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Needs Analysis of Augmented Reality Development on Microbiology Practical Guide of Virus Material

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ABSTRACT

This study aims to describe the needs analysis of the development of an AR-based microbiology practicum guide on viral material. This type of research is the research and development (R&D). The development model used in this research is to modify the 4D development model. The population in the study were students of the fifth semester of Biology Education, FKIP UMB and course lecturers. The instrument used is a needs analysis questionnaire for students and for course lecturers. The data were analyzed using descriptive analysis and the percentage of the number of answers given was divided by the total number of respondents multiplied by 100%. Based on the results of the study, it can be concluded that all students agree to develop an AR (microbiology practicum guideAugmented Reality) on virus material because it is important to use an AR-based practicum guide. In addition, based on the results of the analysis of the needs of the lecturers, the lecturers do not know or know the AR application. In addition, there is no specific microbiology practicum guide for AR-based virus material in the study program environment. The use of AR media-based practicum guides is one solution in understanding the content of the material, especially virus material. The thing that must be considered in the practicum guide is that the content and format must be complete and systematic so as to make it easier for students to understand the course of the practicum which contains materials, tools/materials, working methods to the format and reporting of results.

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1. INTRODUCTION

The use of technology in various fields has become a necessity in supporting activities, one of which is in the field of education. In the world of education, the learning process is undergoing a rapid transformation, so the use of technology in the learning process is important to improve digital competence. Technology has a considerable influence in various fields, one of which is the field of education (Pratama, 2018). According to Rusman (2015), that through technology students are expected to understand information, manage information and know where the information is obtained.

Technology will always develop from time to time, therefore a lecturer must be able to introduce and innovate in the use of technology, this is expected so that the learning process is not far behind with other countries. During the pandemic, AR is very appropriate to be used in microbiology practicum on virus material because AR technology is able to visualize real 3D. This is because viruses are small creatures, so it becomes an obstacle for students to study shapes, making it difficult to imagine the 3D shape of the virus structure. In addition to the use of AR in practicum, a guide is also needed for conducting practicum, the guide is used to assist students in carrying out systematic, directed and operational practices so that they can achieve learning goals (Prayitno, 2017). Microbiology is a branch of biology that is included in science learning. Microbiology is one of the compulsory subjects that must be taken by biology education students (Mauludin, 2017). The object of study in microbiology is microorganisms which include bacteria, fungi, and viruses. The learning objectives in this course are integrated with the practicum process carried out inside and outside the laboratory. (Prasetyo, 2016; Fitriani, 2019).

Laboratories are usually created to allow these activities to be carried out in a controlled manner (Yuanita, 2015). Based on observations and experiences, the researchers concluded that students need a practical guide that contains theories and pictures. This is because it makes it easier for students to understand the learning material. Therefore, an educative practicum guide is needed in order to achieve the learning objectives so that the class becomes optimal. The practical guide is a guide that contains procedures for preparation, work procedures, data analysis and reporting, so that students will be orderly in carrying out practical activities (Fitriani, 2019).

The development of practical guides is carried out by utilizing technology, namely AR (Augmented Reality) applications, one of which is Augmented reality technology or abbreviated as AR. AR is a combination of the virtual world with the real world created by computers (Furth, 2011). The results of objects in AR applications can help students generate new perceptions that allow them to interact with the real world (Ani, 2019). Researchers also found the fact that the Microbiology course practicum guide did not include videos and images based on AR technology, so students only focused on the lecturer and lacked participation in the learning process. In addition, based on the experience of researchers, students are faster in capturing the content of the material when it is presented with audio, video and image media. Thus, the question of this research is how to analyze the needs of developing an AR-based microbiology practicum guide on virus material.

