IMPROVING MATHEMATICS LEARNING OUTCOMES THROUGH THE USE OF PEN TABLET WITH ZOOM APPLICATION

Imroatus Sholekhah
SMAN 2 Tanggul, Jember
email: iimsmadata@gmail.com

Abstract

This Best Practice writing aims to describe the improvement of mathematics learning outcomes through the use of a Pen Tablet with the Zoom application. The subjects of this best practice writing are students of class XII MIPA-3 SMAN 2 Tanggul in the odd semester 2021/2022 academic year, totaling 34 students on the Derivatives of Trigonometric Functions. Quantitative data were obtained from quiz scores and daily tests using multiple choice written test techniques using Google Form. From the implementation of mathematics learning using a pen tablet and the Zoom application, an increase in student learning outcomes was obtained, seen from the average value and classical student learning completeness. The average score for quiz 1 is 64.12 and quiz 2 is 79.12. This means that from quiz 1 to quiz 2 there is an increase of 15% From quiz 2 with an average of 79.12 to daily tests to 86, 76 increased by 7.64% . Judging from the mastery of learning also increased. Quiz 1 learning completeness classically is 32.35%, quiz 2 is 70.59%, and daily test is 85.29%. This means that there is an increase from quiz 1 to quiz 2 by 38.24% while from quiz 2 to daily tests it increases by 14.7%. This best practice shows an increase in mathematics learning outcomes through the use of a Pen Tablet with the Zoom application, especially for class XII MIPA-3 students of SMAN 2 Tanggul in the odd semester of the 2021/2022 academic year.

Keywords: *Study result, pen tablet, zoom*

1. INTRODUCTION

Learning mathematics in the distance learning (PJJ)/online period which was held from March 16, 2020, somewhat made students experience difficulties in learning. In face-to-face learning the teacher can create a conducive classroom atmosphere that has a significant influence on student learning motivation, but this condition does not occur in online learning. Teachers and students who previously interacted directly in a free classroom, now have to interact in a limited virtual space so that it affects student learning outcomes. They are less motivated in learning so that student learning outcomes are low. This is supported by Wijayanti & Widodo (2021) and Noor & Munandar(2019), which stated that with the implementation of online learning, learning activities are hampered which results in a decrease in student learning outcomes, one of which is in mathematics. To overcome this, teachers are required to provide various learning strategies that are in accordance with online learning by creating a conducive, creative and innovative learning atmosphere. Teachers are required to use appropriate learning media so that students can understand the subject matter so that learning objectives can be achieved. Learning activities cannot be separated from learning methods. The selection of learning models and methods will determine the success of student learning. The method used should not be arbitrary, but must be in accordance with the learning objectives to be achieved (Rusmana & Isnaningrum, 2015). To overcome this, teachers are required to provide various learning strategies that are in accordance with online learning by creating a conducive, creative and innovative learning atmosphere. Teachers are required to use appropriate learning media so that students can understand the subject matter so that learning objectives can be achieved. Learning

activities cannot be separated from learning methods. The selection of learning models and methods will determine the success of student learning. The method used should not be arbitrary, but must be in accordance with the learning objectives to be achieved (Rusmana & Isnaningrum, 2015). To overcome this, teachers are required to provide various learning strategies that are in accordance with online learning by creating a conducive, creative and innovative learning atmosphere. Teachers are required to use appropriate learning media so that students can understand the subject matter so that learning objectives can be achieved. Learning activities cannot be separated from learning methods. The selection of learning models and methods will determine the success of student learning. The method used should not be arbitrary, but must be in accordance with the learning objectives to be achieved (Rusmana & Isnaningrum, 2015). Teachers are required to use appropriate learning media so that students can understand the subject matter so that learning objectives can be achieved. Learning activities cannot be separated from learning methods. The selection of learning models and methods will determine the success of student learning. The method used should not be arbitrary, but must be in accordance with the learning objectives to be achieved (Rusmana & Isnaningrum, 2015). Teachers are required to use appropriate learning media so that students can understand the subject matter so that learning objectives can be achieved. Learning activities cannot be separated from learning methods. The selection of learning models and methods will determine the success of student learning. The method used should not be arbitrary, but must be in accordance with the learning objectives to be achieved (Rusmana & Isnaningrum, 2015).

