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Analysis of the Needs for Developing E-Modules for Microbiology Practicum in the Biology Education Program at Raden Fatah State Islamic University Palembang

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ABSTRACT

Needs analysis is a systematic process for determining objectives, identifying actual and expected conditions, and prioritizing actions. Needs analysis in the development procedure is carried out to determine the students' assessment of the practicum guide used and the expectations of the practicum guide to be made.The purpose of this study was to analyze student needs for the development of e-modules for microbiology practicum in the biology education study program at UIN Raden Fatah Palembang. This type of research is descriptive qualitative, while the instruments used are student questionnaires and interview guidelines for lecturers and laboratory assistants. The results obtained are 55% of students like microbiology courses, 78% of students like practicum methods, low student science process skills, learning microbiology has been with practicum activities, there is already a practicum guide but it is still printed and not model-based, 46% of students like practicum guides with laboratory assistant direction, 57% of difficult material is sensitivity to antimicrobial substances. In conclusion, it is necessary to develop a practicum guidebook based on the guided inquiry model and integrated with technology on the material of sensitivity to antimicrobial substances to improve the science process skills of biology education students at UIN Raden Fatah Palembang.

INTRODUCTION

Practicum is a form of teaching and learning activities carried out in the laboratory or outside the laboratory to provide direct experience to students through application, observation, and proof of the theory that has been learned in the classroom (Fauziah, 2019). Learning with practicum provides opportunities for students to interact with the objects studied and apply the theory that has been learned in real problems (cognitive), train sensitivity to plan research and respond to various symptoms or problems in research (affective), and train skills in operating the tools and research instruments used (psychomotor) (Rahmi & Silvina, 2019). Practicum is an important element in the national standards of higher education because it plays an important role in fostering students' scientific skills (Putri, 2021).

Microbiology courses as a branch of biological science that studies microorganisms or small living things that can only be observed using a microscope, of course, require practicum activities to provide students with a more real picture of the objects studied in microbiology. The implementation of practicum activities cannot be carried out carelessly, there must be adequate preparation to ensure that practicum activities run effectively and ensure safety aspects in their implementation.

The implementation of practicum requires various preparations, in addition to the deepening of theory, of course, it also requires guidelines as a reference in the implementation of a practicum. Guidelines in the form of practicum guidebooks can provide technical instructions and operational procedures to students in practicum implementation (Prasetyo, 2016) The smooth running of a

practicum activity is strongly supported by the existence of an instrument in the form of a practicum guide (Putri et al., 2018). The practicum guide as a guideline in carrying out practicum for students contains preparation procedures, implementation instructions, data analysis procedures and reporting mechanisms designed according to the rules of scientific writing by the teacher or person in charge of the course handling the practicum (Nurussaniah & Nurhayati, 2016). To create practicum activities that run effectively is to develop a practicum guide that suits the needs.

Development is carried out in several stages, according to the instructional design model used. In general, the first stage is to conduct a needs analysis (Kusuma et al., 2019). Needs analysis is a systematic process for determining objectives, identifying actual and expected conditions, and prioritizing actions. Needs analysis in the development procedure is carried out to determine the students' assessment of the practicum guide used and the expectations of the practicum guide to be made.

According to Songhori (2008), the term needs analysis generally refers to activities that involve gathering information to identify the needs of a group of learners. By conducting a needs analysis in the development procedure, the designer will better understand the gap that exists between the desired end result and the knowledge and skills already possessed by a group of learners (Rachman, 2016). So that the practicum guide that will be made is more in accordance with existing needs based on the problems identified through the needs analysis. The purpose of this study was to analyze student needs for the development of e-modules for microbiology practicum in the biology education study program at UIN Raden Fatah Palembang.

MATERIALS AND METHODS

1. **Time and Place of Research**

   This research was conducted at the biology education program of UIN Raden Fatah Palembang, in October 2024.

2. **Types of Research**

   This research is descriptive qualitative. The focus of this study was to determine the needs analysis of the development of e-modules for microbiology practicum of biology education students.

3. **Population and Sample**

   The research subjects were biology education students of UIN Raden Fatah Palembang who had passed the microbiology course in the academic year 2023/2024, one lecturer teaching the microbiology course and one laboratory assistant.

4. **Research Procedure**

   This research procedure includes distributing student needs analysis questionnaires to students who have passed microbiology courses in the 2023/2024 academic year and interviews with microbiology lecturers and laboratory assistants in microbiology courses.

5. **Data Collection**

   Data was collected through the results of a student needs analysis questionnaire and the results of interviews with lecturers and laboratory assistants.