2. METHODS

This research has been carried out from October to November 2021 and the research location is in the Biology Education Study Program, FKIP UMB in the Microbiology course. The population in this study was the fifth semester students of Biology Education, FKIP UMB, totaling 35 students. The data collection method was using a questionnaire. The questionnaire was used to obtain information about the need for developing an AR-based microbiology practicum guide on Augmented Reality (AR)-based virus material. The types of questionnaires used in this study were open and closed questionnaires. This research is a research and development (R&D) with a procedural model. The development model used in this research is to modify the 4-D development model. The research development procedure includes 4 stages of development, namely defining, designing, developing and disseminating. The data were

analyzed using descriptive analysis and the percentage of the number of answers given was divided by the total number of respondents multiplied by 100%.

The stages of developing this 4-D model begin at the definition stage, which at this stage consists of several parts, namely: 1. Conducting interviews with students and teachers about practical activities. 2. Distribute a questionnaire on student needs which contains several questions. The data were analyzed using the percentage technique and processed descriptively.

3. RESEARCH AND DISCUSSION

3.1. Analysis of the Importance of Practicum Activities

Based on the results obtained that 70% of students think that practical activities are very important to be carried out. Because with the practicum in the course, students will better understand and understand the material so that the practicum process runs optimally.

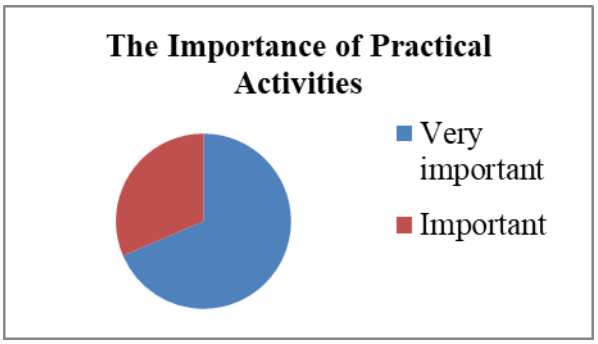

Figure 1. Diagram of the importance of practical activities

Based on the results of the analysis of the needs for student practicum guides regarding the importance of practicum activities, it was obtained that 70% of students consisting of 24 students thought that practicum activities were very important to be carried out. Students better understand the content of the material if each course is held practical activities. In line with opinion (Fitriani, 2019) that in Biology learning there are many complex concepts that do not need to be explained orally, through practical activities is one solution to understand concepts and learn the content of the material. Science process skills can be trained through observation, investigation, making hypotheses and asking questions (Suryaningsih, 2017).

Biology learning requires two crucial and interconnected components, namely theory and practice. The theory obtained by students is used as basic knowledge to carry out practical activities. Emda (2017) argues that practicum is real evidence on the basis of the theory that has been studied so that practicum activities can sharpen understanding of the subject matter. Biology learning is contextual learning and students not only receive theory but also proof of theory. One of the activities to prove theory is through practical activities (Nurmilasari, 2013).

3.2. Media Needs Analysis

Based on the results obtained that 100% of students answered that they had never done practicum on virus material and there was no special practicum guide for virus material that was developed based on 3D images and videos so that 99% of them answered that they agreed to develop a special practicum guide for virus material because it can help students in the practical process. Through the practicum guide, students understand and understand more in completing practical activities. Students do not feel confused about starting, packing and ending the practicum activities.

Based on the results of the analysis of the needs of the lecturers that the lecturers do not know or are familiar with the AR application. In addition, there is no specific microbiology practicum guide for AR-based virus material in the study program environment. Therefore, lecturers need to study and

understand the specific microbiology practical guide for AR-based virus material. With the aim that lecturers can take advantage in the fields of science and technology.

Based on the data obtained that students have never done practical activities on virus material, this is due to the limited tools and materials. Therefore, it is necessary for a lecturer to follow up on this so that learning objectives can be achieved by developing a practicum guide on virus material. The pandemic period has limited real space for students to carry out practicum activities in large groups. So that researchers offer an application that is suitable for practical activities, namely augmented reality. Augmented reality application is an application that combines the virtual world with the real world or often referred to as tethered reality which is projected into the real environment at the same time. (Mustaqim & Kurniawan, 2017).