To accommodate these needs, it is necessary to choose the right learning media, namely media that are able to clarify the presentation of messages so that students are motivated to learn even though they are learning online. Online learning media that have been used by most teachers include WhatsApp, Google Classroom, Zoom, Google meet and others. Most teachers use teaching materials in the form of Power Points and learning videos. Learning videos can be made by the teacher themselves, uploaded from YouTube or obtained from educational TV sites, e-learning and others, because learning videos are considered to be able to meet the needs of students in online learning such as the article written by Machfud (2021), about the effectiveness of using learning video media during the covid 19 pandemic.

The author agrees that learning videos are effective for all subjects because they can reduce student boredom. However, for learning mathematics, especially at SMAN 2 Tanggul, based on the author's experience learning using learning videos is still not able to achieve the expected learning outcomes as obtained when face to face, because in face-to-face learning students are accustomed to receiving material based on an explanation from the teacher directly written in steps. step by step on the board. For this reason, the author took the initiative to use a Pen Tablet in explaining the subject matter according to the characteristics of students and the characteristics of the subject matter and student learning styles. In online learning, the Pen Tablet can replace the function of the whiteboard in class so that the teacher can explain step by step according to students' abilities, just like learning in class, the only difference is that the use of the Pen Tablet is done virtually with the help of the Zoom application.

In practice, the author uses a Pen Tablet with the Zoom application to support the needs of students and teachers. The use of the Pen Tablet and the Zoom application has a meaningful function for the author because it affects students' learning motivation. Sudjana and Rivai quoted by Sundayana, regarding the function of learning media state that learning media is one of the elements that must be developed by educators in realizing an effective teaching and learning situation which is an integral part of the overall teaching situation, where in its use it must look at the objectives and subject matter, its use must also be able to complement the learning process so that it attracts the attention of students, so that it can accelerate the learning process and can help students understand the material presented by the teacher (Sundayana, 2010). 2013). Based on the media function expressed by Sudjana and

Rivai, the selection of Pen Tablet media using the Zoom application is considered to have a function that can help students learn in a pleasant atmosphere and make them more motivated so that students can understand concrete to abstract material and in the end the learning objectives well achieved.

With the Pen Tablet, learning mathematics, especially for class XII MIPA-3 students, becomes more fun, because learning is almost the same as learning in class. Teachers and students can ask questions directly in solving a math problem to completion. Learning using a Pen Tablet with Zoom can be recorded by the teacher and the recording can be played back by students so that students can understand the subject matter being studied and their learning outcomes have increased. The learning recording results are uploaded in Google Classroom so that students who do not follow the zoom can see the learning process through the recording.

Based on the above background, the purpose of writing Best Practice is to describe the author's experience in using a Pen Tablet with a zoom application to improve students' mathematics learning outcomes on the material of Derivatives of Trigonometric Functions.

2. RESEARCH AND METHOD

This Best Practice report is written based on the best experiences in an effort to improve students' mathematics learning outcomes that the authors have done during online learning. The data in this Best Practice is in the form of quantitative data obtained from quiz scores and students' daily tests using multiple-choice written test techniques using Google Forma. The results of the data acquisition were analyzed and described in the form of tables and graphs.

*Best Practice*implemented at SMAN 2 Tanggul in the odd semester of the 2021/2022 academic year in class XII MIPA-3, totaling 34 students, from July 15 to September 8, 2021. The material taught is the material for Derivatives of Trigonometric Functions. The author uses a Laptop, Android cellphone and Pen Tablet with the Zoom application as an online learning medium. The author also uses whatsapp groups to convey information and consultations as well as Google Classroom for providing materials and assignments. Students collect assignments given by the teacher through Google Classroom.

3. RESULT AND DISCUSSION

a. Result

This *Best Practice* has been carried out on 34 students of class XII MIPA-3 SMAN 2 Tanggul for the 2021/2022 academic year in the odd semester. Before online learning begins, the teacher has uploaded the Specialized Mathematics Module for class XII in Pdf format on Google Classroom. With this module, students are expected to be able to study independently at home.

This learning is carried out for 18 hours of lessons @ 45 minutes which is divided into 9 meetings with 6 meetings for the implementation of learning and 3 meetings for the implementation of quizzes and daily tests. Learning will take place from 15 July to 8 September 2021 with the following schedule:

Table 1. Learning Schedule

No.	Meeting	Date and time	Resource materials
1	1	Thursday, July 15, 2021	Basic Formulas for Derivatives of Trigonometric Functions and Their Properties
2	2	Thursday, July 22, 2021	Quiz 1
3	3	Thursday, July 29, 2021	Tangent Slope
4	4	Thursday, August 5, 2021	Monotone of Function
5	5	Thursday, 12 August 2021	Quiz 2
6	6	Thursday, August 19, 2021	Minimum Maximum Value
7	7	Thursday, August 26, 2021	Concave Trigonometric Functions
8	8	Thursday, September 1, 2021	Application of Derivatives of Trigonometric Functions
9	9	Thursday, September 8, 2021	Daily Derivative Trigonometric Functions

