Application of Online Science Practicum by Using Microsoft Teams and Learning Management System (LMS) During the Covid 19 Pandemic

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Abstract. The research objective of this is to see how to apply science practicum online using Microsoft Teams and Learning Management System (LMS). The form of this research is classroom action research which aims to apply the online science practicum during the Covid 19 pandemic. Therefore, it is carried out using two cycles in the application of online science practicum. The subjects of this study were students of the seventh semester in the Natural Science practicum course. Through observation and evaluation, it is shown that in the cycle I the percentage of practicum implementation which includes aspects of preparation, process and data and practicum results is 87.5%, in cycle II it has increased to 92.5%. In the assessment aspect of the practicum report, the average practicum assessment obtained in the first cycle was 3.09 from the highest score of 4 and in the second cycle was 3.7, while the aspect of student knowledge about the use of the Microsoft team which was taken using google form was 93%. In the aspect of student knowledge about the use of Learning Management System (LMS) by 75% and aspects of student understanding in the implementation of online science practicum using Microsoft Teams by 75%.

1. Introduction
The COVID-19 pandemic has changed the way of teaching and learning in Indonesia, lecturers and teachers are competing to find alternatives and learning innovations during the COVID-19 pandemic [1]. The alternative used is of course IT-based where during the COVID-19 pandemic, face-to-face learning is not allowed because it is to avoid the transmission of the corona virus. In conducting online learning, lecturers can combine two approaches, namely synchronous and asynchronous. Synchronous...
learning is a learning interaction between lecturers and students carried out at the same time using video conference or chat technology [2]. Asynchronous learning is online learning with the lecturer preparing the material first and learning interactions are carried out flexibly and do not have to be at the same time, for example using discussion forums or independent study/student assignments [3].

Practical learning is learning that has a role in the development of science process skills [4]. Where these science process skills students can apply the scientific method in understanding, developing and discovering knowledge [5]. In science process skills, there are three components that need to be developed, namely 1) the ability to use the mind (intellectual), 2) the ability to reason, 3) Efficient and effective actions to achieve certain results, including creativity, therefore science process skills are typical skills used by science students and can be applied to understand phenomena [6]. The components in the science process skills are very much needed during practical learning, because the application of science process skills as well as the development of scientific attitudes that support the knowledge process in students is very possible in practical activities so that in this science lesson practicum has a very important position [7].

Practicum is one of the learning strategies that can attract students' interest in developing scientific concepts, because practicum can provide students with direct knowledge and experience to simultaneously develop scientific attitudes that support the process of acquiring knowledge (scientific products) within students [8]. In practicum activities, students can observe, interpret data, predict, use tools and materials, plan practicum, communicate practicum results and ask questions [9]. Practicum is a good learning tool for students/students in developing science process skills with practicum students/students are invited to directly discover new knowledge and are trained to develop all their five senses [10]. Practicum and science process skills cannot be separated because the development of science process skills in students is to use the practicum method because in the practicum activities psychomotor, cognitive and affective skills can be developed [11].

In March 2020 until the beginning of 2021 and even now all learning carried out both in schools and universities which are usually done face-to-face has turned into distance learning (PJJ) due to the covid 19 pandemic which requires not to meet in person to prevent the spread of the COVID-19 virus. Therefore, the atmosphere of the teaching and learning process changes and the teaching and learning process must immediately adapt to new habits, namely learning from home. From this case, blended learning is applied by combining or combining synchronous and asynchronous learning. The application of synchronous and asynchronous combinations here is to combine learning using the Web Conference from Microsoft Teams and the Learning Management System (LMS) in the form of power point teaching materials, videos and teaching materials in pdf format. Microsoft Teams is an example of a synchrony that functions as a Web Conference with Microsoft Teams of students and lecturers being able to meet or meet face-to-face online by activating the video feature. In addition to face-to-face online, there is also a chat feature with this feature students can submit messages or questions in writing, this feature can be used to accommodate student questions during the online learning process. Learning Management System (LMS) is an example of asynchronous which has functions as attendance, delivery of material in pdf and ppt formats, assignment and collection of assignments and management of assessments, not only that in LMS there is also a discussion forum feature where you can carry out discussions and lecturers can provide an assessment in each of these discussions. Therefore, the combination of synchronous and asynchronous aims to support the learning process that will be taught.

Before implementing synchronous and asynchronous, students and lecturers are provided with first how to use the platform. The debriefing is carried out online and using video tutorials on the website. In this case, lecturers and education staff work together and learn to use this application quickly, so that learning services for students can be optimized. As a result of the briefing, students and lecturers can make good use of the Web Conference from Microsoft Teams and the Learning Management System (LMS) platform. This is due to the enthusiasm between lecturers and students to be able to adapt in online learning for practicum courses.

