

The Readiness of Learning Object Materials During the COVID-19 Pandemic

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Abstract—The current COVID-19 pandemic requires everyone to limit their activities outside home. This situation also affects the learning process, which requires students and teachers to do their work from home without having to meet face to face following the government policies in schools. Therefore, they must use electronic learning (e-learning) to solve these problems. However, this e-learning model has not been well responded by teachers for learning activities. The research examines the readiness of Learning Object Materials (LOM) during the pandemic at two vocational schools in Magelang. To assess the teachers' readiness, a mixed-method is used, namely qualitative and quantitative methods. Interview and technical assistance are also done in the research. The results show how the material can be completed using the available time so that the teachers can focus on deepening the material and increasing correspondence. The use of free software using a computer can answer the e-learning model. Moreover, after mentoring, there is a 27% increase in understanding about LOM materials. However, it is also found that teachers are not ready and do not understand how to start online learning and use e-learning. There are problems in knowledge, the Internet, the LOM process, facilities and infrastructures, as well as the combination of theory and practice.

Index Terms—Learning Object Materials, COVID-19 Pandemic, E-Learning

I. INTRODUCTION

ELECTRONIC learning (e-learning) amid the unpredictable Coronavirus Disease 2019 (COVID-19) pandemic is an alternative way of carrying out the learning process. Change in the form of education on a large scale around the world greatly affects learning activities that have been carried out at school and home. Most academic institutions use e-learning as a solution, including about 290 million students who experience it [1]. Some schools or colleges have gradually changed the form of learning process from face to face to an online model [2].

Before starting to use e-learning, most teachers only rely on Microsoft PowerPoint as learning materials. The materials are uploaded to an application such as Google Drive and blog [3]. Moreover, inadequate resources and infrastructure do not support the need for material recording so that students cannot access them from home using devices such as laptops, PCs, or smartphones [4]. In the last twenty years, there has been an increase in the use of technology for education, even though online education is still relatively new. Learning is carried out at home with materials that can be accessed by streaming independently, such as Cisco Webex, Zoom, Microsoft Teams, and Google Classroom [5].

Based on regulation number 4 of 2020 from the Indonesian Ministry of Education and Culture, it recommends that all educational activities are carried out remotely at home. It causes educational institutions to use its innovation in accordance with their ability to conduct learning during the pandemic. It aims to reduce direct contact with many people. This problem is very worrying for all parties. There is uncertainty when people can live a normal life with the need for normal learning again before the pandemic [6]. All schools are making changes to achieve educational quality priorities using different teaching means. Educational institutions must ensure changing current teaching forms by alleviating students' and parents' anxieties in this complicated situation [7].

Alternative learning methods during a pandemic are carried out to reduce the spread of the COVID-19. On the other hand, some demands require learning to continue [8]. Learning activities such as face-to-face (conventional) are done before the COVID-19 pandemic. Entering the Industrial Era 4.0, the learning model has also changed. It no longer requires students to come to school. The students can use a laptop and an Internet connection. The material can be read anywhere, and assignments can be collected at any time [9]. The characteristics of distance learning are

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the existence of an organization that regulates how to learn independently.

Distance education is a learning method that uses correspondence as a tool to communicate between learners and teachers. One of its characteristics is that learners and teachers are separated but united by correspondence [10]. It uses the Internet or e-learning. This method is expected to be relatively higher in learners' independence than conventional learning through interactive learning media [9].

In the provision of distance education, two models can be used, namely synchronous and asynchronous. Synchronous method is used in the learning interaction between teachers and students simultaneously but in different places [11]. It uses video conference or chat applications [6]. Meanwhile, in the asynchronous method, teachers can prepare material in advance. Then, the learning interactions are carried out flexibly and are not necessarily at the same time or place [12]. For example, the teachers use a discussion forum, independent study, or student assignments [7]. This model requires a learning management system application and more complex contents such as text, multimedia, animation, practice questions, or assignments [13]. However, the teachers can also use a combination of the two methods simultaneously [14].

With the Internet, there are no more time and space limitations in implementing teaching and learning. On the other hand, teachers' role becomes more and more crucial in preparing teaching materials before online classes begin. They have to make educational designs according to Learning Outcomes (LO), presentation teaching materials, multimedia, online meetings, and others. The increasing number of teacher assignments in preparing teaching materials is certainly very draining. There is a need to see teachers' readiness in facing this online teaching pattern [15].

Moreover, during the COVID-19 pandemic, distance learning is obligatory by utilizing information technology. A difficulty arises because teachers have not been trained to use distance learning models [16]. Support is needed for the adaptation of this learning model [17].

