The effectiveness of distance learning through Edmodo and Video Conferencing Jitsi Meet

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Abstract. Distance learning is intensively used since the outbreak of the Covid-19 requires the lecture to be done from home. A variety of applications to support distance learning, including e-learning Edmodo as a learning management system with video conference Jitsi meet to optimize lectures online. The purpose of this study is to see the course's effectiveness by using e-learning Edmodo with or without a video conference Jitsi Meet in reducing students' mistakes in answering the questions given. Research design using experimental type posttest, only group control design. The object of research consists of two classes, namely class control and class comparison. The analysis results indicate the use of an e-learning Edmodo integrated video conference Jitsi Meet provides advantages compared to only using e-learning Edmodo because it can reduce the level of error in answering questions by 50%.

1. Introduction
Since the outbreak of the Covid-19 in Indonesia, the government prevents its spread, especially in the education sector. Therefore, the Higher Education Directorate's Ministry of Education and Culture (Kemendikbud) instructs the college to do distance learning and advises students to learn from each other's homes. Learning distances as a solution to limited learning situations can save time, costs, and resources [1].

Changes in learning methods face-to-face into a distance learning online make students seek various preparation for implementing online learning. The liveliness of the students to practice using technology is quickly required. They are reviewing the methods of interaction, learning online different from learning face-to-face. On the face-to-face method, students and teachers usually meet face-to-face directly but not in learning online. Both of them do not meet directly in the classroom but meet in the virtual classroom. The sophistication of information technology can facilitate the learning of proper methods of face-to-face, although the students and lecturers do not meet directly in the class [2], the use of technology in the process of learning is known as e-learning [3].

The process of online learning on subjects descriptive statistics are also organized through the process of e-learning. Subjects descriptive statistics are subjects that require analysis to answer any questions that shaped the count. Learning with the face-to-face course, many students are still confused and experience an error concept in solving the problems given, first convening the obligations in implementing online learning. Although online learning has been used previously; however, the duration and intensity are not the same in the Covid-19, this implement online learning 100%.
Therefore, strategies are needed or a significant step in building the faculty's creativity in the study's redesign process so that learning remains interesting and meaningful. To run an optimal lecturing process is designed wherever possible to approach the regular classes' pattern, so it is necessary to use instructional media that support the learning process online. It is intended that students still feel the lecturer's involvement in the lecture online the same with the pattern of the normal classes. It used consideration of the selection of media that is easily accessible to various platforms, social media-based, has a better security level and its free use. Selected Media in the descriptive statistics process, its name is a learning management system known as an e-learning Edmodo and video conference using Jitsi Meet.

Edmodo is a learning management system based e-learning as a platform of learning to collaborate and connect between the students and faculty in sharing educational content, the task and handles notification of each activity. Edmodo is a safe application to be used both by teachers/lecturers or by the students/students to be able to interact with each other [4] based social networking that is safe and free in allowing teachers to create and manage a virtual classroom so that students can connect with classmates and faculty anytime and anywhere [5]. Edmodo has several advantages, among others: first, Edmodo ensure the safety and ease of the above learning activities such as sharing ideas or the other either in the campus or outside the campus; second, the lecturer can collect the material or materials used in learning; third, Edmodo provides quick and easy access such as assignments, quizzes, learning resources, web-based; fourth, the lecturers can share files, ideas and other material with other lecturers. This allows us to expand the library and learning strategy; fifth, the User Interface. By adapting the look like Facebook, are simple Edmodo is relatively easy to use even for beginners though; the sixth, compatibility Edmodo support the preview of various types of file formats such as pdf, ppt, Html and so on.

There are various types of video conference in the learning management system so it can be used to optimize learning online, such as Jitsi Meet. Jitsi Meet is an application used for video conferences. The advantages of Jitsi Meet are that do not need to create an account to do a video conference, simply create a meeting room. The URL of the meeting room has been made so it can be shared directly with participants who will be invited to a video conference, and the virtual meeting's security, a password can be added to prevent other people from freely entering the meeting room. In addition to video conferencing, the Jitsi Meet has the features of chat, desktop sharing, and the URL of the video-sharing of Youtube and the blur effect on the background and no less remarkably, that is fully skyped beta free or free to use [6].

This study aims to compare the learning by using the App Edmodo between video conference, Jitsi Meet and not using a video conference to reduce the student's error answer the questions shaped the analysis that shaped the reasoning. The results will provide input on learning effectiveness in particular subjects Descriptive Statistics for study from home in terms of selecting learning media.

