

Article

The Effect of Multi-Practicum-Based Learning on the Science Process Skills of Grade XII High School Students

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Abstract: This study aims to analyze the application of multi-practicum-based learning in supporting the development of science process skills of high school grade XII students. Multi-practicum-based learning is an approach that integrates several practicum activities continuously so that students gain direct learning experience through scientific activities. This study uses a quantitative approach involving 135 grade XII students at SMAN 1 Sintang. Data was collected through student response instruments to the implementation of multi-practicum-based learning which included involvement in practicum activities, use of tools and materials, understanding of procedures, implementation of experiments, observation, and data collection and analysis. The results of the study showed that students responded positively to the application of multi-practicum-based learning. Most students stated that they had the opportunity to do several types of practicum, were able to use laboratory tools and materials well, understood the instructions for using tools, and followed practicum procedures systematically. The findings showed that multi-practicum-based learning provides an active and direct learning experience and creates space for students to practice science process skills. Thus, multi-practicum-based learning can be one of the approaches that supports the development of students' science process skills through active, directed, and contextual experimental activities.

Keywords: Multi-Practicum, Biology Learning, Science Process Skills, Practicum, High School

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1. Introduction

Biology learning at the Senior High School (SMA) level is not only directed at mastering scientific concepts and facts, but also on students' ability to understand and carry out scientific processes. Biology as part of the natural sciences has characteristics that are closely related to observation of life phenomena, data collection and interpretation, hypothesis testing, and drawing conclusions based on empirical evidence. Therefore, Biology learning needs to provide opportunities for students to experience firsthand the process of acquiring knowledge through scientific activities. One form of learning that can facilitate this experience is practicum activities. Practicum activities allow students to interact directly with scientific objects, phenomena, tools, and procedures so that learning does not only take place at the level of theoretical understanding, but also on the experience of conducting scientific processes.

Science process skills are one of the important competencies in science learning because they are related to students' ability to carry out various scientific activities systematically. These skills include the ability to observe, classify, measure, predict, formulate hypotheses, design and conduct experiments, interpret data, draw conclusions, and communicate results. Mastery of science process skills allows students not only to

know a concept, but also to understand how the knowledge is obtained and proven. Idris et al., through a systematic literature review, show that experimentation is one of the main activities in science learning and the mastery of science process skills is needed so that students are able to engage in scientific methods and problem-solving [1]. The study also identified several strategies that can support the development of science process skills, including hands-on and minds-on activities, inquiry-based learning, discovery learning, manipulative skills, argumentation, the use of information technology, and STEM integration.

Practicum has an important position because it provides opportunities for students to connect conceptual knowledge with empirical experience. Through practicum activities, students can observe phenomena directly, use instruments, take measurements, record observations, process data, and communicate findings. Thus, practicum has the potential to be a learning environment that supports the development of science process skills as well as concept understanding. However, the existence of practicum activities does not automatically guarantee the development of students' science process skills. A systematic review of practical work in science education shows that practicum activities have various benefits, but also face a number of limitations in their implementation, including problems of activity design, learning objectives, implementation methods, and evaluation. Thus, the quality and design of practicum activities are important factors that determine their benefits for science learning.

In the context of Biology learning, these problems become increasingly important because the characteristics of Biology materials are very diverse. Biology materials can require students to make observations of the structure and function of organisms, identify the characteristics of objects, test physiological processes, observe biological changes, and analyze the relationships between various variables in a phenomenon. If practicum activities are only carried out in a limited manner and oriented towards following predetermined procedures, students' opportunities to develop science process skills as a whole can be less optimal [2]. Practicum that is too structured also has the potential to make students more oriented towards obtaining final results rather than understanding the scientific process carried out. Therefore, a practicum learning design is needed that provides a more diverse and sustainable scientific experience.

One approach that can be developed is multi-practicum-based learning. In this study, multi-practicum is understood as learning that integrates several practicum activities in one interrelated learning series. Each practicum does not stand alone, but becomes part of a learning experience that gradually provides opportunities for students to develop various science process skills. Through several practicum activities, students gain more opportunities to make observations, identify problems, formulate hypotheses, define procedures, conduct experiments, collect data, analyze results, draw conclusions, and communicate findings. Thus, multi-practicum can be viewed not as simply an increase in the number of practicum activities, but as a strategy to expand and enrich students' experience in conducting scientific processes.