6. **Data Analysis**

   The data collected was analyzed qualitatively by identifying the findings that emerged from the interviews and Questionnaire results from students were analyzed with the equation :

$$\text{Percentage of results:} \frac{\text{Number of students who answered}}{\text{Number of students}} \text{x}100\%$$

RESULTS AND DISCUSSION

Based on the results of research in the form of a questionnaire given to students, it is known that students like microbiology courses. This can be seen in Figure 1. There are 55% of students who like microbiology courses.

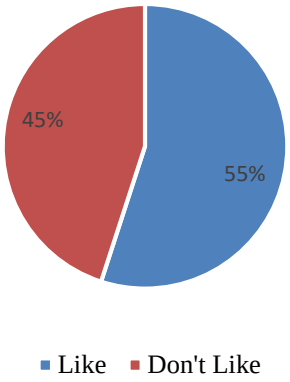

Figure 1. Diagram of students who like microbiology courses

Microbiology is one of the courses studied in the biology education study program. The large number of students who like this course is because in this course there are practicum activities. According to Dwidjoseputro (2020), microbiology is the study of microscopic creatures such as protists, microbes or microorganisms that are only visible under a microscope.

The learning method preferred by students in microbiology courses is the practicum method, where as many as 78% of students who like the method (Figure 2.).

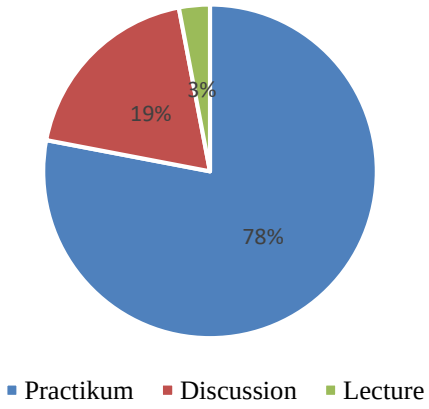

Figure 2. Diagram of students' preferred learning method

Learning in Microbiology courses has been accompanied by practicum activities. Some of the material carried out practicum activities such as the introduction of sterilization tools, making PDA and NA media, microscopic observation of bacteria and their staining, microscopic observation of fungi and antimicrobial activity tests. Practicum provides a real context in which students can apply the theory they have learned in a classroom environment. Through practical experience, students have the opportunity to observe, measure, and conduct experiments, which in turn enriches their understanding of the principles of science (Forman, 2018). Practical activities can provide direct experience to students and students on learning materials (Masruri, 2020). Practicum is one of the strategies in learning that helps explore the concepts that have been learned, in this case the practicum provides direct experience to observe a process that occurs in order to increase understanding. Therefore, practicum activities must be carried out properly, because practicum activities have an important role in realizing the effectiveness of biology learning (Hamidah et al., 2014). Practical activities are one way to facilitate science process skills(Satriani et al., 2018).

Science process skills are essential abilities used in the scientific process to process information, solve problems, and draw conclusions (Kurniawan et al., 2019). The science process

skills of uin raden fatah biology education students are still relatively low. This can be seen from the low practical performance assessment in the aspects of observing, analyzing and concluding skills. Some indicators of science process skills are observing, classifying, measuring, predicting, concluding, and communicating (Syafi'ah et al., 2022). Students in this modern era are required to have various skills that are relevant to the times, one of which is science process skills. Improving these skills is essential to foster higher-order thinking and engagement in the learning process (Jamil & Mahmud, 2019). According to Khotimah et al., (2021), Science process skills help students in developing critical thinking, analytical skills, and complex problem solving. This is in line with the demands of the world of work which increasingly requires graduates who are able to think systematically and scientifically.

One of the requirements for practicum activities to run well and smoothly must be supported by the existence of practicum instructions (Winata et al., 2017). Microbiology practicum activities in the Biology Education Study Program at UIN Raden Fatah Palembang are equipped with a practicum guidebook, but the existing guidebooks are still in printed form and are not model-based. The research results show that students prefer guidance with the direction of laboratory assistants, seen from Figure 3.

