

# Online physiology practicum during the COVID-19 pandemic at Faculty of Medicine Universitas Pembangunan Nasional Veteran Jakarta

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**Abstract.** During the COVID-19 pandemic, student learning activities at the Faculty of Medicine Universitas Pembangunan Nasional Veteran Jakarta should be implemented online. Therefore, a learning method of physiology practicum was designed to achieve the learning objectives. One week before the online meeting, students in small groups are assigned to make a video recording of the physiology practicum at home. At online meetings, first, the students have to listen to an introduction related to the theory underlying the practicum. After that, they played the recorded video, followed by a discussion about the results of the physiology practicum. This study aimed to describe student perceptions related to the learning process. A questionnaire with a 4-point Likert scale and open-ended questions were used to obtain student perceptions of the learning process, including the practicum guide, video making, introductions, and discussions. Students appreciate online physiology practicum because it is easy to implement, fun, and increases their understanding as they are required to explain the physiology practicum they did with the underlying theory. It can be concluded that this method can be used as an alternative physiology practicum.

## 1 Introduction

Referring to the Learning Guide for the Academic Year 2021/2022, learning methods in universities during the COVID-19 pandemic are carried out online to prevent disease transmission. Following up on the government's policy [1], the physiology laboratory at the Faculty of Medicine, Universitas Pembangunan Nasional Veteran Jakarta (FMUPNVJ), was implemented online. A learning method of physiology practicum was designed so that the learning objectives could be achieved. The general learning objective of the online physiology practicum is to deepen the students' knowledge.

This online physiology practicum is designed with interactive, contextual, scientific, collaborative, and student-centered learning characteristics following the National Higher Education Standards [2]. This online practicum combines several learning methods, namely, collaborative learning, lecture, and group discussion, to facilitate the achievement of learning objectives effectively. Online physiology practicum is conducted online by utilizing the Learning Management System (LMS) called e-Learning 4.0 UPNVJ, which was later changed to Learning Activities through Digital System (LeADS) UPNVJ. To be interactive, the implementation of physiology practicum refers to the UPNVJ distance education implementation guide, which requires learning to use the principles of Resources, Activities, and Feedback (RAF). The principles of RAF are: 1) Resources (learning materials) are uploaded to the LMS, 2)

Activities are the interaction between lecturers and students which carried out in a structured manner through video conferences or discussion forums, 3) Feedback is delivered individually in the form of quizzes, assignments, or individual comments to students to assess learning achievement [3].

At FMUPNVJ, the physiology practicum is allocated two hours for online activities. Online physiology practicum is provided with asynchronous and synchronous methods. The stages of the physiology practicum are: 1) making a video recording of the physiology practicum, 2) preparing PowerPoint presentation text to explain the results of the practicum, 3) introduction, 4) group discussion, and 5) quizzes.

One week before the online meeting, students in small groups (7-9 people) are assigned to make a video recording of the physiology practicum at home. There are 5-7 experiments for each topic of physiology practicum. Each student only does one experiment assisted by family members at home to make it easier. Other students are assigned to combine and edit the video so that the duration of the video becomes 8-10 minutes. The group must also prepare a PowerPoint presentation text to explain the results of the physiology practicum. Link of the video recording and PowerPoint presentation text must be uploaded at LeADS UPNVJ before the online meeting.

As a reference for making videos and preparing for online meetings, students can download learning materials and video-making instruction e-books from LeADS UPNVJ. The video-making instruction e-book is

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**Table 1.** Characteristics of the Subject

No.	Characteristic	First-semester	Third-semester	Fifth-semester
1.	Sex			
	Female	97 (72.4%)	58 (75.3%)	18 (69.2%)
	Male	37 (27.6%)	19 (24.7%)	8 (30.8%)
2.	Age (years)	18 (17-19)	19 (18-19)	20 (19-21)
3.	Learning process (quizzes, discussion & assignments) score	76 (47-89)	74 (53-86)	81 (52-79)
	Total	134 (56,5%)	77 (32,5%)	26 (11%)

equipped with videos from youtube and pictures. The guide is packaged using the Book Creator application to make it interesting.