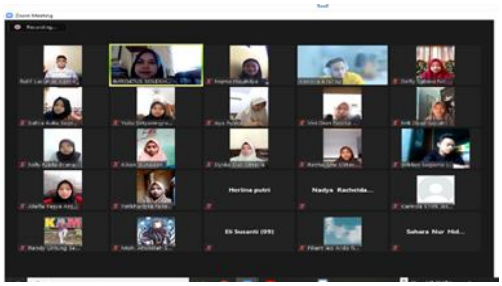
At the first meeting, the teacher provided material in the form of learning videos through Google Classroom (GCR) and students were asked to write their names on the Google Classroom forum in the comments column to make sure they had watched the

video and as a complete student attendance. The learning video is obtained from the m4th-lab Youtube channel. At the 2nd meeting, the teacher took quiz 1 through Google Form. The data from the results of quiz 1 is used as initial data when learning has not used the Pen Tablet and the Zoom application. At the 3rd and 4th meetings, the teacher gave the material directly using a Pen Tablet with the help of the Zoom application with each meeting for 90 minutes (2 x 45 minutes). With the Pen Tablet students explained in detail the material being studied. Next, a question and answer session was conducted for students who did not understand the teacher's explanation. The teacher also provides materials and independent assignments in Google Classroom so that students who cannot take Zoom can learn the material through GCR. Assignments are submitted through the GCR and teachers can provide feedback on assignments submitted by students. . At the 5th meeting, the teacher carried out quiz 2 via Google Form. The data from the results of quiz 2 is used as comparison data when learning is already using Pen Tablet and Zoom. At the 6th to 8th meeting, the teacher also carried out direct learning using a Pen Tablet and Zoom. At the 9th meeting, a daily test of the Derivatives of Trigonometric Functions was held. Assignments are submitted through the GCR and teachers can provide feedback on assignments submitted by students. . At the 5th meeting, the teacher carried out quiz 2 via Google Form. The data from the results of quiz 2 is used as comparison data when learning is already using Pen Tablet and Zoom. At the 6th to 8th meeting, the teacher also carried out direct learning using a Pen Tablet and Zoom. At the 9th meeting, a daily test of the Derivatives of Trigonometric Functions was held. Assignments are submitted through the GCR and teachers can provide feedback on assignments submitted by students. . At the 5th meeting, the teacher carried out quiz 2 via Google Form. The data from the results of quiz 2 is used as comparison data when learning is already using Pen Tablet and Zoom. At the 6th to 8th meeting, the teacher also carried out direct learning using a Pen Tablet and Zoom. At the 9th meeting, a daily test of the Derivatives of Trigonometric Functions was held.

The following are the steps for learning to use the Pen Tablet with the Zoom application: (1) Connect the Pen Tablet to the laptop; (2) Open the Chrome browser on the laptop; (3) Select Zoom on the Google menu; (4) Click start a meeting, create a meeting invitation and share it to the student's WA group; (5). After all students are confirmed to enter, click record meeting to record learning activities; (6) In the preliminary activity, before starting the lesson the teacher performs apperception such as: praying, checking student attendance, and motivating students by asking questions related to the learning material followed by conveying the basic competencies and learning objectives; (7) In the core activity, students are ready to receive explanations from the teacher, click more options at the bottom of the screen, select whiteboard, click start a new whiteboard and we will get Jamboard File; (8). When explaining the material by giving examples of questions and the steps to solve them, the teacher continues to interact with students and let the questions be solved together so that students always concentrate during the learning process, ending with congratulation for students who can solve the questions correctly; (9). The teacher gives practice questions for each student to work on, and the results are discussed together; (10) In the closing activity, the teacher guides students to make a summary of the material that has been studied. The teacher advises students to ask questions through the whatsapp group if there is an explanation of the material or examples of questions that are still not understood during learning; (11) The teacher closes the learning activities and students are allowed to leave the meeting with greetings; (12) Select stop recording to complete the learning recording process.

To strengthen the results of the implementation of Best Practice, the following authors present documentation of its implementation, including screenshots of student photos and screenshots of one of the materials being taught.

