

Development of E-Learning-Based Blended Learning to Increase Student Learning Motivation During a Pandemic

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ABSTRACT

The impact of the Covid-19 pandemic, which began in early 2020, led to the need for online learning. This does not rule out the need for an e-learning media that requires a learning method that supports synchronous and asynchronous learning. Therefore it is necessary to develop e-learning based on blended learning that utilizes the potential of the features in the Moodle Learning Management System. The proposed development of potential features in Moodle is virtual conferences for synchronous learning and discussion forums for asynchronous learning. The use of e-learning based on blended learning aims to get good student learning motivation. To measure the impact of learning motivation, a questionnaire was administered to high school level students. The results of the questionnaire show online learning using other media such as Whatsapp groups without conducting face-to-face learning to get an average score of 1.85 which is a low criterion, while the results of the student learning motivation questionnaire after participating in e-learning based on blended learning get an average score of 3.39 which includes high criteria.

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1. INTRODUCTION

The background of this research was the issuance of a government appeal regarding physical distancing and not allowing gatherings or crowds. This appeal is one of the efforts to reduce the risk of spreading the corona virus, finally the government stipulates the implementation of studying and working from home which indirectly requires changes in the learning system, which initially learning activities only occur face to face in the classroom to move to their respective homes. respectively online [1].

Actually, online learning is considered less effective due to various obstacles [2]. Learning with direct interaction is necessary because in addition to a more objective learning assessment, this learning can also increase student learning motivation. Direct interaction between teachers and students can increase students' interest in learning. However, face-to-face learning in the classroom still cannot be carried out due to the impact of the co-19 pandemic.

Learning during the Covid-19 pandemic was carried out by utilizing learning media technology [3]. This learning is carried out through the development of e-learning based on blended learning which makes the learning process more effective because online learning is currently carried out without face-to-face meetings and can be assisted by face-to-face learning that utilizes information technology and can be done anytime and

anywhere [1,4,5,6,7,8,9,10]. Blended learning is a learning strategy that combines synchronous learning and asynchronous learning activities to create predetermined learning. However, not only combining face-to-face and online learning, blended learning when viewed from the perspective of space and time (synchronicity) is the best combination of two learning settings, namely, synchronous and asynchronous. Therefore, during this pandemic, blended learning is an ideal strategy for creating a learning process to achieve learning goals [10].

The development of this blended learning utilizes the Moodle Learning Management System (LMS) (Modular Object-Oriented Dynamic Learning Environment) [11,12,13,14], which is an internet-based software for creating and conducting training [15]. The feature in developing this LMS uses a plugin available in Moodle called Jitsi Meet as a support for the synchronous learning process, and the Discussion feature as an asynchronous learning tool [16].

Ramli explained the role of motivation in increasing the productive competence of vocational students in West Sumatra, and tested the link between the two. The results stated that the overall motivation of SMK students in West Sumatra was in the good category and there was a positive motivational effect on learning the productive competence of SMK West Sumatra. It can be concluded that if the motivation to learn increases, then the tendency of students to increase productive competence will also increase [17]. Other research using meta-analysis of search results for articles with Google Scholar and publish or perish applications related to the use of blended learning in learning during the Covid-19 pandemic also supports improving learning outcomes [4,18]. Based on some of the facts that the researchers described in the previous section, this research needs to be conducted to see how e-learning based on blended learning can help increase student learning motivation.

2. RESEARCH METHOD

The main objective of this research is to build and design e-learning using a blended learning model. Tests were carried out to see the feasibility of e-learning as well as a learning tool, and it is proven to increase students' understanding of flowchart material. Research Development (RD) was chosen as the research method in this study [19]. The method is used only to find out students' understanding of concepts before and after conducting learning using e-learning with a blended learning model.

2.1. Research Design

The research design used in this study was a one-group pretest-posttest pre-experimental design which can be seen in Table 1. Before being given treatment, students did a pretest. Comparing with the previous situation can determine the accuracy of the treatment given [19].

Table 1. Pre-experimental Design One Group Pretest-Posttest

Group	Pretest	treatment	Posttest
Eksperiment	O1	X	O2

Information:

O1 = Student motivation before being given treatment

O2 = Student motivation after being given treatment

X = Treatment using e-learning with a blended learning model

2.2. Research Procedures

The Full Life Cycle or "Siklus Hidup MENyeluruh" (SHM) is used to build this e-learning. The stages used are based on Munir [20]. This SHM model has five stages in the process. In the analysis phase, data collection was carried out through observation, interviews, and literature studies. The literature study was carried out by reviewing readings related to some of the challenges experienced by students in simulation and digital communication subjects, especially during a pandemic.