Practical guides in technology-based courses, students will more easily understand and understand the content of the material so that practicum objectives can be achieved in line with research results

Pratama & Risdianto (2021), that based on research results it is necessary to use augmented reality media in the learning process and even need someone to innovate in developing this application so that it can be applied to teaching materials, modules, or others.

3.3. Content Analysis and Format of the Practical Guide

Based on the results obtained that the practicum guide must be complete, clear and systematic so as to make it easier for students to understand the course of the practicum which contains materials, tools/materials, working methods to the format and reporting of practicum results. The content and format of the practicum guide become the basis for students to carry out practical activities. If the content and format of the practicum guide are directed, the results of the practicum activity are maximized and vice versa if the content and format of the practicum guide is confusing, the time for the practicum activity process runs out by searching and reading how the practicum process will be carried out so that practicum activities do not run effectively and efficiently because the guide is difficult to understand.

The practicum guide must be complete and systematic so as to make it easier for students to understand the course of the practicum which contains materials, tools/materials, working methods to the format and reporting of results. The practical guide must be clear and comprehensive because the practicum guide will guide students in carrying out practical activities. One indicator of the success of the practicum is the practicum guide itself. The components in the practicum manual are cover, introduction, table of contents, rules, tools and materials, practicum procedures and bibliography (Sari, et al, 2018). The practicum guide must use standard and easy-to-understand language and can be used in self-learning without the guidance of a facilitator (Susanti, 2018).

3.4. AR-Based Practical Media

Based on the results obtained that only a few students know about AR applications, therefore students agree when developing an AR-based practicum guide, this is because AR applications can display 3D images and videos so as to make learning more interesting and not boring. AR applications are practical and modern because they use 3D images and videos.

Based on the results of the questionnaire obtained, the virus material is a material that is difficult to understand. Because in order to understand the content about viruses, an observable object is needed so that students get a complete picture and knowledge. Therefore, AR media is suitable to be used in understanding viral material in practical activities. By using AR media it will be easier to understand and simplify the course of the practicum.

The fact in the field is that it is difficult for students to understand viral material, especially this is because students are less able to capture the content of the material when it is presented in descriptive form and only has a few pictures. Students are more interested if the viral material is presented in the

form of interactive Puteri, et al. (2020) that learning through videos makes students happy, understand and motivated to find out more about the material being discussed. When a video or 3D image is playing, all students focus on paying attention to what is being seen so that this can increase the level of concentration (Martiya, 2020).

Therefore, it is necessary to use technology in practical activities, one of which is augmented reality. Because AR applications can display 3D images and videos, making learning more interesting and not boring. AR applications are practical and modern because they use 3D images and videos. AR-based practicum guides can also be used on the Android platform so that students can repeat independently if they don't understand and create learning time whenever and wherever offline using an Android cellphone. Based on the results of the analysis, it was found that all students agreed to develop an AR-based practicum guide.

3.5. Student Hope

Based on the results obtained, students hope that the AR-based virus material practicum guide is immediately applied and realized in the microbiology course at FKIP UMB because there is no Augmented Reality (AR)-based microbiology practicum guide on virus material and this AR-based practicum guide is expected to be developed in this course. others (Mauludin, 2017). According to Satriawati (2015), that the development of the 21st century, known as technological development, requires that everything utilize technology so that modules can be developed into e-modules. The advantages of e-modules include increasing learning motivation and learning outcomes.

4. CONCLUSION

Based on the results of the research conducted, it can be concluded that it is necessary to develop an AR (Augmented Reality) Microbiology Practical Guide on Virus Material. Students strongly agree with developing an AR-based practicum guide because AR displays 3D images and videos so that learning is more interesting and not boring. The material in the field of biology studies with various branches of science in it is very much with their respective characteristics, so it is necessary to develop appropriate teaching materials to improve applicable learning. The suggestions that need to be followed up are the use of a larger number of samples taken from different agencies.

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