Figure 1. Photos of Students While Learning with Zoom

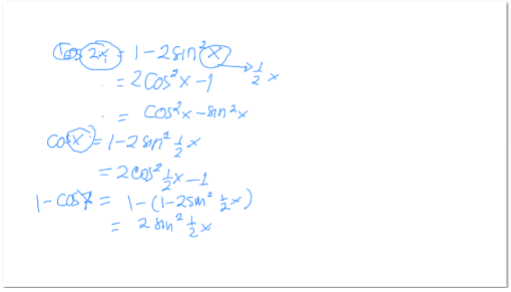


The picture shows photos of students who are present in the lesson. When learning takes place the teacher explains the material as well as makes observations of students, the teacher always records students who are actively asking questions and students who complete practice questions during meetings. At every meeting not all students can attend because the student concerned is being constrained by quotas and networks. Most of the students actively participated in the learning step by step until the learning was completed. Students seemed enthusiastic in listening to the material even though some of them were hampered by internet connection, but all of that could be resolved immediately.

Figure 2. Display of Pen Tablet scribbles

The picture shows the teacher sharing a screen while explaining the material being taught using a Pen Tablet, namely the material for the Derivatives of Trigonometric Functions. In this material the teacher can provide scribbles to increase student understanding. Teachers can also use a blank screen to more freely explain student questions as shown in the following picture.

Figure 3. Pen Tablet Scribbles on a Blank Board



In the following, the results of the written tests carried out by the author on quiz 1, quiz 2, and the daily test of the derivatives of trigonometric functions are presented.

Table 2. Student Learning Outcomes

NO	DESCRIPTION	AVERAGE VALUE	NUMBER OF STUDENTS COMPLETE (Value 75)	MASTERY LEARNING (%)
1	Quiz 1	64.12	11	32.35
2	Quiz 2	79.12	24	70.59
3	Daily tests	86.76	29	85.29

b. Discussion

The Minimum Completeness Criteria (KKM) in mathematics is 75. In Table 2 above, it can be seen that the average score obtained by students on quiz 1 is 64.12. This shows that the average score obtained by students is still far from the KKM. This means that the use of learning videos distributed to students through Google Classroom has not been able to improve students' mathematics learning outcomes to the maximum. With such a technique, the teacher cannot monitor how many students download and listen to the learning video. Students are only given videos, absent themselves in Google Classroom after that they work on questions. Discussion of practice questions is carried out in writing and distributed in Google Classroom. Under these conditions, learning cannot run well.

With the competence of the teacher in the field of technology and a strong desire to improve student learning outcomes while online on the Derivative of Trigonometric Functions material, student learning outcomes from quiz 1 to quiz 2 and from quiz 2 to daily tests have increased significantly because their learning uses a Pen Tablet. with the help of the Zoom app. When explaining the material by providing examples of questions and the steps to solve them, the teacher continues to interact with students and motivates students to solve problems together so that students play an active role and concentrate on the material they are learning, plus the rewards that the teacher gives when students are able to solve the questions correctly. make students happy and excited to learn.

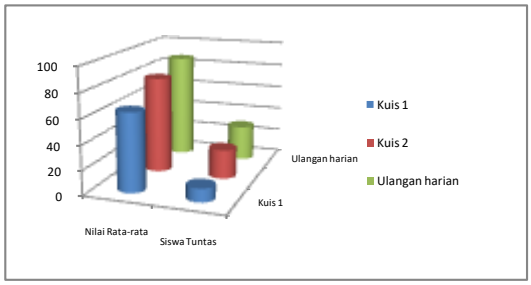
There was an increase in the average score from 64.12 to 79.12. There is an

increase of 15%. and the average has reached the KKM score. In classical learning completeness also increased by 38.24%, from 32.25% to 70.59%. From quiz 2 to the daily test, the average score still increased by 7.64%, from 79.12 to 86.76. His classical learning completeness also increased by 14.7%. With a Pen Tablet during a meeting, the learning steps and the atmosphere are not much different from the learning atmosphere in the classroom, except that this learning takes place virtually.

Based on the description, it is proven that the use of the Pen Tablet with the Zoom application is able to provide convenience and clarity for the material given to students and is able to increase student activity in learning, so that learning outcomes also increase. With the Pen Tablet students are given an explanation of the material like in class, even more than that the material that has been taught can be repeated by students as needed because learning can be recorded and made into a video, and is able to strengthen students' understanding of the learning material. This increase in learning outcomes cannot be separated from the use of more than one media, namely Pen Tablet, Zoom application, WhatsApp, Google Classroom, and Modules. This is in line with the opinion of Zaidah (2021), that learning information requires more than one medium to encourage students to understand online learning and the more often educators approach it, the better the response will be. The approach that occurs in this Best Practice is the existence of effective learning steps that the teacher creates and communication between teachers and students when explaining the material in a Zoom Meeting using a Pen Tablet. Thus, the use of the Pen Tablet is considered effective for learning mathematics.

