

IMPLEMENTATION OF ONLINE LEARNING FOR STATISTICS SUBJECT IN GRADE VIII STUDENTS WITH A SCIENTIFIC APPROACH

Mila Zamilatun Muna¹, Rifqi Aulia Miftahudin²

¹ IKIP Siliwangi, Indonesia
mielazamilatun15@gmail.com

² MTsS YABIS Pasirlangu, Indonesia
rifkiaulia764@gmail.com

Article Info

Article History

Received: 12-02-2023

Revised: 15-03-2023

Accepted: 15-03-2023

Keywords

Implementation;
Online Learning;
Scientific approach;
Statistic

Corresponding Author

Rifqi Aulia Miftahudin,
MTsS YABIS Pasirlangu
Kabupaten Bandung Barat,
Indonesia
Rifkiaulia764@gmail.com

Abstract

Scientific approach is a learning approach that uses problem in everyday life. The first scientific learning step is observing, the second is asking questions, the third is gathering information, the fourth is reasoning or trying, and the fifth is communicating. The method of this research is descriptive qualitative research which aims to describe the process of implementing online learning statistics material for grade VIII junior High school students with a scientific approach. Based on the results of the research, it shows that the implementation of learning is in accordance with the scenarios that have been prepared in lesson plan and worksheet.

How to Cite:

Muna, M. Z., & Miftahudin, R. A. (2023). Implementation of online learning for statistics subject in grade VIII students with a scientific approach. *Pi-Radian Journal*, 1(1), 25-34.

INTRODUCTION

Mathematics is one of the disciplines in the world of education and is a highly important field of study. The role of mathematics in education is significant. However, fundamentally, students still find difficulty grasping mathematical concepts. Statistics is one of the subjects taught in both junior high school (SMP) and senior high school (SMA) levels. Statistics is considered a core subject in the curriculum as it is deemed crucial and practical in everyday life. It is utilized in various scientific fields such as economics, sociology, health, and the business world. According to Febrianti & Chotimah (2020), statistics is generally defined as a specialized science that develops techniques for processing numbers, studies data, and explores ways to analyze it.

Because mathematics serves as a tool for intellectual development in education and has a significant impact on the advancement of science and technology, particularly during the current Covid-19 pandemic, learning is conducted online or in a network. This involves

the use of technology such as computers/laptops, smartphones, and other facilities that utilize the internet. In Indonesia, online learning has been implemented since March 24, 2020, in accordance with the decision of the Minister of Education and Culture of the Republic of Indonesia. The shift to online learning is an effort to mitigate the spread of the Covid-19 virus.

As online learning utilizes the internet, teachers and students can interact online, meaning there is no direct physical contact and it encourages the practice of social distancing. According to Stein (Sadikin & Hamidah, 2020), practicing social distancing is a good solution to prevent the spread of the Covid-19 virus. This policy has impacted the learning process in schools, especially for students, teachers, and parents. The traditional learning process that involves only teachers and students now requires parents to adapt to providing support for their children during online learning.

The efforts of teachers in achieving successful learning are crucial. Therefore, the selection of models, methods, strategies, or learning approaches is of utmost importance. One of the learning approaches developed in line with the implementation of the 2013 Curriculum is the scientific approach. The Minister of Education and Culture (Kamal, 2015) applies the concept that learning with a scientific approach has components, namely observing, questioning, gathering information, reasoning, and communicating.

With the scientific approach, students are expected to be motivated to observe phenomena around them, take note of or identify facts, and formulate problems through the questioning process. From these steps, it is hoped that students can formulate the problems they want to understand. Therefore, the aim of this research is to determine the implementation of online learning on the subject of statistics for eighth-grade junior high school students using the scientific approach.

METHOD

This study is qualitative descriptive research aimed at depicting the efforts made by teachers to improve the quality of online learning in statistics for eighth-grade junior high school students using a scientific approach. According to Best, descriptive method is a research method that describes and explains an object according to its reality. Meanwhile, according to Arikunto (Herni Yanita, 2016), descriptive research is intended to investigate a situation, condition, and other things. The research subjects are 20 eighth-grade junior high school students in one of the schools in the city of Bandung.