The impact of education with this distance learning is most felt in vocational education at the high school and university levels [18]. There is an increasing use of the Internet for this activity. Meanwhile, many teachers are still confused regarding how to start this type of learning. Numerous previous studies have examined the steps to initiating this distance learning phase, including some schools/colleges that have started it long before the COVID-19 pandemic emerged [19]. The curriculum that is available in every country and followed by all schools/universities has been designed by involving all stakeholders [7]. However, several ob-

stacles arise in mentoring teachers for the introduction of this distance learning model. The basic problem is about how to fill in the content that will be provided online. Materials containing diverse files make it difficult for teachers. Learning Object Materials (LOM) can be used to overcome the problem. It is an easy way to organize teaching materials online. Existing materials are arranged according to existing folders to facilitate content creation from the content to be provided. Hence, materials can be used easier and together with other teachers.

Learning object was introduced by [20] and developed by [21] in 1967. It is known by several names: content objects, educational objects, information objects, intelligence objects, learning components, and media objects. LOM is a small part of teaching material when using e-learning to achieve a single learning goal [10]. As a small part of the overall teaching material, it cannot be separated from the three learning elements: objectives, content, and evaluation. LOM can also be used to convey material and separate content from context. It can be recycled (reusable) for various purposes with metadata as a reference with a reference [9]. It is stored in a repository to be reused as a digital resource simultaneously. In other terms, it is collaborative learning. Collaborative learning can be used on the same topic, making it easier to attain filled material. For example, Moodle has collaborative learning, such as forums, message systems, exams, learning materials, and others. Hence, the absorption of content is easier than having to create it.

The LOM model uses a practical approach where teachers directly create material based on topics in each subject. The existing LOM is created by adding some materials that can fulfill the learning model synchronously or asynchronously. Face-to-face learning can be replaced with virtual meeting applications, such as Zoom or Cisco Webex. Using these applications, teachers can share the presentations with the students. The research provides the results of distance learning assistance to vocational school teachers in Magelang, Central Java in developing learning materials. The results are expected to help teachers to compile teaching materials using e-learning as the COVID-19 pandemic still occurs.

II. RESEARCH METHOD

To assess the teachers' readiness, a mixed-method is used, namely qualitative and quantitative methods. With the interview approach and technical assistance, it is expected that teachers can use information technology optimally in the online learning process. The development of teaching materials is adjusted to the

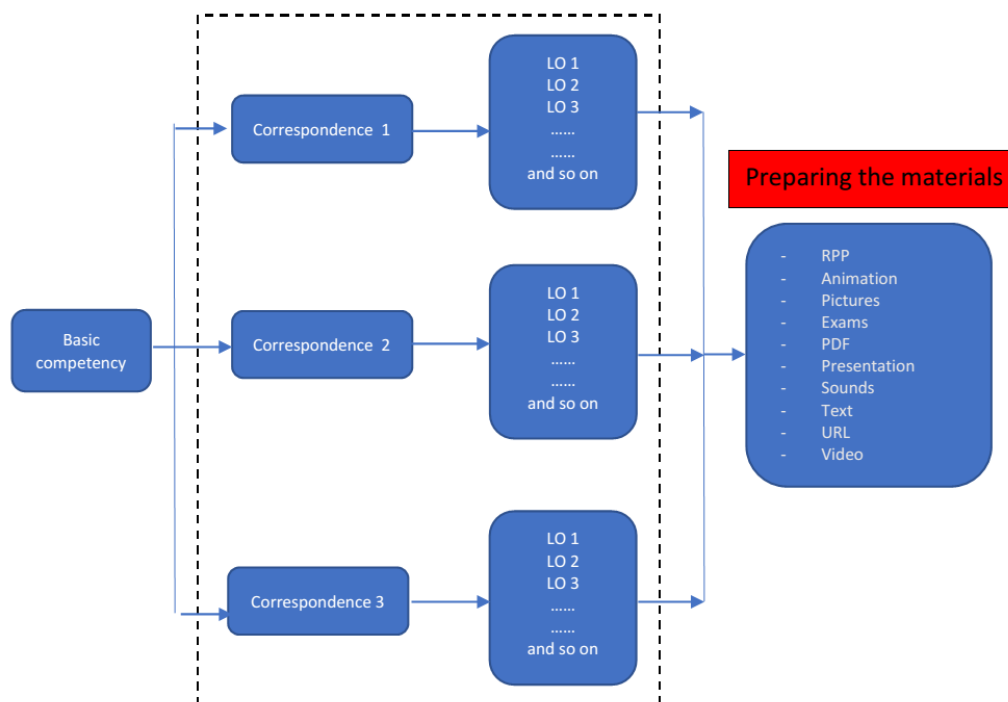


Fig. 1. The used Learning Object Materials (LOM).

