

# Student Activities in Animal Structure Practicum Activities Using Modified Free Inquiry-Based Practicum Guidelines

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**Abstract:** Practical work guide of Animal Structure using modified free inquiry is designed so that the practitioner is actively able to solve problems through observation, exploration, and practical work procedures. This research uses the Four-D model (Define, Design, Develop, and Disseminate) developed by Thiagarajan, Semmel, and Semmel (1974). In this research, the validity of the practical work guide has been carried out, and then development tests are carried out by looking at student activities in practical work activities using the practical work guide of Animal Structure using modified free inquiry, observed by observers using observation sheets of attitude and skill. The data was processed using the percentage formula proposed and obtained the value of student attitudinal activity 81.65 (very effective) and student skill activity 80.81 (very effective). Thus, it can be concluded that the practical work guide of Animal Structure using modified free inquiry is very effective to bring up scientific attitude activities and student work skills in practical work activities.

**Keywords:** Development test; Inquiry; Modified free inquiry

## Introduction

Practicum is part of teaching which aims to allow students to test and implement in real situations what is obtained in theory; and is an effort that can be done to improve student skills in the learning process (Stehle & Peters-Burton, 2019). To guide students in practicum activities, a practicum guide is needed that can direct students to work scientifically and systematically and by the demands of predetermined learning outcomes. Based on that, a modified free inquiry-based Animal Structure practicum guide was developed. The modified free inquiry-based Animal Structure practicum guide has been designed so that the practitioner is actively able to solve problems through observation, exploration, and practicum procedures (Rahmi et al., 2020). The stages in the modified free inquiry-based practicum activities are identifying and mapping the scope of the problem, planning and predicting results, conducting investigations for data collection, interpreting data and developing conclusions, and reflecting (Iqbal et al., 2021).

This practicum guide is a textbook developed using the Four D models proposed by Thiagarajan, Semmel, and Semmel (1974). This development process is in the development phase, has been validated by experts and initial development tests have been carried out in the form of practicality tests on students. For further development tests, effectiveness tests were carried out on modified free inquiry-based practicum guides. Even though the textbook has been declared very valid by the validator, the next test phase must be carried out by the stages proposed by (Rahmadani & Ayu Mustika Sari, 2022). The development test involved trying out the teaching materials on members of the target-trainee group. The purpose of this test is to gather feedback to make the material instructional and motivationally more effective. Often, large discrepancies were found between what the experts predicted and the way the participants practiced.

Haulle et al. (2021) stated that to find out the effectiveness of textbooks in achieving learning objectives, the method is to carry out competency tests. Competency tests can be carried out either through tests

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or non-tests. The choice of competency test depends on what competencies will be known. In this study, the competency tests required for the effectiveness of the modified free inquiry-based Animal Structure practicum guide are attitudinal and behavioral competencies of students' skills, because they are related to practicum activities in the laboratory (Sapriati et al., 2023). The application of the modified free inquiry learning approach to the animal structure practicum guide is because according to (Hofer & Lembens, 2019), practicum implementation should use modified free inquiry learning strategies. This is based on the results of research that has been done, namely the free inquiry learning strategy is modified to further create student interest during the practicum. Free modified inquiry learning strategies require students to be able to think critically to solve problems that have been raised at the beginning of the meeting.

From the results of Depari et al. (2019) regarding the application of modified-free inquiry, before treatment, all students had an understanding with fewer criteria with an average value of 21.3, but after being given remedial teaching treatment with the modified-free inquiry model, students' understanding of concepts increased on average to 68.3. Before the treatment, all students' conceptual understanding scores were below 65, while after the treatment, 75% of students had an understanding score of more than 65.

Thus, the development of practicum guides that use a modified free inquiry approach can increase student

activity in animal structure courses, especially in the material being practiced.

### Method

This study uses the Four-D models development research design proposed by Thiagarajan, Semmel, and Semmel (1974) which consists of define phase, design phase, develop phase and disseminate phase. The stage carried out in this study was the development phase, which was a test of product effectiveness. The instruments used consisted of attitude activity observation sheets and skill activity observation sheets. The aspects of attitude that are assessed are the responsibility in practicum activities, ethics in drawing observations, cooperation in discussions to fill in differences tables (collection of hypothesis data), and making conclusions. Meanwhile, the aspects of the skills that are assessed are skills in dissecting objects and skills in drawing objects.