The research procedure includes the following steps: 1) preparation phase, where the researcher prepares the research instruments; 2) implementation phase, where the researcher conducts online learning using the scientific approach according to the prepared lesson plan; 3) evaluation phase, where the researcher collects, corrects, processes, analyzes, and concludes the data. The scientific approach steps outlined by Nur (Rhosalia, 2017) include, among others:

Table 1. Steps of Scientific Learning Approach

Steps	Learning Activities
Observing	Observing is an activity that involves using one or more senses in our body. For example, watching a video, smelling an aroma or scent, touching a surface, and so on. The result of the observing

	process is called evidence or data. In the observing phase, students are expected to independently discover facts about the observed objects and the learning material.
Questioning	In the questioning activity, the teacher provides an opportunity for students to ask questions about what has been observed. These questions serve as a basis for finding further information from various sources. By asking questions, students can develop self-confidence, curiosity, and the ability to formulate questions. Through questioning, the learning process becomes interactive rather than monotonous or one-directional, fostering interaction between the teacher and students as well as among students.
Gathering Information	Gathering information is an activity that follows the questioning process. This activity involves collecting information from various available sources, including books, the internet, and even firsthand field observations. Through this activity, students can obtain various information by reading books, conducting experiments, observing phenomena, and even interviewing in the field.
Associating (Reasoning)	Reasoning is the activity of processing the information collected from experiments and observations, as well as from gathering information. This activity is carried out to find connections between one piece of information and another. It develops a careful attitude and the ability to apply procedures and think critically in drawing conclusions.
Communicating	Communicating activities can be done by writing or narrating observation results, presenting conclusions based on analysis either orally, in writing, or through other media. It develops a careful attitude and enhances systematic thinking skills while expressing opinions.

RESULTS AND DISCUSSION

The research on online learning in statistics implementing the scientific approach was conducted over 8 sessions. The online learning platforms used in the school were WhatsApp and Zoom applications. The introductory activities took approximately ten minutes through the WhatsApp Group. The teacher initiated the session by giving greetings, checking student attendance, praying, and stating the learning objectives. If the learning session was conducted via Zoom Meeting, the teacher provided the link in advance before the session started.

The teacher connected the upcoming material with students' experiences and engaged in A question-and-answer session. Following that, the teacher motivated students by explaining the practical benefits of statistics in daily life and encouraged them to study diligently while maintaining their health during the pandemic. The core activities were conducted after the introductory session. The teacher provided Learning and Practice Sheets (LKPD) related to statistics learning using the scientific approach through WhatsApp Group or Zoom. The steps were as follows:

First, observing. The observing stage involves looking, reading, listening, and paying attention to things or phenomena in the surrounding environment. By observing, students will identify various problems.



Figure 1. Observing

In the observing stage of the aforementioned Learning and Practice Sheets (LKPD), students are guided to observe a nearby hospital. The goal of this step is for students to identify issues present in that hospital. Here, students are directed to observe COVID-19 patients specifically. Students attempt to complete the tasks given by the teacher.

Next Questioning. In the questioning stage, students are encouraged to ask questions or formulate problems. The teacher's role in this questioning stage is to motivate students without pressuring them to ask questions and to praise students for their inquiries.



Figure 2. Questioning

After observing one of the nearest hospitals or health centers, students are guided to generate various questions. The aim is to help students comprehend the issues they observed concerning COVID-19 patients in that hospital. The questions created by students can take various forms, such as interviews with sources or surveys. Students are free to ask anyone to gather information.

Gathering Information (Experimenting), Experimenting means taking action to solve a problem. The trying stage can be carried out through experiments. In this stage, the teacher plays the role of a mentor in assisting students in conducting experiments.

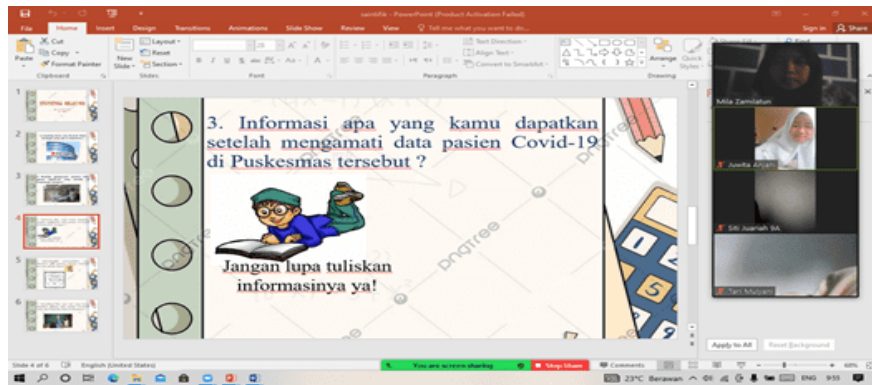


Figure 3. Gathering Information

In the process of gathering information, the teacher instructs students to document the data obtained from the previous process regarding the COVID-19 data in that hospital. This step can be carried out by collecting the results from interviews or surveys conducted earlier. The information gathered is expected to help students understand the issues they observed.

Analyzing/Processing Information, analyzing means reasoning, understanding, and linking one concept to another. Students are encouraged to explore various reference sources, both manually and digitally, to process the experimental data. Ultimately, a conclusion is drawn from the formulation of the problem. The teacher's role in this stage is to monitor the students.