Based on the initial observations that the author made by interviewing science practicum lecturers via WhatsApp, the use of synchronous and asynchronous has advantages and disadvantages. The advantage is that the learning process can still be carried out during the pandemic with the
synchronous and asynchronous methods. The drawback in using synchronous and asynchronous uses is that students and lecturers must have a strong and stable signal network, and students and lecturers must learn more about the use of Microsoft teams and the Learning Management System (LMS) for the implementation of distance learning in science practicum courses. Students and lecturers must be able to adapt in the implementation of online science practicums, the things that students must prepare are internet networks, knowledge of the use of Microsoft teams and learning management systems (LMS), as well as preparing tools and materials for the implementation of science practicums. Meanwhile, the things that must be prepared by lecturers are the same as students, namely knowledge about the use of Microsoft teams and learning management systems (LMS), then preparing Tutorial Activity Plans (RAT) and Tutorial Program Units (SAT), power points of teaching materials and video tutorials.

Therefore, based on the explanation of the background above, the author is interested in conducting a research entitled "Implementation of Online Science Practicum by Using Microsoft Teams and Learning Management System (LMS) During the Covid 19 Pandemic Period at UPBJJ-UT Jambi."

2. Method
The research method used in this research is Classroom Action Research (CAR). Classroom Action Research (CAR) is a research that is carried out systematically reflective of various actions taken by teachers/lecturers as researchers, from the beginning of the preparation of a plan to the end of the assessment of real actions in the classroom in the form of teaching and learning activities, in order to improve conditions learning [12].

Broadly speaking, there are four stages in Classroom Action Research (CAR) which are carried out repeatedly or in cycles, namely (1) Planning, (2) Implementation, (3) Observation and (4) Reflection [13].

a. Planning
Before carrying out the action, it is necessary to have a plan in advance and the forms of activities included in the plan are:
1) Create tutorial activity units
2) Prepare a practical guide
3) Prepare the observation sheet
4) Setting up the Microsoft Teams link
5) Prepare the Learning Management System (LMS)

b. Action Implementation
After the preparation has been carried out, the next stage is the implementation of the action. The action plan consists of: 1) lesson plan, 2) activity plan, 3) what plan will be observed, and 4) data analysis plan [14]. The forms of activities in this research are as follows:

1) Checking the availability of practical tools and materials
The tutor checks the availability of practical tools and materials by activating the camera so that the tutor can see the availability of these tools and materials.

2) Practicum Implementation
a. The tutor conveys the title, purpose and workings of the practicum through Microsoft Teams.
b. Tutors guide students in the implementation of practicum.
c. Students follow the tutor's directions.
d. Students present the results of the practicum that has been done.
e. The tutor provides feedback on the presentation of student practicum results.
f. The tutor asked the obstacles in the implementation of the practicum.
g. Students upload practicum reports in the Learning Management System (LMS)

c. Observation
After planning and implementing actions, the next stage is observation and evaluation. The forms of activities from observation and evaluation are as follows:
1. Fill out the student practicum process assessment sheet
2. Provide assessment of student practicum reports

d. Reflection

The reflection in this research is on the application of science practicum and the obstacles found during the practicum. In this reflection, researchers can review the obstacles and problems that occur so that the results of the reflection can be used to determine further steps to achieve the goals achieved [15].

3. Result and Discussion

Table 1. Percentage of Science Practicum Implementation in Each Cycle

| Aspect                      | Percentage % |
|-----------------------------|--------------|
|                             | Cycle 1      | Cycle 2      |
| Practical Preparation       | 88           | 91           |
| Practical Process           | 87.84        | 93.8         |
| Practical Data and Results  | 86.74        | 92.7         |
| Average                     | 87.5         | 92.5         |

Table 1 and table 2 explain that the percentage of practicum implementation in each cycle is 87.5% in cycle 1 and in cycle 2 it increases to 92.5%, and the average practicum assessment in cycle 1 is 3.09 and in cycle 2 it is 3.7 with an average The highest average 4. It can be said that the application of science practicum using Microsoft teams and the Learning Management System during the covid 19 pandemic can be applied in the implementation of science practicum during the covid 19 pandemic, besides being an alternative to the implementation of science practicum during the covid 19 pandemic.