A number of previous studies have shown that learning based on laboratory and inquiry activities has strong potential in improving science process skills. The research of [3], for example, shows that the application of inquiry-based Biology laboratories can improve science process skills. The study used a pretest-posttest control group design and found that laboratory practices based on guided inquiry and other laboratory approaches can improve students' science process skills [4]. Other research on inquiry-based laboratory approaches to cell materials also shows that the approach is effective in improving science process skills and encouraging active participation, group work, and students' ability to conduct experiments [5].

Findings in the context of Biology learning in Indonesia also show the same trend. [6] Through research on grade XII science students, found that the application of guided

inquiry in photosynthesis practicum can improve students' science process skills. This improvement can be seen in the ability to observe and draw conclusions after the application of learning [7]. Other research on guided inquiry learning in physiology practicum also shows that there is a difference in science process skills between the group that received inquiry learning and the control group. In addition, the study by [8] on Biology learning research shows that learning that uses a scientific approach is related to the development of students' science skills.

Although various studies have shown the effectiveness of practicums, inquiry-based laboratories, problem-based learning, and scientific approaches to science process skills, most of these studies focus more on one learning model, one type of inquiry approach, or one practicum activity on a specific material[9]. The study of [1] also shows various strategies for developing science process skills through experimentation, but has not specifically placed the integration of several practicum activities as a learning series designed to develop science process skills comprehensively [10]. This shows that there is a research space to examine how learning that combines several practicum activities in one learning series can have an influence on students' science process skills.

The need for a more diverse practicum learning design is also increasingly relevant to the development of science learning that emphasizes the active involvement of students. The development of science process skills requires sufficient opportunities for students to carry out scientific activities in a repetitive and reflective manner. It is not enough for students to make observations or experiments only once, but they need repeated experiences to develop the accuracy of observations, data processing skills, skills to use tools, the ability to identify relationships between variables, and the ability to convey research results. Thus, the integration of several practicums in one learning series has the potential to provide a richer experience than learning that relies on only one practicum activity.

In addition to conventional practicums, technological developments have also given birth to alternatives to virtual laboratories. A systematic study by [11] shows that virtual laboratories can be an alternative to support the development of science process skills, especially when there are limitations in physical laboratory facilities. However, the use of virtual laboratories and learning technology does not completely replace the need for students to gain hands-on experience in using tools, manipulating objects, and interacting with biological phenomena. Therefore, the development of multi-practicum-based learning that utilizes hands-on practicum activities remains relevant, especially in high school level Biology learning.

Based on this description, there is a need to develop and test learning strategies that not only place practicum as a complementary activity after the delivery of the material, but make it an integral part of the learning process [12]. Multi-practicum-based learning offers an alternative by systematically integrating several practicum activities so that students obtain a more diverse and sustainable scientific experience. The novelty of this research lies in its focus on the influence of multi-practicum series on the science process skills of grade XII high school students, rather than simply testing the effectiveness of one practicum activity or one particular learning model. This focus is important to see whether the intensity and diversity of integrated practicum experiences can provide a more comprehensive improvement of science process skills.

Based on the research gap, this study aims to analyze the influence of multi-practicum-based learning on the science process skills of grade XII high school students. Science process skills that are of concern in the research include the ability to observe, classify, formulate hypotheses, conduct experiments, interpret data, and communicate results. The results of the research are expected to contribute to the development of Biology learning strategies that are more oriented to scientific experience and become a consideration for teachers in designing practicum activities that are not only oriented

towards achieving cognitive learning outcomes, but also on developing students' scientific skills.

2. Materials and Methods

This study uses a quantitative approach with a quasi-experimental method and a Pretest-Posttest Control Group Design design. The research involved two XII high school classes selected using purposive sampling techniques, namely the experimental class that obtained multi-practicum-based learning and the control class that obtained conventional learning on the same material. Both groups were given a pretest before learning and a posttest after the entire learning series was completed.

