discussion of material in face-to-face activities can be accommodated by online learning (e-learning). This learning design that combines direct learning and online learning is more effective in improving the quality of learning than both being carried out independently and in increasing the pedagogical competence of teachers [5]. There are at least 4 main challenges in designing blended learning: (1) incorporating flexibility, (2) encouraging interaction, (3) facilitating students' active learning, and (4) promoting an effective learning climate [8,9]. These challenges encourage science teachers to upgrade their pedagogy aspects to conduct science blended learning successfully as expected by national curriculum and 21st century challenges. Therefore, workshop was required to help teacher preparing a blended learning class.

Researches related to the implementation of blended learning, most of the results have a positive influence on the quality of learning and the abilities of students. Many researches explained that the application of blended learning can increase students' motivation, conceptual understanding, creative thinking, and student learning outcomes [10-12]. In addition, Semarang as a large city where most of the people are active internet users, enables the implementation of blended learning. The internet network has reached almost all areas in Semarang, making access to educational portals such as e-learning easy. Based on the potential analysis and research findings, the implementation of blended learning has the potential to be carried out to support the improvement of the quality of the learning process in schools, especially schools in Semarang.

## 2. Methods

This research applied descriptive quantitative method to study an actual phenomenon of online science learning in several junior high school in Semarang during COVID-19 pandemic on how schools, teachers as well as students struggled in actualizing science learning with limitation experience of it. Having collaboration with Semarang science teacher association sub rayon 04, there were 25 science teachers who were willing to participate in this project. Descriptive quantitative percentage analysis was enforced to examine participants' effort in designing students' activities in LMS in order to improve that reached an ideal requirement. The formula below shows comparison between the number of participants who met requirements (N pmr) and total participants (N tp).

$$\% = \frac{N\ pmr}{N\ tp} \times 100$$

LMS-assisted science blended learning design workshop contained two main materials. The first material was an explanation of blended learning and how to design its lesson plan. The next material is about LMS, its features, how to install it, and how to use it. The activity plan was as follows.

1. Prepare training materials and check the completeness of the facilities and infrastructure needed. The teachers who are prospective trainees are first given information on the minimum specifications of the laptop, computer, or smartphone processors needed to install LMS,
2. Prepare the user manual and installation of LMS,
3. Conducted online workshop 3 times through Zoom Meetings followed by discussion, mentoring, monitoring and evaluation through Whatsapp groups.

## 3. Result and Discussion

Workshop were carried out online in three meetings. The duration of each online meeting was 2 hours, including material presentation activities by the committee followed by assignments that were counted into training hours as well so that the total training hours held are 33 hours. The detailed training implementation can be seen in Table 1.

In every training activity there were always assignments and reflections. The task at meeting 1 required training participants collected the lesson plans that had been used in online learning last semester then filled out a questionnaire given by the Service Team about the LMS used in the previous semester's learning activities. The results of the lesson plan evaluation showed that in general the trainee

teachers have been able to design lesson plans for online learning. However, teachers still experience problems in preparing the lesson plans into one-page lesson plan format. Confusion was felt related to how to convert or summarize from a lesson plan containing 12 components to a lesson plan containing only 3 components of the lesson plan.

**Table 1.** Workshop meeting agenda

| Meetings | Speaker | Topics |
|---|---|---|
| July, 4th 2020 | Risa Dwita Hardianti, M.Pd | Science Blended Learning design in the new normal era |
| July, 11th 2020 | Indah Urwatin Wusqo, M.Pd | Distance learning and Merdeka Belajar Lesson Plan |
| | Arka Yanitama, M.Si | LMS-assisted learning design |
| July, 18th 2020 | Committee | Workshop feedbacks and discussion |