In general, this Best Practice supports the findings of the Best Practice conducted by Mafidah (2021) with the title "The Effectiveness of Mathematics Learning Videos on Three Dimensional Materials Using Pen Tablets". In Best Practice, students' learning outcomes increased after being given treatment in the form of learning videos made using Pen Tablets. The difference with this Best Practice is that the Pen Tablet is used directly with Zoom Meetings, at the same time students interact and see the steps that the teacher gives directly. Thus, it is clear that the use of a Pen Tablet with Zoom Meeting can improve students' mathematics learning outcomes as shown in the following graph.

Figure 3. Graph of Improving Student Learning Outcomes



4. CONCLUSIONS

Based on the results and discussion above, the following conclusions can be drawn:

1. *Pen Tablets with the Zoom application can be used as an effective distance learning medium, especially for mathematics,*
2. The use of a Pen Tablet with Zoom Meeting can increase student activity in learning mathematics.
3. The use of a Pen Tablet with Zoom Meeting can improve students' mathematics learning outcomes.
4. The use of a Pen Tablet with Zoom Meeting has a good impact on improving the quality of mathematics learning, especially for class XII MIPA-3 students of SMAN 2 Tanggul.

5. REFERENCE

Abdillah, L. A., & Darma, U. B. 2020. *Online Learning Menggunakan Zoom Teleconference.*

Dimyati dan Mudjiono. 2006. *Belajar dan Pembelajaran*. Jakarta: PT Rineke Cipta.

Ernes, Stella. 2017. *Saat Aku Besar Nanti: Aku Ingin Menjadi Desainer Grafis*. Jakarta : Buana Ilmu Popular.

Hamalik, Oemar. 2008. *Dasar-Dasar Pengembangan Kurikulum*. Bandung: PT Remaja Rosdakarya.

Martini, Noywuli dkk. 2021. *Membangun Pembelajaran Merdeka Belajar dan Kampus Merdeka di pergunruan Tinggi-Pemamfaatan Kemajuan*

Teknologi Melalui Aplikasi Zoom pada Pembelajaran OnLine.. Bandung. CV. Media Sains Indonesia.

Machfud. 2021. *Efektivitas Penggunaan Media Video Pembelajaran di SMP Negeri 2 Tarakan Pada Masa Pandemi Covid-19*. *Edutech : Jurnal Inovasi pendidikan Berbantuan Teknologi*. Vol 1. Hal 181 – 183.

Mafidah, Evi. 2021. *Video Pembelajaran Matematika pada Materi Dimensi Tiga dengan Menggunakan Pen Tablet*. Secondary : Jurnal Inovasi Pendidikan Menengah. Vol 1. Hal 319-321

Noor, N., & Munandar, I. 2019. *Pengaruh Model Pembelajaran Kooperatif (Tipe TAI dan TPS) dan Aktivitas Belajar terhadap Hasil Belajar Matematika: Eksperimen Pada Kelas X SMK Kosgoro Karawang*. Jurnal Ilmu Pendidikan (JIP) STKIP Kusuma Negara Jakarta, *11*(1), 65-75.

Rusmana, I. M., & Isnaningrum, I. 2015. *Efektifitas Penggunaan Media ICT dalam Peningkatan Pemahaman Konsep Matematika*. Formatif: Jurnal Ilmiah Pendidikan MIPA, 2(3), 198-205.

Slameto. 2010. *Belajar dan Faktor-Faktor yang Mempengaruhi.* Jakarta: PT Rineka Cipta.

Sudjana, Nana. 2001. *Penilaian Hasil Proses Belajar Mengajar*. Bandung: PT Remaja Rosdakarya.

Sundayana, Rostiana. 2013. *Media Pembelajaran Matematika (Untuk Guru, Calon Guru, Orang Tua dan Para Pencinta Matematika).* Bandung : Alfabeta.

Suprijono, Agus. 2010. *Cooperative Learning Teori dan Aplikasi*. Jakarta: Pustaka Jaya.

Surya, H.M. 2008. *Kapita Selekta Kependidikan SD*. Jakarta: Universitas Terbuka.

Wijayanti, N., & Widodo, S. A. 2021. *Studi Korelasi Motivasi Belajar terhadap Hasil Belajar Matematika Selama Daring.* Journal of Instructional Mathematics, *2*(1), 1-9.