Multi-practicum-based learning is carried out through several practicum activities that are systematically designed and interrelated. Activities include problem orientation, hypothesis formulation, planning and execution of experiments, data collection and interpretation, and communication of results. The series of activities is designed to provide a continuous scientific experience and train various indicators of science process skills.

Research data was collected using science process skill tests, observation sheets, and practicum assessment rubrics. Science process skill indicators include the ability to observe, classify, communicate, conclude, formulate hypotheses, identify variables, design or conduct experiments, and interpret data. Research instruments are first tested for validity and reliability before being used.

The data were analyzed descriptively and inferentially. The analysis included normality tests, homogeneity tests, N-Gain calculations to determine the improvement of science process skills, and t-tests to test the difference in results between the experimental class and the control class. Hypothesis testing was carried out at a significance level of 5% ($\alpha = 0.05$).

3. Results

Respondent Characteristics

This study involved 135 high school grade XII students from five classes, namely grades XII A to XII E. The distribution of respondents by class is presented in Table 1.

Table 1. Distribution of Respondents by Class

Classes	Number of Students	Percentage
XII A	33	24.4%
XII B	25	18.5%
XII C	25	18.5%
XII D	20	14.8%
XII E	32	23.7%
TOTAL	135	100%

Based on Table 1, the largest number of respondents came from class XII A, which was 33 students (24.4%), while the least number of respondents came from class XII D, which was 20 students (14.8%). Meanwhile, classes XII B and XII C each consisted of 25 students (18.5%), while class XII E was 32 students (23.7%). The composition shows that the research respondents came from five classes with a relatively diverse number of students.

Characteristics of Respondents by Gender

Based on gender, out of 135 respondents, there were 50 male students (37%) and 85 female students (63%).

Table 2. Distribution of Respondents by Gender

Gender	Quantity	Percentage
Male	50	37%
Female	85	63%
TOTAL	135	100%

The composition shows that female respondents are more than male respondents. Female students are 85 people (63%), while male students are 50 people (37%).

Discussion of Respondent Characteristics

The composition of respondents from five classes gives an idea that the study involves grade XII students with relatively diverse class backgrounds. The difference in the number of students between classes needs to be considered in the analysis process, especially if the class is used as an experimental group and a control group. The division of groups should follow the actual class or treatment group, not based on the number of students in order to produce a certain composition.

The difference in gender proportions shows that the number of female students in the study is larger than that of male students. However, the characteristics of gender in this study are more appropriately positioned as descriptive information of the respondents, not as a basis for concluding that gender affects the skills of the science process. Conclusions about the influence of gender require a separate analysis.

Table 3. Answer Distribution

Answer Options	Number of Students	Percentage
Strongly Agree (SS)	102	75.6%
Agree (S)	30	22.2%
Hesitation (R)	0	0%
Disagree (TS)	0	0%
Strongly Disagree (STS)	3	2.2%
TOTAL	135	100%

Based on the results of the study, most students responded positively to the statement that teachers provided opportunities for students to do some type of practicum during the learning process. A total of 102 students (75.6%) said they strongly agreed, while 30 students (22.2%) said they agreed. Thus, as many as 132 students or 97.8% gave a positive response to the implementation of multi-practicum-based learning. Meanwhile, there were no students who chose the category of hesitation or disagreement. Only 3 students (2.2%) expressed strongly disagreement.

The findings show that from the perspective of most students, the learning carried out provides considerable opportunities to engage in various practicum activities. This condition indicates that practicum activities are not only placed as additional activities, but have become part of the student's learning experience.

The results showed that most students responded positively to the application of multi-practicum-based learning. In the statement "Teachers provide opportunities to do several types of practicum during learning", as many as 102 students (75.6%) strongly agreed and 30 students (22.2%) expressed agreement. No students chose the category of hesitation or disagreement, while 3 students (2.2%) strongly disagreed. Thus, as many as 97.8% of students responded positively to the opportunity to do several types of practicum during learning. These findings show that learning provides a wide space for students to

be directly involved in various practicum activities. This involvement has the potential to support the development of science process skills because students gain experience in conducting observations, experiments, data collection, and information processing directly.