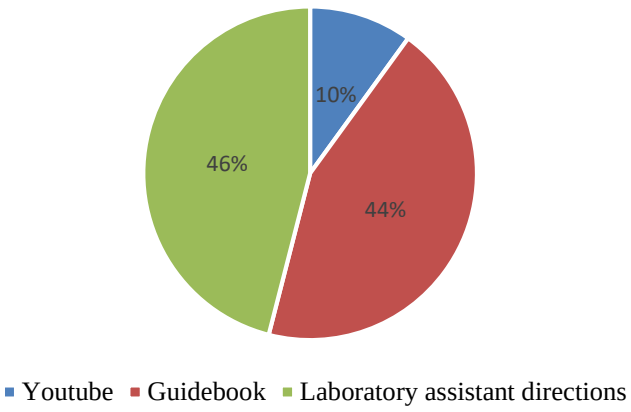

Figure 3. Student-Preferred Lab Guide Diagram

As many as 46% of students liked the direction of laboratory assistants because it was easier, did not need to read the guidebook, and were lazy to bring the guidebook. This is an obstacle when practicum activities are carried out, students are less active because they tend to only wait for the direction of laboratory assistants. However, the quantity of laboratory assistants that is not possible will make practicum activities also not run effectively and result in a lack of efficiency of practicum time (Haafida et al., 2024) and learning is less meaningful if only fixated on the direction of laboratory assistants. So another alternative is sought, namely by developing a practical and model-based practicum guidebook.

The learning model is a strategy used by teachers to increase learning motivation, learning attitudes, be able to think critically, have social skills and achieve better learning outcomes (Isjoni and Ismail, 2012). The inquiry learning model is a suitable model for use in practicum activities, because the inquiry learning model requires students to find concepts or facts that are not yet known, one of which is through practicum activities. Practical activities with the inquiry model can improve science process skills (Nugraha & Nurita, 2021), practicum activities with a guided inquiry learning model have an effect on increasing KPS and student scientific knowledge and involving active students (Hamidah, 2022). Technology integration in practicum guides is important to increase engagement and effectiveness (Herditiya et al., 2023). Students have shown positive responses to digital resources such as e-modules, indicating a preference for innovative learning tools (Darmaji et al., 2020; Defianti & Putri, 2023). Research studies highlight the validity, practicality and

effectiveness of e-modules in enhancing students' learning experience (Rahayu, 2020). These digital resources offer accessibility through smart phones and laptops, where students do not need to carry guidebooks anymore, and can be accessed through cell phones that students must carry anywhere.

Microbiology material that is considered difficult by students is material on sensitivity to antimicrobial substances, this can be seen in Figure 4.

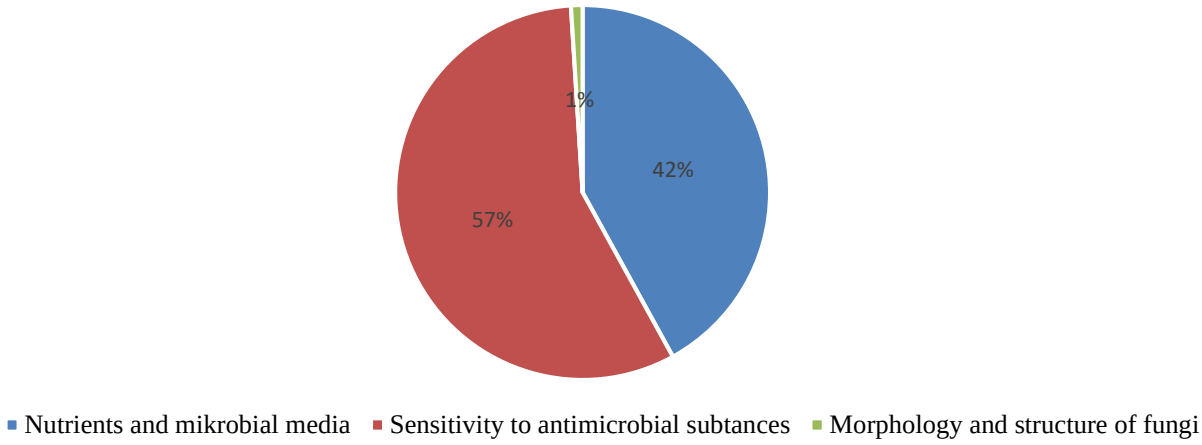

Figure 4. Diagram of difficult microbiology material

A total of 57% of students stated that sensitivity to antimicrobial substances was difficult material on the grounds that the material was complex and the practicum was difficult. The practicum carried out on this material is about testing antimicrobial activity invitro. This material not only requires an understanding of the material but also requires an understanding of laboratory tests (Nugroho et al., 2013).

CONCLUSION

The microbiology learning process has been equipped with practicum activities and there is already a practicum guidebook, but the existing practicum guidebook is still in printed form and is not model-based so that learning is less meaningful and causes less active students when carrying out practicum activities which causes low student science process skills. For this reason, it is necessary to develop a practicum guidebook based on the guided inquiry model and integrated with technology on the material of sensitivity to antimicrobial substances to improve the science process skills of biology education students at UIN Raden Fatah Palembang.

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