Table 2. Average IPA Practicum Assessment

| Aspect                              | Assessment Component                          | Cycle 1 | Cycle 2 |
|-------------------------------------|------------------------------------------------|---------|---------|
| Practicum Report Assessment         | Practicum Title and Objectives               | 4       | 4       |
|                                     | Tools and materials                           | 4       | 4       |
|                                     | Theoretical basis                             | 3       | 3       |
|                                     | Trial Procedure                                | 3       | 4       |
|                                     | Observation result                            | 3       | 4       |
|                                     | Questions                                     | 3       | 4       |
|                                     | Discussion                                    | 2       | 3       |
|                                     | Conclusion                                    | 2       | 3       |
|                                     | Bibliography                                  | 3       | 4       |
|                                     | Confusion experienced/suggestions and input   | 4       | 4       |
|                                     | Practicum Photo/Video                         | 3       | 4       |
| Average                             |                                                | **3.09**| **3.7** |

In addition to the percentage of science practicum implementation and the average science practicum assessment, this study also looks at students' understanding of the knowledge of using Microsoft Teams as measured by using a google form questionnaire. The following is the result of a questionnaire on student understanding of Microsoft Teams knowledge.
Figure 1. Questionnaire results of students' understanding of the knowledge of using Microsoft teams

From Figure 1 above, which is about the results of the questionnaire on students' understanding of the knowledge of using Microsoft Teams, that 93.8% of students understand the use of Microsoft Teams and in Figure 2, the results of the questionnaire on students' understanding of using the Learning Management System (LMS) that 75% of students can use LMS to science practicum report collection. The following are the results of the questionnaire on students' understanding of the use of the Learning Management System (LMS):

Figure 2. The results of the questionnaire on students' understanding of the use of the Learning Management System (LMS)

In addition to a questionnaire on understanding the use of Microsoft Teams and the Learning Management System (LMS) in this study, this study also looked at student understanding when tutors provided direction and guidance during the implementation of science practicum using Microsoft Teams. The results obtained are that 75% of students understand the direction and guidance of science practicum which is carried out using Microsoft Teams. Attached are the results of the questionnaire to
see student understanding when tutors provide direction and guidance in the implementation of science practicum using Microsoft Teams:

![Figure 3. The results of the questionnaire see students' understanding when the tutor provides direction and guidance in the implementation of science practicum using Microsoft Teams](image)

### Figure 4. Documentation of the Implementation of Science Practicum using Microsoft Teams

#### 4. Conclusion

The results obtained in applying the online science practicum using Microsoft teams and the Learning Management System (LMS) during the covid 19 pandemic, namely in the process of implementing the science practicum where there are aspects of preparation, process, data and practicum results in cycle 1 the average percentage is obtained by 87.5% and in cycle 2 it increased to 92.5%, while the average science practicum assessment obtained in cycle 1 was 3.09 and in cycle 2 it increased to 3.7 with the highest average of 4. In the aspect of student knowledge about the use of Microsoft Teams taken using Google Form are 93.8%, while aspects of student knowledge about the use of the Learning Management System (LMS) are 75% and aspects of student understanding in the implementation of online science practicum using Microsoft Teams are 75%. Based on the results of the research obtained, it can be concluded that the application of online science practicum using Microsoft teams and the Learning Management System (LMS) during the covid 19 pandemic can be carried out well and can be an alternative for science practicum during the covid 19 pandemic where learning must be carried out from home without face to face. The obstacle found in the implementation of this online science practicum is the signal network that is less supportive in each student's area. This research is still limited to the application of online science practicum, it is hoped that further research on other aspects can be carried out.
References
[1] SAj; Maria JosÃ©; Serpa, Sandro 2020 Sustainability 12(20) p. 8525
[2] Samson, Perry J 2020 Journal of Geoscience Education 1 p. 10
[3] https://pjj.ui.ac.id/ufaqs/sinkronus-atau-asinkronus/
[4] Johansson, Peter 2020 Educational Action Research, p. 1-16
[5] Matthews, Michael R 2018 [Science: Philosophy, History and Education] History, Philosophy and Science Teaching || Epistemic Practices and Science Education. , 10.1007/978-3-319-62616-1(Chapter 5), 139–165. doi:10.1007/978-3-319-62616-1_5
[6] Purwandono, E 2000 Penerapan Pertanyaan Produktif dalam Mengembangkan Keterampilan Proses Sains Siswa pada Pembelajaran Konsep Pemencaran organisme (Bandung : UPI Press).
[7] Turrini T, Dörler D, Richter A, Heigl F, Bonn A 2018 Biological Conservation 225 p.176–186
[8] Daniah, D 2020 PIONIR: JURNAL PENDIDIKAN 9(1)
[9] Gerde H K, Pierce S J, Lee K, Van Egeren L A 2017 Early Education and Development p. 1–21
[10] Huguet C, Pearse J, Noè L F, Valencia, Diego M, Ruiz N C, Heredia A J, Avedaño M 2019 Journal of Geoscience Education p. 1–13
[11] Sholikah T 2020 Indonesia Journal of Science Learning
[12] Darmadi H 2015 Desain dan Implementasi Penelitian Tindakan Kelas (PTK) (Bandung: Alfabeta)
[13] Markley C T, Miller H, Kneeshaw T, Herbert B E 2009 Journal of Geoscience Education 57(4) p.264–274
[14] Slameto S 2015 Scholaria : Jurnal Pendidikan Dan Kebudayaan.
[15] Niemi R 2018 Five approaches to pedagogical action research. Educational Action Research p. 1–16