curriculum that the Indonesian Ministry of Education and Culture has given. There are three parts: national content, regional content, and vocational specialization content. Then, there is also final content. It refers to projects or assignments in vocational subjects. It requires extra attention because some materials cannot be carried out if there is no teacher's assistance [22]. Using a group discussion forum at vocational schools in Magelang, an alternative method is proposed to prepare material to support it based on the LO of each subject. LOM is prepared to make it easier for teachers to prepare teaching materials [20]. The LOM preparation is adjusted to the used tools by teachers to see the extent to which existing infrastructure can be used for online learning development [15]. The LOM preparation activity is carried out for one month by directly practicing the teaching material into the schools' e-learning application.

Material development is followed by various kinds of teachers from different disciplines. The researchers also conduct pre-tests to see teachers' readiness in understanding teaching materials and the use of the Internet to search for teaching materials by using applications to carry out the learning process online. There are 33 observed teachers. Next, the researchers assess the process of the materials that have been made to be discussed together. It is to see the extent of the

teacher's understanding of the obtained materials.

III. RESULTS AND DISCUSSION

A. Preparation of Teaching Materials

The vocational schools have four study programs: food crop agribusiness and horticulture, brackish water and marine fisheries agribusiness, fishing techniques, and agricultural product processing technology. Based on existing research, the vocational schools emphasize on the practice. The research uses a companion method of making material, namely blended learning. The result shows that in making the LOM, not all teachers understand.

All teachers are asked to make at least two teaching topics by including teaching materials in each folder that has been created, as shown in Fig. 1. In each correspondence topic, each teacher is asked to create ten folders. There are lesson plans 'Rencana Pelaksanaan Pembelajaran' (RPP), animation, pictures, exams, Portable Document Format (PDF), presentation, sounds, text, Uniform Resource Locator (URL), and video. On average, each LOM folder takes about 3.7 minutes for each topic. Therefore, providing learning resources that are flexible, compatible, reusable, and copyleft helps teachers create teaching materials every week. Teaching materials can be taken from several sources, such as website [23]. Meanwhile, materials for

TABLE I
AGE OF THE RESPONDENTS.

Age	Frequency	Percentage (%)
< 30	11	33.3
30–40	13	39.4
41–50	5	15.2
> 51	4	12.1

video or animation can be taken from many sources, such as YouTube.

The RPP folder contains the curriculum in each topic according to the competence of each subject. The animation folder is for animation materials that use animation or effects. It can also be in the form of 2D or 3D. The pictures folder consists of images, photos as supporting teaching materials. The quality of the images or photos significantly affects the printed results later. Then, the exam folder has the multiple-choice and narrative questions that will become a question bank later.

Meanwhile, the PDF folder contains journals (material obtained from the Internet or teaching materials). The presentation folder is for presentation files. The text folder contains a summary of each material. Similarly, the sound folder contains the used sound files in the creation of teaching materials. Then, the URL folder has the links to the retrieved material. After the LOM is finished, the next step is to make a short video presentation for about five minutes using the Screencastify application. There are several assessments carried out in this mentoring. The assessments are the teachers' readiness in front of the camera, the presented material, and the uploaded video to the e-learning application. It can be seen that the teachers can provide explanations online more easily. Teaching materials, such as presentations, practice questions, and teaching videos, can also be used simultaneously in one activity.

B. E-learning Readiness

The data are taken from mentoring teachers in vocational schools in Magelang. The teachers who take part in this activity have various ages with different experience backgrounds. The result is presented in Table I. Most of the respondents are 30–40 years (39.4%). The result is followed by younger than 30 years (33.3%), 41–50 years (15.2%), and over 50 years (12.1%).

Table II explains the problems in using e-learning. There are problems in knowledge, the Internet, the LOM process, facilities and infrastructures, as well as the combination of theory and practice. However, most

TABLE II
THE PROBLEMS IN USING E-LEARNING.

Variables	Sample	
	Mean	Coefficient of Variation
Level of knowledge	3.80	0.22
Internet connection	4.21	0.29
LOM process	3.72	0.23
Facilities and infrastructure	3.12	0.22
The combination of theory and practice	2.54	0.19

TABLE III
COLLABORATIVE E-LEARNING.