Next is the design stage, where researchers design materials, design e-learning flowcharts, and design e-learning storyboards. After the researcher carried out the design stage, then carried out the development according to the flowchart and storyboard that had been made in the previous stage. After that, referring to the LORI questionnaire, the researcher formulated assessment criteria and references for media design. After

the media and material are declared feasible, research will be carried out on one class of students totaling 20 students. Beginning with distributing student learning motivation questionnaires regarding learning during a pandemic, especially in digital communication system subjects, then giving treatment, namely learning using e-learning based on blended learning in two meetings where the first meeting will be held synchronously and the next meeting will be carried out asynchronous learning and ending by distributing questionnaires on student learning motivation after learning using e-learning blended learning models.

The Assessment Stage is carried out to prove an increase in student motivation by processing the results of a questionnaire in the form of a Likert scale. In addition, student responses after using e-learning based on blended learning were also processed as an assessment of the media.

3. RESULT AND DISCUSSION

3.1. Analysis Step

At this step, the researcher carried out the field study stage which was the initial stage of the Research and Development research method. This field study was conducted through personal interviews with one of the productive teachers at MA YPI Baiturrahman Leles regarding the learning process during Covid-19 and what obstacles were being faced during the learning process.

The conclusion from the results of the interviews that have been carried out is that the difficult subjects for students are Digital Simulation and Communication and the difficult material is Flowcharts material. The reason given by the teacher was that the methods and models were less varied, resulting in boredom in learning for students. This greatly affects the level of student motivation. Therefore the researchers concluded that by making other learning media and using the right learning model to support learning, such as e-learning with the Blended learning model, it will make students more interested in participating in learning so that it can increase student motivation in learning, especially during the Covid-19 pandemic.

Table 2. Material Expert Assessment

No	Lecturer	Teacher	Average Score	Category
1	3.00	5.00	4.00	Good
2	3.00	5.00	4.00	Good
3	4.00	4.00	4.00	Good
4	4.00	4.00	4.00	Good
5	4.00	5.00	4.50	Very Good
6	5.00	4.00	4.50	Very Good
7	4.00	3.00	3.50	Good
8	4.00	4.00	4.00	Good
9	3.00	3.00	3.00	Enough
10	3.00	3.00	3.00	Enough
11	3.00	4.00	3.50	Good
12	4.00	3.00	3.50	Good
13	4.00	4.00	4.00	Good
14	4.00	5.00	4.50	Very Good
15	4.00	3.00	3.50	Good
16	4.00	4.00	4.00	Good
17	4.00	4.00	4.00	Good
18	4.00	5.00	4.50	Very Good
19	4.00	5.00	4.50	Very Good
20	3.00	3.00	3.00	Enough
Total	75.00	80.00	77.50	Very Good
Average Score	3.75	4.00	3.88	Good

3.2. Design Step

At the design step, e-learning design is carried out such as the preparation of materials, learning models, preparation of instruments, flowcharts, and storyboards. The material that will be provided in e-learning

is a flowchart, namely the meaning of a flowchart, flowchart notation, flowchart functions, and examples of algorithms in a flowchart. These materials refer to the syllabus used by MA YPI Baiturrahman Leles which implements the 2013 curriculum. The research was conducted in two meetings where the first meeting was held in virtual synchronous, and the second meeting was carried out in a mixture of independent asynchronous and virtual synchronous.

The developed e-learning flowchart is shown in Figure 1 as follows:

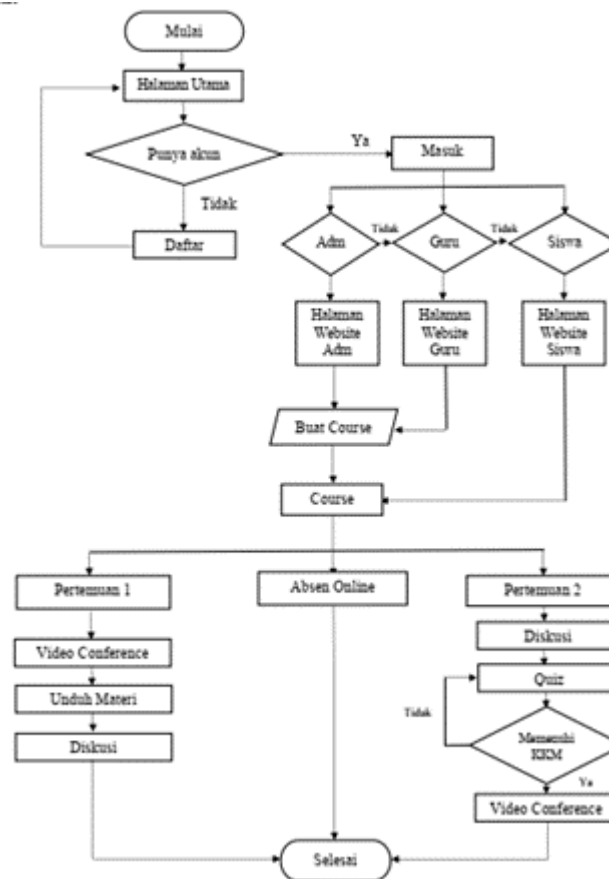


Figure 1. E-learning Flowchart

Synchronous learning at the first meeting uses one of the Video Conference features in the form of a plugin found in Moodle, namely Jitsi Meet. The following is an example of the Jitsi Meet display shown in Figure 2.