2. Method
This research is an experimental type of research. The research method used to find the effect of a particular treatment against the other is ungovernable. In this study involving two groups, namely the experimental group and the comparison group. For the experimental group learning with the App Edmodo by video conference, Jitsi Meet while on class comparison using only the app Edmodo without video conference, Jitsi Meet. The application of this learning on the subjects of descriptive statistics on the material of central tendency. The selection of the sample design is using purposive sampling with consideration of the class was selected based on the average value of which is assumed to be the same on both classes is different, so that the obtained class of experiments, namely class C and class control, is class A third-semester student of mathematics Education STKIP Muhammadiyah Bone. The data in this research is data about the learning outcomes through the use of an Edmodo with video conference, Jitsi Meet (JMEd) compared learning outcomes of students using an Edmodo course (ED). The type of test used in the research instrument in the form of the description.
The design in this study is a posttest-only control group design. This design was used because this study involved two groups; the groups are the experimental and control groups. These groups were given different treatments. The experimental design is described in Figure 1.

**Figure 1.** The experimental study design consists of O1 = test on experiment class, O2 = test on the control class, X1 = learning using the app Edmodo with Jitsi Meet (JMED), X2 = learning using the app Edmodo without Jitsi Meet (ED).

### 3. Results and Discussions

The use of the application Jitsi Meet as a replacement for face to face lectures on learning in the study from home to prevent the spread of the virus Covid-19 gives different nuances for the students in learning. The learning of descriptive statistics shows the positive impact that is not inferior to direct learning or through face-to-face in the lecture room.

#### 3.1. Description student learning outcomes

Student learning outcomes in subjects, descriptive statistics give the test students the material of central tendency. The test was given as many as 10 multiple choice questions with a difficulty level tiered. About the beginning of the matter easy until the hardest. Test 1 is only using the app Edmodo (ED) on the control class, while Test 2 is the learning by using app Edmodo is integrated with a video conference, Jitsi Meet (JMED) on the class experiment, each learning consists of 16 students (Table 1).

**Table 1.** The average test results

| Test   | Completely Right | Wrong | Highest | Lowest | Median |
|--------|------------------|-------|---------|--------|--------|
| Test 1 | 65.00            | 35.00 | 100     | 10     | 70     |
| Test 2 | 82.50            | 17.50 | 100     | 20     | 95     |

Based on the online test results, the results obtained are quite significant differences in students' understanding of the material central tendency between learning with JMED compared with learning using the learning ED. Learning with JMED shows the acquisition of a score of students is better compared to learning ED. The student's level of error in choosing the answers or solve a problem is greater on the learning ED than the learning of JMED, to the percentage the level of error smaller than 50% of learning that uses only e-learning Edmodo without an integrated with Jitsi Meet.
Figure 2 shows that errors in answering questions indicate that many students do not understand the material being taught, starting from the concept up to the completion of a matter. The results of test 1 gives the results of the correct answers (65%) than incorrect answers (35%). On test 2 correct answer (82.5%) and wrong answers (17.5%). Both of these tests showed that the application of learning with an Edmodo with the Jitsi Meet integration more effectively improves students' ability to answer questions related to the lecture material given.

3.2. Test prerequisites

Test prerequisites using the normality test of the data. Normality test data is useful to determine the data to be analyzed normal distribution or not. Normality test data in Table 2 using the test of Shapiro-wilk because of the amount of data to test 1 in-class experiment better and test 2 on the control class each data in under 30 students. If normal distribution of data will then be analyzed further using a parametric test. In this case, the parametric test used is one sample t-test, whereas if not normal distribution then testing the hypothesis using the test non-parametric, namely the Wilcoxon one-sample test. Testing normality of data using SPSS with a significance level of $\alpha = 5\%$ or $\alpha = 0.05$.

| Test  | Statistic | df | $p$   |
|-------|-----------|----|-------|
| Test 1| 0.891     | 16 | 0.057 |
| Test 2| 0.764     | 16 | 0.001 |

After The results of the normality test show test 1 the value of $p (0.057) > \alpha (0.05)$ and test 2 with the value of $p (0.001) < \alpha (0.05)$. It can be concluded that the test data 1 normal distribution whereas the data of test 2 are not normally distributed.

3.3. Hypothesis test

After the data is obtained, the second data will be analyzed further with a different test. Test 1 was applied using the analysis of one sample t-test, while on the test was analyzed with the Wilcoxon one-
sample test. The analysis of the second testing used a significance level \( \alpha = 0.05 \). The research hypothesis as follows.