Figure 4. Analyzing

In the trying/reasoning stage, students are presented with questions related to COVID-19 patient data that are relevant to statistical concepts. The teacher, as a facilitator, provides a brief explanation of the related material. The teacher guides students to connect the collected data with statistical concepts, enabling them to draw conclusions from the presented problem.

Communicating, communicating means presenting or showcasing the processed work. The teacher's role in this stage is to appreciate and reinforce the concepts discovered by students.



Figure 5. Communicating

In this stage, students are asked to communicate the results of the obtained data and draw conclusions regarding the relationship between the data and statistical concepts. Students can communicate their findings in the form of reports or summaries, which are then submitted to the teacher. Students are guided in compiling these results, starting from the process, outcomes, to the conclusions. Subsequently, the teacher can appreciate or provide feedback on the students' work.

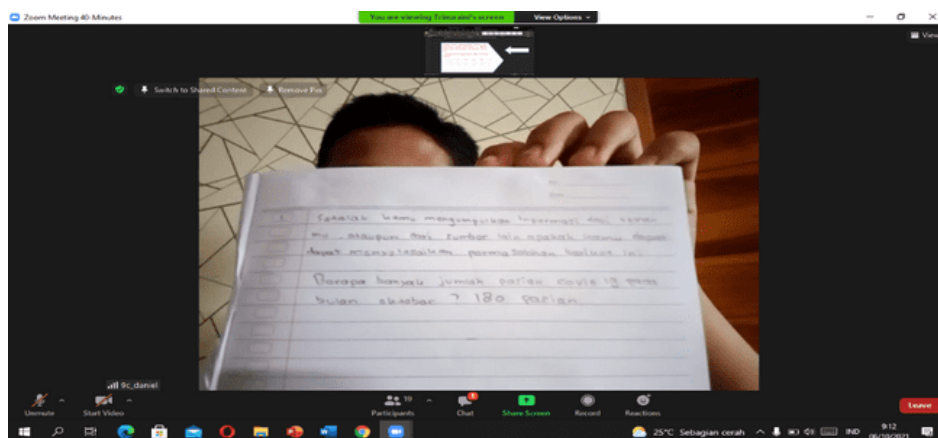


Figure 6. Students give the answer and summary

Here is an example of a student who shares the results of the data they obtained and bravely communicates it to their peers. Such behavior is commendable to motivate other students. The final activity conducted is the closing session. The teacher, along with the students, summarizes the material that has been learned. Students write a summary of the learning experience. The teacher reflects on online learning, and it is hoped that students gain insights and benefits from online learning. Students are evaluated to determine the completeness of the learning objectives. The teacher concludes the lesson by inviting students to pray and exchanging greetings.

To assess the results of implementing online learning on the topic of statistics using the scientific approach, the researcher prepared observation sheets for both teachers and students. The following is a summary of the observations made during the learning sessions.

Table 2. Recapitulation of Teacher and Student Observation Results

Observation	Observation Results of Meeting Number -								Average	Interpretation
	1	2	3	4	5	6	7	8		
Teacher	85%	90%	92%	85%	92%	92%	92%	85%	90%	Excellent
Student	90%	92%	92%	83%	92%	92%	92%	83%	89%	Excellent

Based on the recapitulation table of observation results for teachers and students above, it shows that the average score for teachers is 90%, and the average score for students is 89%. Therefore, it is concluded that overall, the Implementation of Online Learning in Statistics for Eighth-grade Students at SMP Negeri 55 Bandung with a Scientific Approach can be implemented successfully.

Based on the research data on the scenario and implementation of online learning in statistics for eighth-grade students using the scientific approach, it went well. Each meeting involved online learning using the Zoom Meeting platform for communication with students and the use of the WhatsApp Group for the distribution and collection of worksheets.

Learning activities are a conscious process based on planning, implementation, and evaluation activities. Therefore, every teacher is expected to be able to create a good lesson plan, implement the lesson according to the plan, and conduct evaluations to assess student achievement. According to Darmadi (Nursalam, 2016), teaching preparation planning aims to encourage teachers to be ready to conduct lessons with thorough planning. The study on statistical material using the scientific approach was conducted over 8 online meetings and followed the stages outlined in the Lesson Implementation Plan (RPP).

In the first meeting, students appeared enthusiastic about participating in the learning. The learning process went well. However, in subsequent meetings, some students were unable to attend. In each meeting, there was interaction between the teacher and students. Students seemed more active at this stage, although not all students were active. Therefore, teachers must create an atmosphere in such a way that students actively ask questions, enabling them to build new ideas and engage in activities that provide direct experience. Thus, learners are encouraged to take responsibility for their learning process. Active learning strategies can also be interpreted as a learning activity that must be carried out by both teachers and students to help improve students' abilities in listening, observing, asking questions, and discussing, so that learning goals can be achieved effectively and efficiently (Hamruni, Pernantah, 2019).