Meanwhile, the results of the questionnaire show that more than 41 % rely on Whatsapp during online learning. Many teachers consider Whatsapp to be an LMS even though the features in Whatsapp are not specifically made to accommodate online teaching and learning activities even though they allow teachers to interact, convey information, and assignments. On the other hand, as many as 50 % are already using LMS, the most common used is google classroom and Microsoft Teams, while other LMS were schoology, Edmodo, LMS by ministry of education, 'Rumah Belajar Kemdikbud'. A recap of the use of applications for online learning can be seen in Figure 1. After the delivery of the blended learning material, generally the teacher tells about the technical problems experienced, for example not all students have laptops and smartphones, not all parents can afford data quotas, and school facilities are still limited to the implementation of blended learning. Despite limited experience in distance education such as technical skills, time management, knowledge and attitude in online education, teachers, students and schools generally respond well to distance learning [13-18]
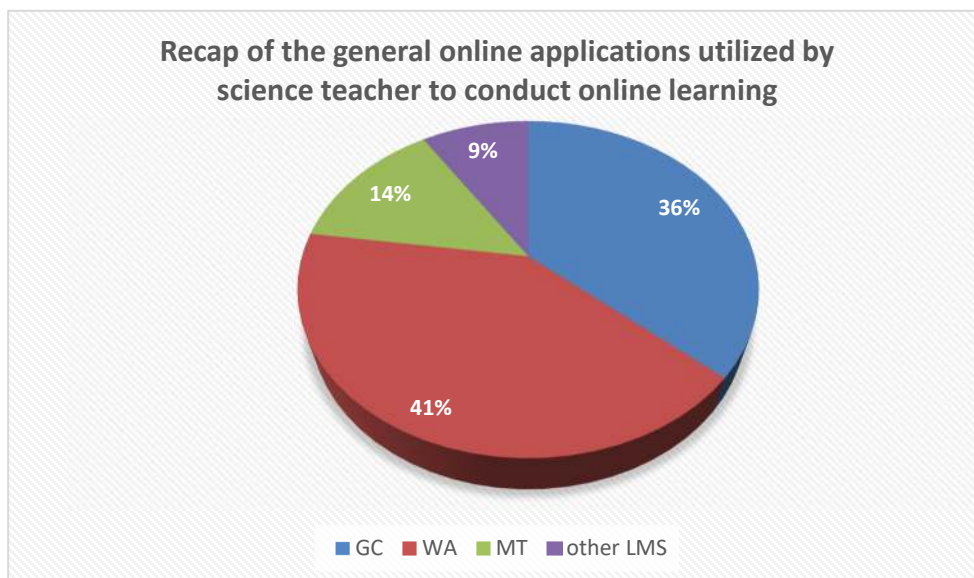


**Figure 1.** General use of online applications

The second meeting discussed distance learning and training in making LMS. The presenter explained in detail how to apply learning models in K-13 in online learning by utilizing LMS. Some

teachers were constrained by the implementation of KD 4 (KD Skills) in online learning, for example in practicum activities. Measuring KD 2 (attitude) is also a challenge for teachers in implementing online learning. Next training material was creating LMS and optimized its features. Optimizing LMS in learning during COVID-19 pandemic was an ideal solution [19,20]. Recently, teachers have not been used properly by teachers so far, for example, creating presence features, group work features on google spreadsheets and creating links to other websites such as YouTube and Kahoot. The task at this second meeting was that the training participants made the LMS and then invited the committee as students in the LMS. Within the predetermined time limit for assignments, most teachers were able to make LMS and invite the Service Team as students. Only a small proportion did not invite the committee because they had to comply with school policies which emphasized that the LMS managed by the school should not be distributed to outsiders. Meanwhile, there were only 2 trainee teachers who had not been accomplished the task.
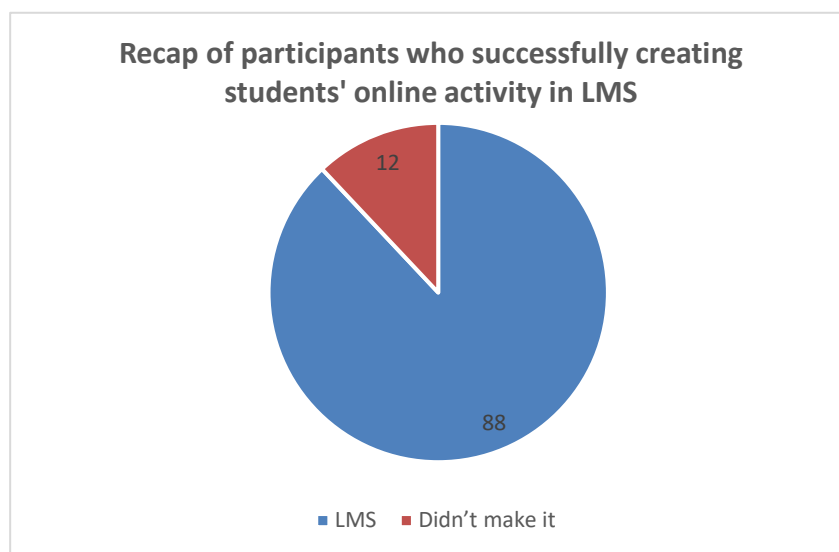