The high percentage of positive responses to the statement "The purpose of each practicum is clearly explained" indicates that multi-practicum-based learning provides a directed learning experience to students. As many as 99.26% of students stated that they agreed or strongly agreed that the purpose of the practicum had been clearly explained. Clarity of practicum objectives is an important part of practicum-based learning activities because students not only conduct experimental activities, but also need to understand the objectives to be achieved through these activities. When the practicum objectives are clearly conveyed, students can know what to observe, what data needs to be obtained, and what expected results from the activities carried out.

In the context of multi-practicum-based learning, practicum activities that are carried out more than once or through several types of activities allow students to gain a more diverse experience. The clarity of the objectives in each activity helps students understand the relationship between one practicum activity and another. This can support the development of science process skills, because students are directed to make observations, identify information, collect data, analyze results, and draw conclusions based on the activities carried out.

Thus, these results show that the clarity aspect of practicum objectives has been implemented very well and can be one of the factors that support student involvement in multi-practicum-based learning.

Student activity in practicum

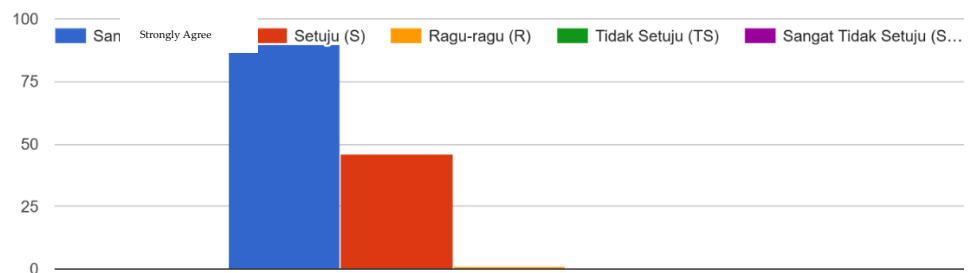


Figure 1. Student Activity in Practicum

The results on the statement "I actively participate in all practicum activities" show a very positive response. Of the 135 students, all of them gave a Agree or Strongly Agree response, with 66.67% choosing Strongly Agree and 33.33% choosing Agree. These findings show that multi-practicum-based learning is able to create student involvement in the learning process. The activeness of students during the practicum can be seen from their willingness to participate in the stages of the activity, make observations, carry out experiments, collect data, and engage in the given learning process.



Figure 2. Student activity in practicum

This activeness has a relationship with the development of science process skills. Science process skills are not enough to be developed only through theoretical material delivery, but require the direct involvement of students in scientific activities. Through practicums, students have the opportunity to experience the process of obtaining and processing information based on the results of observations or experiments [9].

In multi-practicum-based learning, the diversity of practicum activities can also provide opportunities for students to develop science process skills repeatedly. The more actively students are involved in practicum activities, the more opportunities for students to carry out processes such as observing, classifying, measuring, interpreting data, predicting, communicating results, and drawing conclusions.

Therefore, the results of the research in the third statement show that multi-practicum-based learning not only provides experimental activities to students, but also encourages active student involvement during the learning process.

Based on the results of the study, multi-practicum-based learning showed a very positive response from high school XII students. This can be seen from the high percentage of students who stated that the purpose of each practicum was clearly explained and all students stated that they actively participated in practicum activities. The clarity of the purpose of the practicum provides direction to students in carrying out each stage of the activity, while the activeness of students shows direct involvement in the learning process. This condition is an important factor in the development of students' science process skills because practicum activities provide opportunities for students to carry out scientific activities directly, starting from making observations, collecting data, processing information, to drawing conclusions. Thus, multi-practicum-based learning has the potential to make a positive contribution to the development of science process skills of grade XII high school students.