### Result and Discussion

From the observer's observations of attitude and skill activities during practicum activities using a modified free inquiry-based animal structure practicum guide, the results obtained were the effectiveness test results of a modified free inquiry-based animal structure practicum guide as shown in Table 1.

**Table 1.** Student Attitudes and Skills Activity Values

Information	Attitude activity						Skill Activity					
	A		B		C		D		E		F	
	R-1	R-2	R-1	R-2	R-1	R-2	R-1	R-2	R-1	R-2	R-1	R-2
Assess each aspect	74.72	75.45	79.83	90.63	78.98	89.08	76.99	87.50	75.85	79.23	79.80	88.83
Average value	75.08		85.23		84.03		82.25		77.54		84.09	
Overall Value	81.65						80.81					
Overall criteria	Very effective						Very effective					

Information: A = responsibility, B = drawing ethics, C = discussion filling in the difference table, D = discussion making conclusions, E = skills in dissecting objects, F = how to draw, R-1 = Group 1, and R-2 = Group 2.

In Table 1 it can be seen that the assessment of student attitudes and skills activities in practicum activities obtains very effective criteria for both aspects of the assessment. Assessment of aspects of attitude and skill activities that have been grouped based on per-aspect of observation, then combined, and obtained an average value of 81.65 which is categorized as very effective criteria for attitude activity scores, and 80.81 which is also categorized as very effective criteria for skill activity scores. so it can be concluded that practicum using modified animal structure practicum guides can be very effective for use in animal structure practicum activities. In addition to the value of the

overall effectiveness of attitude and skills activities, the assessment is also seen from the percentage of the number of students who get an assessment with effective criteria. The following is presented based on the percentage of the number of students based on the effectiveness value in Tables 2 and 3.

**Table 2.** Percentage of the Number of Students Based on Attitude Effectiveness Value

Criteria	A				B				C				D			
	Amount		Ttl	%	Amount		Ttl	%	Amount		Ttl	%	Amount		Ttl	%
	R-1	R-2			R-1	R-2			R-1	R-2			R-1	R-2		
SE	9	10	19	38	12	21	33	66	12	20	32	64	12	20	32	64
E	9	15	24	48	6	7	13	26	6	8	14	28	6	8	14	28
CE	3	3	6	12	3	0	3	6	3	0	3	6	3	0	3	6
KE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TE	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2

Note: A=responsibility, respect (the ethics of drawing objects), discussion attitude to fill in the difference table, discussion attitude to conclude, R-1= Group 1, R-2= Group 2, Ttl= Total, and %= Percentage

From Table 2 it can be seen that the attitude aspects of students who get assessments with very effective criteria in each aspect of the observation are more compared to the other criteria, where the number of students who get very effective criteria at each meeting exceeds 63% apart from the first meeting (38%). And continued with an assessment with effective criteria

with a range above 25%, except at the first meeting (above 45%). This means that the Animal Structure practicum activity using a modified free inquiry-based practicum guide is very effective in cultivating responsible attitude activities, respecting ethics when drawing, and participating in discussions.

**Table 3.** Percentage of the Number of Students Based on the Value of Skill Effectiveness

Criteria	E				F			
	Amount			%	Amount			%
	R-1	R-2	Total		R-1	R-2	Total	
SE	11	15	26	52	12	22	34	68
E	7	10	17	34	6	5	11	22
CE	3	2	5	10	3	1	4	8
KE	0	1	1	4	0	0	0	0
TE	1	0	1	2	1	0	1	2

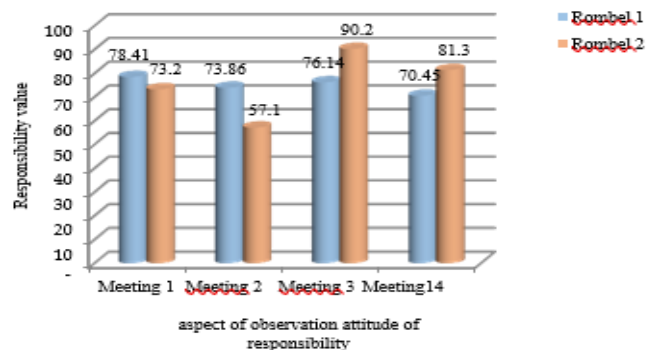
Description: E: Skills in dissecting objects, F: how to draw objects, R-1: Group 1, R-2: Group 2, Ttl: Total, and %: Percentage

From Table 3 it can be seen that the value of the effectiveness of skill activities achieved by students for many dissecting skills is in a very effective (52%) and effective (34%) position. If the total number of students who are in the criteria of very effective and effective then the value of the effectiveness of dissecting skills in practicum activities is above 80%. This means that more than 40 people out of 50 students distributed in Class 1 and Class 2 already have good surgical skills.