**Figure 2.** Percentage of training participants who successfully optimize features of LMS

The third meeting was used to discuss all the tasks that have been done by the training participants as well as the obstacles that are still being faced related to the implementation of online learning. In general, as showed in Figure 2, approximately 88% of training participants were able to make learning activities in the LMS completely, only there was less variation in the use of media and evaluation tools. Most of them display videos from YouTube, although there are teachers who have used the Sway application for their learning media. YouTube has been a popular video channel worldwide that can be accessed freely but teachers should consider the material depth and its coherency with curriculum before attach the files on LMS [21]. It is strongly recommended that teachers create their own video to meet the requirements.
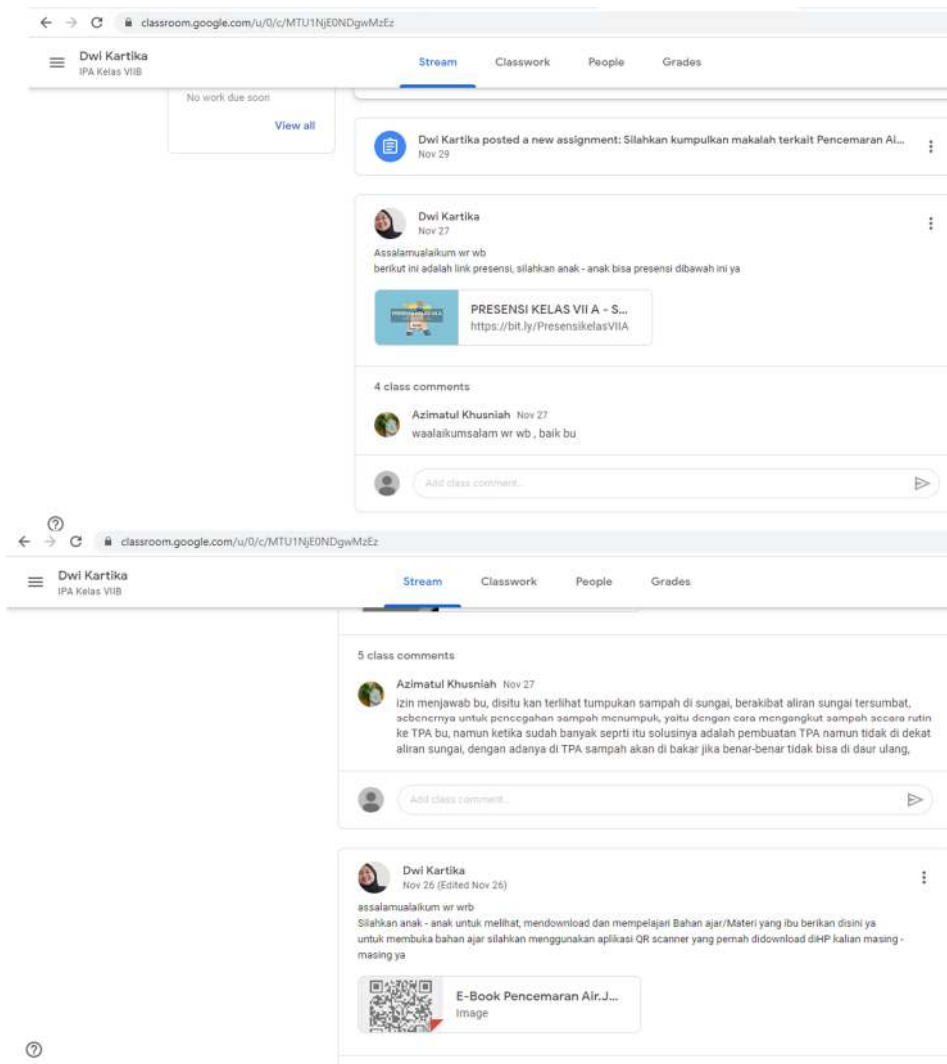
**Figure 3.** The example of LMS created by a participant

Figure 3 indicates at least 4 features teachers (as participants) should create in their LMS: 1) student attendance, 2) topic or material in file or video format, 3) assignments, and 4) evaluation. Each participant invited others to join their class as students. They wrote comments, mark their attendance, and submit assignments there. Most of participants actively involved in others LMS to check whether all features in LMS created by one participant worked well. Committee were also joined as a fellow teacher to monitor LMS activities and made sure that every participant completed all assignments. Finally, all of them stated that the training was meaningful to help them prepare online class during COVID-19 pandemic. Furthermore, government and institution more support to blended learning design are needed in LMS implementation such as improvement in facilities and services.

## 4. Conclusion

The conclusions that can be obtained are as follows.

1. About a half of science teachers participating in the training have no experience using LMS. Instead of optimizing LMS in science learning, they only made use of Whatsapp. Therefore, LMS workshop was demanded to help science teachers improving their online class. There were three

meeting agenda which conducted online via zoom meeting to deliver all material following with discussion, monitoring and evaluation session.

2. After workshop, 88% of teachers meeting minimum requirements: 1) student attendance, 2) topic or material in file or video format, 3) assignments, and 4) evaluation. Even though the variations in the use of learning media were still lacking, they have reached an improvement on integrating LMS and other online apps to conduct online science class.

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