Skills in Using Practicum Tools and Materials

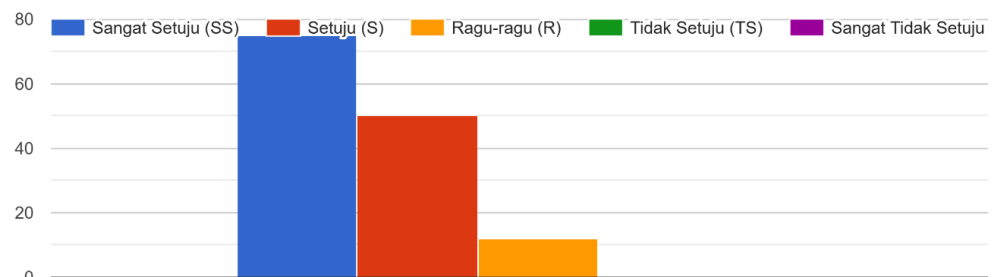


Figure 3. Skills in Using Practicum Tools and Materials

Based on the results of the research on the skill aspect of using practicum tools and materials, a response that tended to be positive from students. In the statement "I am able to use laboratory tools correctly", most students chose the category of Strongly Agree and Agree, while only a small percentage chose Undecided. Similarly, in the statement "Practicum tools and materials are easy to use", the majority of students gave a response of Strongly Agree and Agree. The results showed that students had a positive experience in using tools and materials during multi-practicum-based learning.

Multi-practicum-based learning provides students with the opportunity to be directly involved in experimental activities so that students can gain experience in using various laboratory tools and materials [13]. The direct and repetitive use of tools and materials can help students improve practical skills as well as build confidence in conducting scientific activities. The ability to use laboratory tools correctly is also an important part of science process skills because scientific activities require students' ability to carry out experimental procedures appropriately and systematically.

The high positive response to both indicators shows that multi-practicum-based learning provides an experience that supports the development of students' science process skills, especially in the aspect of skills using tools and materials. However, the presence of students who give a hesitant response shows that there are still some students who need further practice and guidance in using practicum tools and materials.

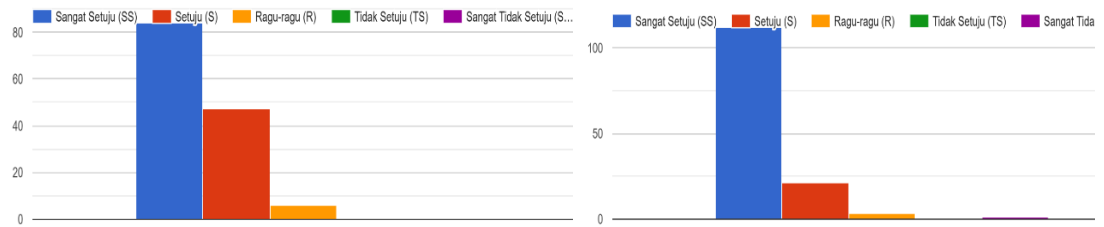


Figure 4. Results of students' responses to the understanding of instructions and the use of practicum tools

In the indicators of skills in using practicum tools and materials, responses that tend to be positive from students are obtained. This can be seen from the dominance of the Strongly Agree and Agree answer in the statement regarding the ability to use laboratory tools correctly, the ease of using tools and materials, the ease of understanding the instructions for using the tools, and the provision of explanations by the teacher before practicum activities.

These results show that multi-practicum-based learning provides direct experience to students in using tools and materials during experimental activities. In addition, the existence of easy-to-understand instructions for using tools and teachers' explanations before practicum help students prepare themselves before conducting experiments. These conditions can make students more confident and directed in carrying out practicum activities.

Experience using tools and materials directly is an important part of developing science process skills. Through practicum activities that are carried out repeatedly and diversely, students have the opportunity to develop their ability to use tools, follow procedures, make observations, and obtain data from experimental activities. Thus, the results of the questionnaire on this indicator show that there is a positive response of students to the implementation of multi-practicum-based learning in supporting science process skills.

4. Discussion

The results of the study showed that multi-practicum-based learning received a very positive response from grade XII students of SMAN 1 Sintang. As many as 97.8% of students agreed and strongly agreed that teachers provide opportunities to conduct several types of practicum during the learning process. These findings show that the application of multi-practicum is able to provide a wide enough space for students to be directly involved in scientific activities. This involvement is important because Biology learning not only emphasizes mastery of concepts, but also requires students' experience in observing phenomena, conducting experiments, collecting data, and drawing conclusions based on empirical evidence.