For skill activity values how to draw objects is more in the criteria of very effective (68%) and effective (22%). If the total number of students who are in the very effective and effective criteria, then the value of the effectiveness of the object drawing skill activity is above 80%. Judging from the two assessments of these skill activities, the modified free inquiry-based Animal Structure practicum guide is effectively used to bring up student skill activities in practicum activities. The following presents a graph of each aspect of observing student attitudes and skills in each Class 1 and Class 2 in Figures 1, 2, 4, 5, 7, and 9.

Assessment of the attitude of responsibility that is assessed in practicum activities is; dividing main tasks properly assigned to the student concerned (Schildkamp et al., 2020); assisting group members in collecting data

(not part of the main task of the student concerned); helping prepare tools for data collection or clean tools. In the assessment chart presented in Figure 1, it can be seen that the average score in Group 1 at meetings 1 and 2 has a bar graph that is higher than Group 2, but the graph for the assessment of the attitude of responsibility for meetings 3 and 4 at Group 2 is higher than Group 2 1.



**Figure 1.** Assessment of the attitude of student responsibility at each practicum meeting

In the aspect of attitude of responsibility that often appears in observations is the assessment of working on the distribution of the main tasks assigned to the

individual concerned, and not much raise the attitude of helping group friends, where the assessment of responsibility ranges from 86% of the number of students in Class 1 and Class 1 2. In Table 1 it can be seen that each meeting shows an effective predicate in the responsibility attitude activity in Group 1, but there is a decrease in the 2nd and 4th meetings. The same is true for the value of the attitude of responsibility in Group 2 which also decreases in the second meeting. This is because the main tasks carried out make their activities for these students (Keiler, 2018).

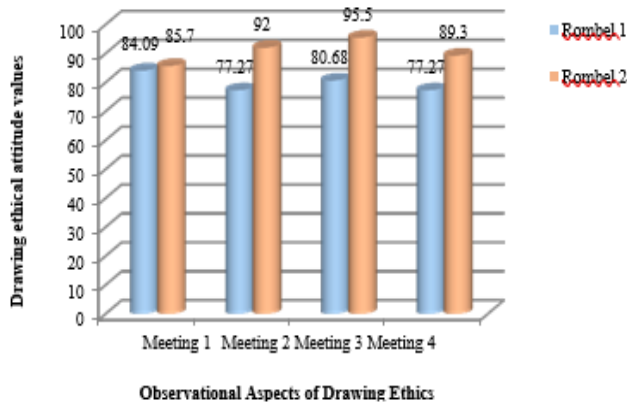


Figure 2. Assessment of students' drawing ethics at each practicum meeting

Assessment of the attitude of drawing ethics is an assessment of attitudes related to student ethics when describing the object of observation, where the attitudes assessed are (Vučković et al., 2020); students describe the results of observations after the object has been unraveled and has been neatly arranged on the surgical tray, and the surgical waste has been bagged; students describe the direct results of the objects they observe and students describe their observations in the image column of their observations. In the assessment chart presented in Figure 2, it can be seen that the average score in Group 1 at each meeting is lower than Group 2, but is still in the range of effective and very effective predicates.

For the ethical activity of drawing objects, on average all groups in both classes draw the results of the practicum if the tools and work tables are clean. Look at Figures 3 a and b, where the surgical trays, equipment, and work table for the group when the group was drawing looked clean and there were no surgical wastes on the table. On average, group members have drawn their work directly from the object in question (see Figure 3). The percentage of effective student attitudes toward drawing ethics is 96% (Table 2).

The assessment of the attitude of the discussion to fill in this difference table is that students participate in discussions to fill in the observation results table,

provide opinions in the discussion, and copy the results of the discussion in the table of their observations. The observation table here is a table of differences in the organ structure of each Vertebrata species which is used as a practicum object.