- **Hypothesis I using the using statistical parametric one-sample \( t \)-test**
  
  \( H_0 \): the Use of Edmodo in the course of descriptive statistical error the students answer the questions with the average score \( (\mu_0) = 35 \)
  
  \( H_1 \): the Use of Edmodo in the course of descriptive statistical error the students answer the questions to achieve the average score \( (\mu_0) \) is less than 35

- **Hypothesis II using statistics the non-parametric Wilcoxon one sample test**
  
  \( H_0 \): the Use of Edmodo integrated application Jitsi Meet in the course of descriptive statistical error the students answer the questions with the average score \( (\mu_0) = 35 \)
  
  \( H_2 \): the Use of Edmodo integrated application Jitsi Meet in the course of descriptive statistical error the students answer the questions to achieve the average score \( (\mu_0) \) is less than 35

The rules of decision \( H_0 \) is accepted if \( p > \alpha \) and \( H_0 \) is rejected if \( p < \alpha \)

### 3.3.1. Analysis of one sample \( t \)-test

The analysis results using one-sample \( t \)-test to test hypothesis 1 (\( H_1 \)) obtained by value \( t \) calculate equal to 1.728 with a value of \( p \) of 0.105.

| Test                      | \( t \)  | \( df \) | \( p \)  | Difference average | Standard deviation |
|---------------------------|---------|---------|---------|--------------------|--------------------|
| The results of the study  | 6.636   | 15      | <0.001  | 30                 | 21.292             |

Based on the output Table 3 above one-sample \( t \)-test with a test value of 35 was obtained the conclusion that \( p < \alpha \) \((0.105 < 0.015)\) then according to the rules the decision of testing the hypothesis \( H_0 \) is accepted, it can be interpreted that the value of the average score of students' mistakes using e-learning with the Edmodo app Jitsi Meet is less than a score of 35.

### 3.3.2. Analysis of the Wilcoxon one-sample \( t \)-test

The results of the analysis using the Wilcoxon one-sample \( t \)-test to test hypothesis 2 (\( H_2 \)) obtained value Wilcoxon of 0.264 with a value of \( p \) equal to 0.04.

| Test                      | Results of study |
|---------------------------|------------------|
| N                         | 16               |
| Normal parameters of      | the average      |
|                           | 82.50            |
|                           | standard deviation |
|                           | 24.358           |
| Test statistic            | 0.264            |
| \( p \)                   | 0.004            |

Based on the output of Table 4, the hypothesis of the test was ran through Wilcoxon one sample test resulted in the conclusion that \( p > \alpha \) \((0.105 > 0.015)\). Then, according to the rules of the decision of testing the hypothesis \( H_0 \) is rejected, it can be interpreted that the average value of the score is the fault of the students who use learning e-learning with Edmodo integrated application Jitsi Meet is small or less than a score of 35.

The analysis results show that the use of e-learning Edmodo reduces the level of error of the students ' answers in completing the questions of central tendency. Both the analysis results indicate the rejection of the hypothesis null, which means the level of error the students after treatment show less than the limit value of the error i.e. a score of 35. However, the use of e-learning Edmodo is integrated with the application Jitsi Meet as an application of the video conference (JMED) showed
better results in favor of distance learning (study from home) with an error rate of students in answering questions is smaller than 50% compared to without using the application Jitsi meet (ED).

3.4. The difference score of errors students
The difference in the students' score was that they got wrong in answering the test given after the learning process was reviewed. The reviewing from the use of a web-based application that Edmodo integrated application Jitsi Meet (JMED) or without the use of Jitsi Meet (ED). The results show the integration with the Application Jitsi Meet gives better results. Better results are obtained from strengthening students' understanding through the absence of direct interaction between faculty and students via video conference by using the application Jitsi Meet. Students are more motivated to learn via video conference rather than using traditional instructions, all of which are also highly dependent on the educators (lecturers) in organizing lessons with both in it counts the experience of virtual learning which is inspiring and exciting that generates effective instructions [7]. The absence of face-to-face directly through the video conference facilitates the students to ask less understandable and easier things for the lecturer to review the tasks and exercises questions clearly or completely than through text, which usually tends to be the students understand the mistakes they experienced in completing the questions. The absence of faculty involvement in continuous mode will facilitate students to construct knowledge from experienced learning experiences. Online learning emphasizes the theory of constructivism the paradigm of constructive in terms of construction of knowledge and understanding, where the responsibility of learning is very dependent on the student [8], [9] [10]. The analysis results indicate that the integration of the application Jitsi Meet is better than just using the Edmodo course, this integration reduces the students' mistakes in answering questions by 50% as errors understand the form of the question the error procedure, as well as data errors.