Figure 2. Video Conference Feature with Jitsi Meet

Learning at the second meeting used the discussion feature as a form of asynchronous learning by students discussing the problems that had to be solved. The following is an example of the display of the discussion forum shown in Figure 3.



Figure 3. Discussion Forum Feature

3.3. Development Step

The e-learning development step is divided into the interface creation step and expert validation. Making this e-learning interface refers to the storyboard that has been made before. Lecturers from the Department of Computer Science Education FPMIPA UPI were selected as material experts. The selected material experts have capabilities that are in accordance with the topic of discussion, namely flowchart material. The learning aspect became the focus of this validation and a Likert scale-type questionnaire was used. In its implementation, the material expert examines the things in the media, then the material in the media is also assessed.

Teacher of Madrasah Aliyah (MA) YPI Baiturrahman Leles was also chosen as a material expert. The researcher's consideration is that the teacher as an executor has the capacity to understand the material. In its implementation, the teacher tries the media that has been made accompanied by the researcher, then reviews the material in the media.

The results of the assessment of material experts in Table 2 show that there is an average difference. The average rating given by the lecturer is 3.75 which means it is in the "Good" category, while the average is 4.00 based on the teacher's assessment and is included in the "Very Good" category.

Table 3. Media Expert Assessment with Media Engineering Aspects

No	Lecturer	Teacher	Average Score	Category
1	3.00	5.00	4.00	Good
2	3.00	5.00	4.50	Very Good
3	4.00	4.00	4.00	Good
4	4.00	5.00	4.50	Very Good
5	3.00	5.00	4.00	Good
6	4.00	4.00	4.00	Good
7	3.00	5.00	4.00	Good
8	2.00	4.00	3.00	Enough
9	4.00	5.00	4.50	Very Good
Total	31.00	42.00	36.50	
Average Score	3.44	4.67	4.06	Very Good

Media expert validation which can be seen in Table 3 and 4 was carried out by assessing aspects of media engineering and visual communication. The selected media experts are lecturers from the Department of Computer Science Education FPMIPA UPI and teachers in the Digital Simulation and Communication subject MA YPI Baiturrahman Leles.

The validation results show that aspects of media engineering and visual communication get the same score, namely "B" in the "Good" category. The difference lies only in the average rating, the media engineering aspect gets an average score of 4.06, while the visual communication aspect gets an average score of 3.81.

Table 4. Media Expert Assessment with Visual Communication Aspects

No	Lecturer	Teacher	Average Score	Category
1	4.00	3.00	3.50	Good
2	4.00	4.00	4.00	Good
3	3.00	5.00	4.00	Good
4	4.00	5.00	4.50	Very Good
5	3.00	5.00	4.00	Good
6	3.00	5.00	4.00	Good
7	3.00	5.00	4.00	Good
8	3.00	4.00	3.50	Good
9	3.00	3.00	3.00	Enough
10	3.00	4.00	3.50	Good
11	4.00	4.00	4.00	Good
12	4.00	4.00	4.00	Good
13	4.00	4.00	4.00	Good
14	4.00	4.00	4.00	Good
15	4.00	3.00	3.50	Good
16	4.00	3.00	3.50	Good
Total	57.00	65.00	61.00	
Average Score	3.56	4.06	3.81	Good

3.4. Implementation Step

This step was carried out by piloting the blended learning e-learning model involving 20 class X students at MA YPI Baiturrahman Leles as the subjects. In its implementation, students participate in learning activities using e-learning blended learning models. Then students fill out an assessment sheet of the media used and provide suggestions and input. These assessments and inputs are used to improve e-learning blended learning models so that the final product is suitable for use in Simulation and Digital Communication learning in MA class X. Aspects of media engineering, visual communication aspects, and learning aspects are used in the assessment.

The average score on aspects of media engineering and visual communication is 4.58, which means that both of them get an "A" in the Very Good category. This can be seen in Table 5.

Table 5. Student Media Assessment

No	Average Score	Category
1	4.70	Very Good
2	4.35	Very Good
3	4.70	Very Good
4	4.55	Very Good
Total	18.30	
Average Score	4.58	Very Good

The final result of this study is an e-learning media model of blended learning in Simulation and Digital Communication subjects. Validation and feedback from material experts, media experts, and field trials are used for further media development.