Figure 3. Drawing practicum objects

The structure being compared is the difference in the organs that make up the vertebrate system, both in number, modification of the organ in question, size, presence, or absence of the organ in question in the observed objects. Discussion in this activity requires the cooperation of group members and high participation because there are columns for differences in organ structure that must be filled in by students as a comparison of organ systems tissues in each Vertebrata. The division of tasks to fill in the answers in the columns will greatly help the student's work and can be completed in a relatively shorter time. so students who copy the results of the discussion in the column of the difference table get a value, but those who fill in the column in the table of differences that do not have any discussion do not get a value. Assessment of the attitude of the discussion to fill in the difference table can be seen in Figure 4.

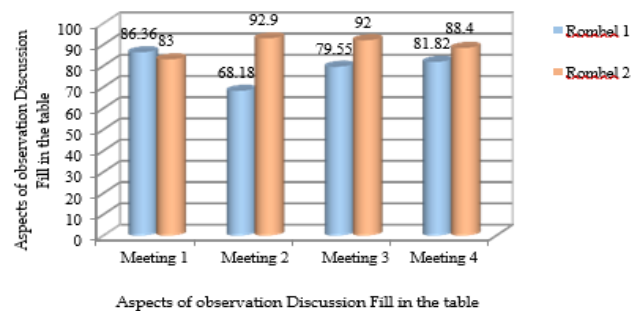


Figure 4. Assessment of the attitude of the discussion filling in the difference table

At the first meeting, Group 1 got a score with very effective criteria and was higher than Group 2, but at the next meeting, Group 2 got a discussion attitude score to fill in the difference table which was higher than Group

1 even though at the fourth meeting Group 1 again got a score with very effective criteria. Another discussion assessment is a discussion assessment making conclusions as shown in Figure 5.

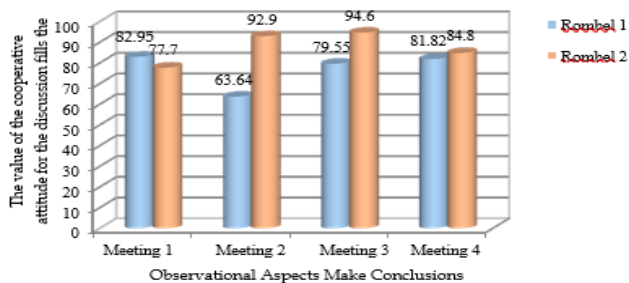


Figure 5. Assessment of discussion attitudes to conclusions

In the assessment discussion, making this conclusion has the same observational aspects as the discussion filling in the difference table, it's just that the level of importance is not that high. But it is at this conclusion that students understand whether or not the concepts, principles, and procedures that have been practiced. Whether or not the hypothesis proposed at the hypothesis formulation stage is answered or not lies at this conclusion stage. So those who play an active role in raising this discussion are the heads of each group. It can be seen in Figure 5, that there was good cooperation shown by group members in this discussion, where the assessment criteria ranged from effective (60-80%) and very effective (81-100%), with an average assessment of the two groups is 82.25% (very effective criteria) as shown in Table 1.

For participation in the discussion, it is good to fill in the table of differences in objects and make conclusions, the assessment of student attitude activities gets an effective predicate for Class 1 and is very effective for Group 2 (Table 1). The discussion value of Group 1 decreased at meeting 2 (respiration system and circulation system), the same case as the value of the attitude of responsibility for Group 1, because a lot of time was spent dissecting so there was little time to fill in the table of differences and conclusions, so many group members choose not to discuss or just listen to group members explain or give opinions. But for the next meeting, there is an increase in a very good assessment towards a very effective predicate. The activeness of students discussing in their groups can be described in Figures 6a and 6b.

The group discussion held by students in the animal structure practicum is an application of modified free inquiry demands, which is embodied in the form of cooperation of group members in finding answers to tables of organ differences and making conclusions from the results of the practicum. In the modified independent inquiry animal structure practicum guide

that has been developed, the material on animal structures has been provided using complete pictures of the structure of Vertebrata organs. So apart from the objects they draw, students can also make comparisons of the material and pictures provided by the guide. The pictures provided are very helpful for students in giving opinions and rebuttals. This was confirmed by Miftahul Jannah et al. (2020) who researched the effectiveness of using science literacy teaching materials on improving learning achievement, that groups using science literacy based science teaching materials were also more enthusiastic about learning the material because according to them the material was easy to understand and lots of pictures that help them understand the material.