The high level of positive response can be understood from the characteristics of multi-practicum-based learning that provides a more diverse and continuous experimental experience. In this study, practicum is not positioned solely as an additional activity after theoretical learning, but as part of a learning series that provides students with the opportunity to carry out scientific activities directly. With several practicum activities, students have more opportunities to repeat the observation process, use tools,

collect data, and interpret results. These repetitive experiences can theoretically help students build scientific skills gradually.

These findings are in line with the study of [1] which shows that experimentation is one of the important activities in the development of science process skills. Hands-on and minds-on activities, inquiry-based learning, discovery learning, scientific argumentation, and STEM integration are some of the strategies that can support the mastery of science process skills [14]. Thus, the positive response of students in this study can be understood as an indication that a learning environment that provides opportunities to conduct hands-on experimental activities can support student involvement in the scientific process.

In addition to providing opportunities to conduct several practicums, the results showed that students responded very positively to the clarity of the objectives of each practicum activity. As many as 99.26% of students stated that they agreed or strongly agreed that the purpose of the practicum was clearly explained. These findings show that the multi-practicum applied not only emphasizes the diversity of activities, but also has a learning structure and direction that is understood by students.

Clarity of purpose is an important aspect of practicum-based learning because experimental activities can lose the meaning of learning if students only focus on completing the procedure. Students need to know the purpose of the activity, the information that must be observed, the data that must be collected, and the relationship between the practicum activity and the concept being studied. In the context of multi-practicum, clarity of purpose also helps students understand the relationship between one activity and the next.

These findings reinforce the idea that the effectiveness of practicum activities is not only determined by the existence or number of experimental activities, but also by the quality of the learning design. [15] show that the benefits of practical work in science education are influenced by the objectives, the design of the activities, the method of implementation, and how the activities are evaluated. Therefore, the results of this study indicate that multi-practicum that is carried out in a directed manner can provide a more meaningful learning experience than practicum that is only oriented towards the completion of procedures.

The results of the study also showed that all students responded in agreement or strongly agreed with the statement that they actively participated in all practicum activities. As many as 66.67% of students expressed strongly agreement and 33.33% expressed agreement. These findings show that there is high student involvement during the multi-practicum-based learning process.

This activity has an important meaning in the development of science process skills. Science process skills are basically developed through the experience of doing scientific activities, not just through theoretical receipt of information. When students are directly involved in observation, experimentation, data collection, and discussion of results, they gain the opportunity to use scientific skills in real terms.

In multi-practicum-based learning, the experience occurs repeatedly. Repetition not only increases the frequency of student activities, but also allows students to learn from previous practicum experiences. Students can improve the way they make observations, improve the accuracy of using tools, improve data collection techniques, and develop the ability to interpret results. Thus, student activeness can be seen as one of the mechanisms that explains why practicum-based learning has the potential to support the development of science process skills.

These findings are in line with the research of Acarli and Dervişoğlu (2021) which shows that the application of inquiry-based Biology laboratories can improve students' science process skills. The results of [6] research also show that the application of guided inquiry in Biology practicum can improve science process skills, especially observation and conclusion drawing skills. The similarity of these findings shows that student

involvement in purposefully designed laboratory activities is an important aspect of science learning.

In terms of the use of practicum tools and materials, most students gave positive responses. Students stated that they were able to use laboratory tools correctly and that practicum tools and materials were relatively easy to use. However, there were still some students who gave hesitant responses. This condition shows that the multi-practicum experience provides support for students' practical skills, but the level of mastery of each student is not completely the same.

The use of tools and materials is an important part of the implementation of the scientific process. Students are not only required to know the function of a tool, but also need to be able to use it according to procedures so that the data obtained can be trusted. Errors in the use of tools can affect the process of measurement, observation results, and interpretation of data. Therefore, the opportunity to use tools directly and repeatedly in multi-practicum can provide an experience that is important for the formation of students' practical skills.