E-learning application	Percentage (%)
Google Classroom	33.33
WhatsApp Group	49.20
Microsoft Teams	0
Moodle	0
Email	12.69

respondents choose that the main problem is the Internet. The Internet connection is unstable, and they need a high Internet quota. If teachers rely on connections from schools, the working time is an obstacle. Based on the results, there are several implications. First, increasing human resources with intensive mentoring is a part of increasing teachers' competence. The teachers are currently required to have basic competency skills such as making instructional designs following pedagogical principles, mastery of Information and Communication Technology (ICT) and the Internet as a source of learning, and mastery of learning material according to their expertise. Second, infrastructure in computers, computer networks, the Internet, and multimedia requires many funds. However, it is not an excuse not to use e-learning as a learning model. The use of LOM is a simple way before using e-learning as a whole. LOM materials can be compiled and prepared. The materials on each topic of correspondence can be retrieved using the reusable concept. Like a puzzle game, the teachers can start from an easy thing by using the existing devices.

Table III shows the e-learning applications that have been used. So far, teachers use the WhatsApp group to provide material (49.20%). The teachers send the assignments and teaching materials through chat. In addition, Google Classroom (33.33%) is used as a substitute for face-to-face learning, and email (12.69%) is for collecting students' assignments.

About 33 teachers participate in the initial introduction of teaching materials to the creation of video content. Then, they are divided into several small groups which will be assisted in making teaching materials for e-learning. The questionnaire is used to see the need

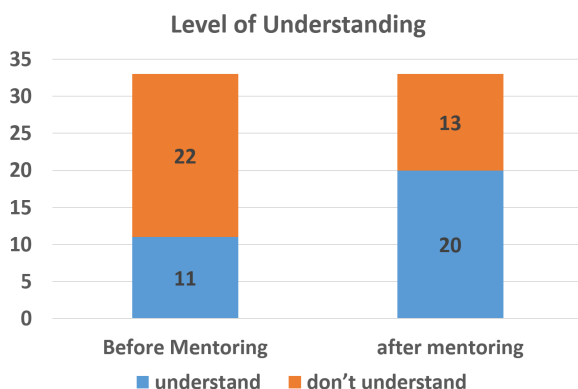


Fig. 2. Level of Understanding Before and After the Mentoring.

for effectiveness, availability of learning resources, and future challenges. There is a 27% increase in understanding of the LOM material after mentoring. The result is shown in Fig. 2.

E-learning is very effective if it is applied today, especially during a pandemic that requires everyone to do activities at home. With the material guide, using LOM can make it easier for teachers to prepare teaching materials. There are ten points of teaching material that can be arranged in each meeting. Teachers can use other widely available material on the Internet as long as they include the citations. Moreover, the final project in vocational schools can be made using videos that teachers can teach to students.

The preparation of the LOM can make it easier for teachers in learning activities. It can take place even though they are online. For example, using Moodle as a platform for learning activities makes it easier for teachers and students to monitor their activities. Then, face-to-face learning can be replaced by using applications, such as Zoom, Google Classroom, or Microsoft Teams. However, infrastructure readiness is also a new problem in the e-learning model because teachers are supposed to compile material and adjust to existing facilities and infrastructure. The teachers who participate in this activity are still not familiar with compiling teaching materials online. Their readiness is still limited to textbooks. Their understanding of technology and the Internet is also lacking.

IV. CONCLUSION

The research provides the results of distance learning assistance to teachers at the Magelang vocational schools. It shows how the material can be completed using the available time so that the teachers can focus on deepening the material and increasing correspondence. The use of free software using a computer can

help in this learning model. However, it is also found that teachers are not ready and do not understand how to start online learning and use e-learning. There are problems in knowledge, the Internet, the LOM process, facilities and infrastructures, and the combination of theory and practice. Moreover, after mentoring, there is a 27% increase in understanding about LOM materials.

An in-depth exploration of online learning is not only limited to teachers but also the readiness of facilities and infrastructure. The readiness of infrastructure is also a new problem in the e-learning model because teachers are supposed to compile material and adjust to existing facilities and infrastructure. The school should be responsible for this issue. Material that has been collected using LOM can be reused for the development of the learning process. The ten stages of learning preparation can use material from the Internet by including original links or sources. Asynchronous learning can be applied directly by involving students in making learning modules, such as making fish feed ingredients in fisheries vocational schools. Then students can make material according to the teacher's direction. Collective or collaborative learning can be done from the text, video, multimedia editing, and so on. In the end, the results of learning subjects can be achieved.

There are several research limitations. First, only 33 teachers in 2 vocational schools in Magelang are used as the research subjects. Therefore, the sample of processed data is very small. Second, the researchers are aware that the research only represents the step towards a full evaluation of learning preparation.

Based on the limitations, future researchers can increase the number of research subjects and assess the readiness of teachers, students, and schools in using the technology for e-learning. The importance of online learning during the COVID-19 pandemic and the involvement of students and other parties such as schools are significant in the success of the LOM.

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