At online meetings, 23-26 students first have to listen to an introduction related to the theory underlying the practicum for 45 minutes. In the introduction session, students were allowed to ask questions related to the topic. After that, the class is divided into three groups consisting of 7-9 students. A lecturer guides each group. In small groups, students were asked to play the recorded video, followed by a discussion about the results of the physiology practicum. Lecturers facilitate discussions, ask questions to each student to assess understanding, and

provide feedback. After participating in the online meeting, students are asked to work on quizzes in the LMS.

This study aims to describe student perceptions of the learning process including the practicum guide, video making, the introduction, and the discussion process.

## 2 Materials and methods

This research is a descriptive study using a cross-sectional design. The population of this study is all first, third, and fifth semester of FMUPNVJ students in Academic Year 2021/2022, with a total population is 437 students. The

**Table 2.** Subject feedback on online physiology practicum

No.	Statement	Number of Subjects			
		SD	D	A	SA
1.	The physiology practicum guide is interesting because it is made in the form of an e-book which equipped with pictures and videos	0	3	111	123
2.	Easy-to-understand physiology practicum guide	0	12	139	86
3.	Need to make a more detailed guide for making videos	0	9	100	128
4.	There are no significant difficulties in making physiology practicum videos	2	35	133	67
5.	The video editing process is easy to do and doesn't take a long time (30-60 minutes)	9	44	166	68
6.	The introduction has provided an overview of the theory related to the practicum	0	11	142	84
7.	The introduction needs more time	0	4	52	127
8.	This physiology learning is interactive because there is a discussion session	0	2	119	116
9.	I am motivated to learn because each student is asked to explain using a PowerPoint presentation text in the discussion	1	21	117	98
10.	I get feedback regarding my understanding in the discussion session	1	3	119	114
11.	I actively participate in the practicum because I not only make practicum video but also have to analyze and explain the results	0	2	115	120
12.	This physiology practicum method is fun	0	9	138	90
13.	This method increases my interest in studying physiology	0	8	135	194
14.	This method deepen my knowledge	0	3	125	109
15.	Online physiology practicum needs more time	7	48	132	50
16.	Quiz test my understanding of the practicum topic	0	5	117	115

Note: Total subject = 237 students, SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

subjects were students who had participated in the online physiology practicum and did not take a remedial physiology laboratory class. The instrument of this study is a questionnaire using a 4-point Likert scale and open-ended questions to get student perceptions related to the learning process. The questionnaire was designed by the researcher based on instructional design theory [4] and has been tested for validity and reliability on 30 students. The test showed that each question is valid and reliable with Cronbach's alpha = 0.900.

This study is an evaluation of physiology learning and has obtained permission from the faculty leader. Informed consent was obtained directly from the subject online. The questionnaire in Google form was shared with the population in December 2021. Data were analyzed using SPSS software to describe the research subject characteristics and students' perceptions of the online physiology practicum, including the practicum guide, video making, the introduction, and the discussion process.

### 3 Results and Discussion

A number of 237 subjects from the total population participated in the study. The time of data collection, which coincided with the end of semester exams, caused the response rate in this study to only 54%. In Table 1, it can be seen that 73% of the subjects were female, aged between 17-21 years, with the composition of the first (56.5%), third (32.5%), and fifth semester (11%) students, and learning process scores.

The study results showed that the method of online physiology practicum was well appreciated by most of the subjects. The subject scored 8 (6-10) for this online

physiology practicum. In Table 2, it can be seen that the subject's opinions in detail related to the online physiology practicum, including the practicum guide, practicum, video, introduction, and discussion process. According to the subject's opinion, the learning process is interactive and fun, increases motivation, encourages active participation, provides feedback, and increases understanding.

All stages of these online physiology practicum activities impressed the subject for some reasons. A short lecture was given to introduce the students to the online physiology practicum theory. This introduction makes the discussion topic easier to understand (Table 3). The subject's opinion is in line with the study results, which show that the combination of short lectures and collaborative learning improved the grades obtained for digestive physiology [5].

According to the subject's opinion, this online physiology practicum is interactive, contextual, scientific, collaborative, and student-centered following the National Higher Education Standards (Tables 2 & 3). Interactive learning is carried out in two directions in learning activities, especially during group discussions, presentations of practicum results, and then getting feedback from other group members and lecturers. The students also obtained feedback after knowing the quiz results, which showed their level of understanding related to the practicum topic. Feedback is needed to be given in learning. Feedback enhances the learners' knowledge, skills, and professional performance. Feedback improves performance not only by helping students correct their mistakes but also by reinforcing learning [6].