A positive response to the teacher's understanding of the instructions for using the tool and the teacher's explanation before the practicum also shows the importance of the teacher's role as a facilitator. In practicum-based learning, the teacher not only acts as a material presenter, but also provides orientation, ensures students understand the procedure, provides direction when difficulties arise, and helps students reflect on the results of the activity.

Thus, the findings of the study show that the success of multi-practicum is not only related to the number of practicums carried out, but also to the learning support that accompanies each activity. Teacher explanations, instructions for the use of tools, clarity of objectives, and opportunities to practice directly are complementary parts in creating a scientific learning experience.

Overall, the results of the study show a positive trend between the application of multi-practicum-based learning and students' experience in conducting scientific activities. Findings regarding the opportunity to conduct several practicums, clarity of objectives, student activity, and ability to use tools and materials show that multi-practicum provides a learning environment that allows students to interact directly with the scientific process.

Theoretically, the relationship can be explained through the characteristics of science process skills that require practice and experience. The skills of observing, measuring, classifying, formulating hypotheses, conducting experiments, interpreting data, and communicating results do not develop through teacher explanations alone. Students need the opportunity to perform such skills in real, repetitive learning situations. Padilla (1990) distinguishes basic process skills and integrated process skills, suggesting that scientific skills range from simple abilities to more complex abilities in scientific investigation.

In the context of this research, multi-practicum provides an opportunity for students to gain such experience through several experimental activities. The practicum can be a space for students to make observations and measurements, while subsequent activities can provide an opportunity to process data, draw conclusions, and communicate results. Thus, the series of practicums allows science process skills to be practiced in more diverse contexts.

The results of this study also have compatibility with previous research. [3] show that inquiry-based laboratories can support the improvement of science process skills. [6] found that science process skills are improved through guided inquiry in Biology practicums, while [1] through systematic literature review show that experiments and various active learning strategies have a role in the development of science process skills. Thus, the results of this study reinforce the previous finding that an active and directed practicum experience is one of the relevant learning environments for the development of scientific skills [16].

However, the results of the study need to be interpreted carefully. Positive student responses indicate that they feel that there is a learning experience that supports practicum activities, but these responses have not in themselves proven the magnitude of the improvement in science process skills. This is important because the influence of learning should be supported by the results of measuring science process skills through test instruments, observations, or performance assessments. In this research method, the use of pretest-posttest, N-Gain, and t-test has actually been designed to test the differences between the experimental and control groups.

Therefore, the discussion of the influence of multi-practicum on science process skills should not only be based on the percentage of student responses, but also relate it to the results of measuring science process skills directly. If pretest, posttest, N-Gain, and t-test data are available, these results need to be included so that conclusions about the influence of multi-practicum-based learning have a stronger empirical basis.

Practically, the results of the study show that Biology learning can be designed by placing practicum as an integral part of the learning process. Multi-practicum can be used to provide repeated scientific experiences, but its implementation needs to pay attention to the relationship between activities, clarity of objectives, readiness of tools and materials, teacher assistance, and skill indicators of the science process to be developed. With this approach, practicum does not stop at the activity of conducting experiments, but becomes a means for students to learn how scientific processes are carried out and how evidence is used to build knowledge.

Thus, the findings of the study indicate that multi-practicum-based learning is a potential approach in creating active and scientific experience-oriented Biology learning. The advantage of this approach mainly lies in the opportunity for students to gain diverse and repetitive practicum experiences. However, its effectiveness remains dependent on the quality of learning design and empirical evidence regarding changes in students' science process skills.

5. Conclusion

The results of the study showed that multi-practicum-based learning received a positive response from students. Most students were able to use laboratory tools correctly, understand instructions for use, and follow practicum procedures after receiving directions from teachers. These conditions show that multi-practicum provides students with hands-on experience in carrying out experimental activities systematically. This involvement supports the development of science process skills, especially in using tools and materials, conducting experiments, observing processes, and collecting data. Thus, multi-practicum-based learning can be an approach that supports the development of science process skills through active, direct, and directed learning experiences.

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