The scientific approach is a learning process designed in such a way that students actively construct concepts or principles through stages of observing, formulating problems, collecting data, analyzing data, drawing conclusions, and communicating the concepts found. The scientific approach involves students in problem-solving activities. According to Pebriyanti, Afrilianto, & Rosyana (2021), the advantages of the scientific approach are that it can develop all three domains (cognitive, affective, and psychomotor) simultaneously. The steps of the scientific approach are as follows:

The first activity in the scientific approach is observing. Observing or observation is the activity of looking, observing carefully, and understanding knowledge about an existing problem. Students are given a problem and guided to observe that problem. The goal is to stimulate students' curiosity so that they can discover new knowledge. According to Piaget (Rudi Susilana, 2014), children are active learners who are always interested in observing to understand the world. Thus, observation is the beginning of the formation of their knowledge.

During the observation activity, students showed great enthusiasm because they were eager to learn more. The teacher facilitated students to pay attention to things they considered important in an object or problem. However, there were still students who hesitated to carry out the observation. The role of a teacher is crucial in motivating these students to be brave and not afraid of making mistakes.

The second step in the scientific approach is asking questions. At this stage, students are guided to ask questions about information that cannot be understood from what they have observed or questions to obtain information about the observed problem. According to Munastiwi (2015), asking is an activity of seeking information or matching existing knowledge with new knowledge. In this stage, many students ask various questions, and some questions might be new for the teacher. At this stage, the teacher must be ready to provide answers so that students can achieve the results they desire.

The third step in the scientific approach is collecting information. The activity involves conducting experiments or obtaining data needed from various sources using various methods. Students can read books, browse the internet, interview experts, or search for other sources of information. According to Abdul Majid (Izzuddin, 2021), in this activity, students are expected to develop attitudes such as diligence, honesty, politeness, respect for others' opinions, communication skills, and the ability to collect information in various ways. The teacher guides students to collect as much information as possible to ensure more accurate results and reminds them to always take notes of the information they gather.

The fourth step is reasoning. According to Saminanto (Ayuni, 2015), reasoning is a logical and systematic thinking process based on the facts obtained to gain conclusions in the form of knowledge. The information collected from previous activities is then processed by considering the breadth and depth of the material. This is done to identify the connections between one piece of information and another.

The fifth step is communicating. The learning activity involves presenting the results of observations, conclusions based on analysis in oral, written, or other media forms. In this stage, students showcase their abilities regarding what they have learned. According to Sani (Wida Khusnul Solikha, Martini, 2022), communicating is the activity of expressing observations or conclusions through oral, written, photos, or videos. The teacher motivates students to express their opinions. In this stage, students are actively involved, although there may still be some who are hesitant to share their opinions.

In line with the research conducted by Mahmudah (2016), the learning process with a scientific approach to statistics material can improve students' learning outcomes. As demonstrated by this study, the results of implementing online learning for statistics

material using the scientific approach show positive outcomes. Based on Table 2, the observation results obtained over 8 meetings were interpreted as very good for both teacher and student observations. This indicates the effectiveness of online statistics learning using the scientific approach. According to several studies, it can be concluded that the implementation of the scientific approach has a positive impact on the improvement of students' knowledge and attitudes, as mentioned by Sutiarso (2020).

CONCLUSION

Based on the results and discussions above, it can be concluded that the Implementation of Online Learning for Statistics Material in Grade VIII Junior High School Students with a Scientific Approach conducted at SMP Negeri 55 Bandung for 8 meetings is not yet optimal but shows good results. Therefore, based on the above conclusions, the researcher suggests that online learning with a scientific approach to statistics material can be considered an alternative in mathematics education to provide students with a conceptual understanding using everyday life contexts and offer a different learning experience. Based on the results and discussions above, it can be concluded that the Implementation of Online Learning for Statistics Material in Grade VIII Junior High School Students with a Scientific Approach conducted at SMP Negeri 55 Bandung for 8 meetings is not yet optimal but shows good results. Therefore, based on the above conclusions, the researcher suggests that online learning with a scientific approach to statistics material can be considered an alternative in mathematics education to provide students with a conceptual understanding using everyday life contexts and offer a different learning experience.

ACKNOWLEDGMENTS

The author extends heartfelt thanks to the entire family for providing both moral and material support. Also, gratitude is expressed to my supervisor for the time and opportunities given, allowing this article to be completed. May this article be beneficial for the author and, specifically, for the readers.

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