The review of aspects of media engineering, visual communication aspects, and learning aspects is carried out as media feasibility parameters. The results of the overall assessment obtained the criteria of "Good" which means that the e-learning model of blended learning media is suitable for use in learning Simulation and Digital Communication materials in MA. In line with what was stated by experts including teachers, with revisions according to suggestions stating that the e-learning blended learning model is "appropriate" to use.

3.5. Assessment Step

Material experts, media experts, and MA students conduct an assessment to verify the feasibility of the blended learning e-learning model. The feasibility test includes three aspects, namely aspects of media engineering and visual communication, as well as learning aspects. The results of student assessments in field trials also determine the feasibility of the learning media that has been developed.

Data regarding the feasibility of the media engineering aspect were obtained from media experts showing that the blended learning e-learning model which was developed according to the feasibility of the media engineering aspect, obtained an average score of 36.5. The media expert's assessment of the feasibility of the engineering aspect of media is included in the "Very Good" category with an "A" grade.

Data on the feasibility of visual communication aspects obtained from media experts showed that e-learning developed in terms of the feasibility of visual communication aspects obtained an average score of 61.00. The media expert's assessment of the feasibility of the visual communication aspect is included in the "Good" category with a "B" grade.

Data on the feasibility of the learning aspects obtained from material experts showed that the e-learning developed in terms of the feasibility of the learning aspects obtained an average score of 77.50. The media expert's assessment of the feasibility of the learning aspect is included in the "Good" category with a "B" grade.

3.6. Learning Motivation

The instrument used uses a Likert scale with five scales in Table 6.

Table 6. Score Conversion Guide

Score	Range	Grade	Category
5	$X > 4.70$	A	Very Good
4	$3.34 < X \leq 4.01$	B	Good
3	$2.26 < X \leq 3.34$	C	Enough
2	$1.99 < X \leq 2.26$	D	Not Enough
1	$X \leq 1.99$	E	Very Less

The assessment was carried out in a field trial of 20 students. Students complete the motivational study questionnaire before and after using the e-learning blended learning model. The results of the questionnaire were then compared to see whether there was an increase in learning motivation or not after using the media. Scores can be seen in Table 7 and 8.

Table 7. Student Learning Motivation (Before)

No	Average Score	Category
1	1.65	Low
2	3.10	High
3	1.60	Low
4	1.73	Low
5	1.68	Low
6	1.68	Low
7	1.78	Low
8	1.63	Low
Total	14.84	
	1.86	Low

The results of the questionnaire show that there is an increase in the average student motivation score with an increase in value from 1.85 to 3.39 or in other words from the "Very Low" to "High" category.

The results of the comparison of the average scores of students' learning motivation in the conditions before and after the use of e-learning blended learning models are presented in the form of diagrams which can be seen in Figure 4.

Table 8. Student Learning Motivation (After)

No	Average Score	Category
1	3.28	High
2	3.40	High
3	3.80	High
4	3.35	High
5	3.83	High
6	3.27	High
7	3.08	High
8	3.17	High
Total	27.16	
	3.39	High

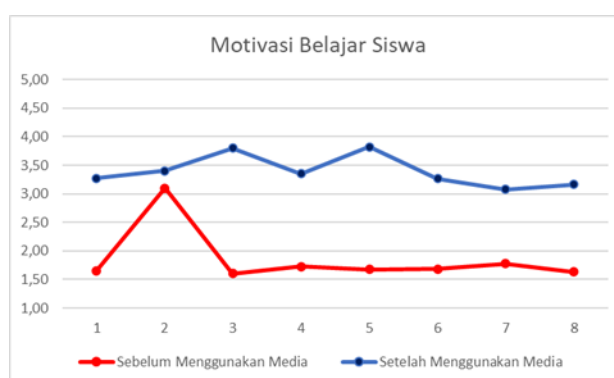


Figure 4. Student Learning Outcomes Data

Based on Figure 4, it is found that there is a comparison of students' learning motivation ("motivasi belajar siswa") before and after using the e-learning blended learning model, with significant improvement results. Changing the category from "Very Low" to "High" indicates that the use of e-learning blended learning models can increase student learning motivation.

4. CONCLUSION

Based on the findings and discussion of the research results that have been carried out, several conclusions are obtained, namely, the development of e-learning based on Blended learning in Simulation and Digital Communication subjects in Flowchart material which can be proven by utilizing the potential of the Moodle LMS feature with the Video Conference Feature, namely Jitsi Meet in Synchronous learning and the Discussion Forum feature for Asynchronous learning. Where is learning with blended learning which is supported by the development of e-learning as needed during a pandemic which forces online learning with the integration of virtual synchronous and independent asynchronous media that support one another. The implementation of the learning process using this model with the eye of flowchart material is proven to be able to provide an increase in student learning motivation.

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