The learning is also contextual because practicum is designed to be carried out at home and is related to events or problems faced by students daily. Groups must interact and cooperate when making video recordings and

**Table 3.** Things that impressed the subject from the online physiology practicum

No.	Subject Opinions
<b>A. Practicum Guide</b>	
1.	The guide is made in such a way that it is interesting to read and easy to understand
2.	The guide is equipped with interesting and easy-to-understand learning videos
3.	The practical guide given is cute
<b>B. Introduction</b>	
1.	Introductory explanations make it easier to understand the topic during a discussion session
2.	Interesting and easy to understand because the topic is related to everyday life
<b>C. Practicum &amp; Video</b>	
1.	Even online, we can still do practicum like when we are offline
2.	Interesting and fun because students are given learning videos and asked to do the practicum at home.
3.	The making of the video encouraged me to read the theory before the online meeting
4.	The process of making videos and ppt explanations requires group collaboration
5.	This process is fun because I can watch videos made by other groups whose links are uploaded on LMS
<b>D. Discussion</b>	
1.	Each student is asked to tell with his word what is in the ppt so that the topic is memorable
2.	Discussion sessions in small groups make the material easy to understand because the study in a collaborative manner
3.	Watching video recording and the practicum results other groups increase my knowledge
4.	I get feedback from the lecturer and I can ask more freely
5.	Discussions with lecturers and friends create an interactive atmosphere
6.	The questions and answers encourage me to think systematically
<b>E. Online Physiology Practicum in General</b>	
1.	The method is not difficult even though it is done online
2.	The learning uses various media to increase understanding

**Table 4.** Limitations and suggestions for improvement

No.	Subject Opinions
<b>A.</b>	<b>Limitations</b>
1.	Some of the instructions in the practical guide are less detailed
2.	Video editing sometimes takes a long time
3.	The total time for the online practicum is only 2 hours, so the duration of discussion is considered not enough
4.	Signal disturbance/running out of quota spoils the learning process
<b>B.</b>	<b>Suggestions for Improvement</b>
1.	The details of the practicum should be informed in advance so that the preparation and making of the video can be maximized
2.	Instructions in the practicum guide should make more detailed
3.	Improved discussion sessions as well as feedback from lecturers to ensure student understanding
4.	In addition to ppt, it is better to give practicum videos made by the lecturers

explanations of the practicum results so that learning becomes collaborative. According to social constructivism theory, interaction with teachers and other learners plays a fundamental role in developing understanding [7]. Collaborative learning is student-centered learning and promotes active learning. Students also gain generic skills through collaborative learning, including teamwork and communication skills [8].

The practicum is also scientific because it prioritizes a scientific approach. Students must provide an explanation of the practicum results using valid literature/learning sources that must be looked for themselves. The literature search process will develop students' independent learning abilities. Furthermore, students will gain understanding/knowledge through the discussion process. Discussion allows students to participate in learning actively [8]. Lecturers act as facilitators who help students learn. Based on the characteristics that are active, collaborative, and lecturers who act as facilitators, this online physiology practicum can be said to be student-centered learning [9].

The physiology practicum is also considered effective by the subject because students can receive the material well in the allocated time so that their understanding increases (Table 2). The problems for a small number of subjects were making videos which took time, some of the instructions in the practicum guide were considered not in detail, internet signal, and lack of the duration for the discussion (Tables 2 & 4). Some suggestions for improving this practicum method that can be done are revising the practicum guide, providing earlier information regarding practicum assignments, and improving the ability of lecturers to facilitate discussion and provide feedback (Table 4). It is hoped that this online physiology practicum method will be better implemented in the future.

This is preliminary research on the online physiology practicum. To obtain more comprehensive data, it is necessary to conduct qualitative research and research that aims to determine the effectiveness of this method in achieving learning objectives.

## 4 Conclusions

Online physiology practicum was appreciated by the students because it is easy to implement, fun, and

increases their understanding. Therefore, this method can be used as an alternative physiology practicum. It is necessary to conduct a further study about the influence of online physiology practicum on learning achievement and conduct a qualitative study to obtain more detailed information regarding this method based on the perceptions of lecturers and students.

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