3.5. The effectiveness of the Application Edmodo integrated with Jitsi Meet
The effectiveness of integrating the applications of video conference, Jitsi Meet with an Edmodo can be seen from the results of the average test scores of students of the class using the app Edmodo (JMED) and just use an Edmodo course (ED). Although the use of an Edmodo has full face-to-face online features are not owned, it is with similar apps such as Schoology and Google classroom. The study results found that without face-to-face or online learning, most of the students are still very difficult to understand the concept of matter, particularly the material of central tendency, the average student has a desire face-to-face. However, in the pandemic Covid-19, the situation has to apply the social distancing so that the entire campus was closed. Then the learning process has to apply distance learnings. Therefore, face-to-face is replaced with online via the application video conference using the Jitsi Meet. Use Jitsi Meet gives the students ease in consultation with the lecturer, especially of subjects descriptive statistics that need explanation and deep understanding that is not met using only e-learning Edmodo even has the feature of discussion (chat) but not maximum felt. This is in line with what is found by Valenti, Feldbush, & Mandernach, (2019) that using learning technology by using the system management learning is integrated with the video better than just using one medium only [11].

The advantages of an e-learning web-based Edmodo obtained during the learning online gives the ease of flexible time for students to repeat material that still felt less so that helps students who have memory slow in learning. The presence of online learning provides opportunities to learn the material and complete the task anywhere and anytime [12]. The course material for one semester has been available in the app Edmodo, so students can study them whenever. Learning with an Edmodo also provides a more positive attitude toward online learning [5]. However, in the absence of face-to-face, most of the student confused to understand the lecture material. This is reinforced from the students' preferences because almost 90% gave a response still requires the presence of direct interactions and feedback from lecturers. The Ucampusmade a certain rule in online learning, as one of the main factors. It affected the effectiveness of learning itself. So it involved such as presence, expertise, and support [13]. There is a need for learning evaluation and feedback in improving teaching and learning.
[14], [15]. The results of the analysis also indicate the differences where the integration with the application Jitsi Meet is more effective than only using an Edmodo course with an average score of 70 through learning with an Edmodo course (ED) with an average score of 95 through learning with utilizing an Edmodo is integrated with the application Jitsi Meet. So the application of e-learning web-based Edmodo with integrated with face-to-face online (video conference) using Jitsi Meet is very effective to help the students in understanding the lecture material. The value of the Education to be gained from online learning when contained collaboration, participation, and interaction [16], [17], as well as students, will achieve the learning objectives if they analyze, speculate and explore a problem to get to the option or alternative the answer to the question [18].

Learning is done by utilizing learning media online such as an Edmodo with Video Conference, Jitsi Meet as an alternative solution in delivering the material to students not only in the pandemic Covid-19 can also be implemented sustainably. This is in line proposed by [19] that learning online has a positive effect on motivation, self-reliance, participation, and improvement in understanding mathematical concepts compared with learning conventionally. From the research that has been done, there are some important notes in the transformed learning is online that attention and motivation teachers should continuously implant, feedback should always be done not only to evaluate learning but also related to personal contact in the development of fosters students. Media used is varied to support the student experience in learning to maximize the involvement of cognitive and minimize the risk of passivity, the consistency of the learning time should be considered not only the lecturer and also the students so that continuity of learning is maintained, and the final learning content is made as interesting as possible. To conclude, lecturers need to improve digital literacy in designing learning experiences that draw the students ' learning motivation to understand the lecture's teaching materials.

4. Conclusion
The Level of Error in the student answer the questions on the subjects of descriptive statistics with the material of central tendency through e-learning Edmodo with Jitsi meet (JMED) is shown the error rate is lower than without the use of the application Jitsi meet (ED). It is seen from the use of e-learning Edmodo that the e-learning is integrated with the application of Jitsi (JMED). Student learning outcomes is high, the average score of 95 or average level of the truth of the answers is 82.50 with an error rate of 17.50. Then, the score results were compared with the use of e-learning Edmodo without the use of the application Jitsi meet (ED) with the average student learning outcomes is 75 or the average level of the truth of the answers they amounted to 65, with the average error rate of 35. These Results show students' error rate can be reduced by 50% with the use of the application Jitsi meet. App Jitsi Meet is effectively used as a substitute for face-to-face lecturer in explaining the material and Steps of problem-solving as well as provide direct feedback to the students because only with the use of e-learning Edmodo is not enough. However, e-learning Edmodo has the features of the interaction of images, sound, and video, students still feel a lack without face-to-face with the lecturer. The effectiveness of the Use of Jitsi Meet in the learning reinforced from the preferences of the students from the results of a questionnaire given after the learning showed that 90% of students require face-to-face and feedback, so the app Edmodo by video conference Jitsi meet (JMED) is effective as a substitute for interaction between faculty (lecturer) and students in distance learning.

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