Figure 6. Group discussion: a and b are pictures of groups that are having a discussion

In discussion activities, differences of opinion will lead to small debates to defend that opinion. This action is very positive because these differences of opinion and objections are based on the theory that they get and they believe to be true so that there is an exchange of opinions and views that will open the horizons of students' minds to analyze and also add to their knowledge so that there are no difficult words to understand. What they learn and what competencies they must achieve in learning. Here (Parra, 2016) gives the same opinion, that discussion is a learning strategy that exposes students to a problem that is studied, analyzed, and presented through a forum to reach an agreement. Discussion is not a debate that ends in a victory, but rather an exchange of ideas, views, or arguments that eventually find common ground.

During the occasional discussion, students also asked the supervisor about the correctness of the results of the discussion they got. To maintain communication that trains students' independence and critical thinking level, questions submitted by students are answered in the form of causal questions (if-then) that provoke these students to open their horizons of thought. This has been adjusted to the characteristics of a modified free inquiry that is to carry out guidance the lecturer provides in the form of questions. According to Haleem et al. (2022) active communication between students and lecturers

and peers also makes students more innovative in designing simple experiments.

This of course adds to student references, information, and innovations that will later be applied in school. Nyumba et al. (2018) also stated the results of the research they observed that with discussion and presentation activities as well as joint discussions with the teacher, students become more open so that they find it easier to understand the learning material being discussed. By itself, the level of difficulty in learning encountered by students is included in the very low level. By understanding the learning material by students, it becomes easier for students to carry out the learning process, in this case in the process of working on practical jobs. Very few students encounter problems or difficulties during their learning process.

Fadilla et al. (2019) stated from the results of his research that the emergence of curiosity led to the emergence of indicators of science process skills in the form of asking questions. This activity can be seen when students ask questions while making observations, students ask each other about what they find during observation activities, or when students experience difficulties related to understanding the material. This questioning activity is carried out by fellow students, assistants, or lecturers. With the activity of asking questions, students can exchange knowledge and understanding related to the material. Coman et al. (2020) also said that active communication between students and lecturers and peers also makes students more innovative in designing simple experiments. This of course adds to student references, information, and innovations that will later be implemented in schools.

Overall, the assessment of the effectiveness of the use of free inquiry-based Animal Structure practicum guides modified on student attitude activities has exceeded 85% (very effective and effective criteria). Combining the assessment of discussion attitudes is good for filling in the table of object differences and making conclusions Class 1 and Class 2 get a very effective predicate because it exceeds the value of 80. This states that the free modified free inquiry-based animal structure practicum guide is effectively used as teaching material in Animal Structure practicum activities to foster student discussion attitudes.

In this object dissecting skill the abilities required of students are; students hold the object to be dissected correctly, or students show the object's body surgery lines or students dissect the object's body on the surgical line carefully without injuring the internal organs that will be observed using surgical instruments; students separate the organ systems or show how to separate the organ systems that are observed carefully and not damage the observed organ systems from other organ

systems using surgical tools; students describe the organ systems or students show how to describe the organ systems observed in a single, inseparable sequence carefully without damaging the organs or channels -the channel (Davis et al., 2021). Assessment of dissecting skill activity can be seen in the graph presented in Figure 7.

In the assessment of the object dissecting skill activity, it can be seen in the graph that at the first meeting the ability to dissect objects in Group 1 gets a very effective predicate, and for the next meeting gets an effective predicate, and in Rombel 2 it can be seen that there has been an increase from an effective predicate to a very effective predicate at the end of the meeting. The surgical skills that require special accuracy are the respiratory system and circulatory system practicum which are carried out at the second meeting (Kamińska et al., 2019). Here the skills of Class 1 are lower than Group 2, due to the level of difficulty in dissecting, dissecting, and assembling organs because it is done twice.

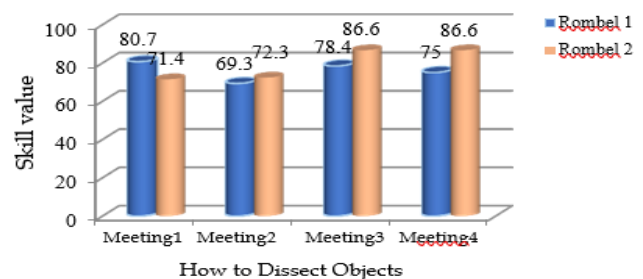


Figure 7. Assessment of object dissecting skills

Thoracic surgery can be done quickly by class 1 students, but heart surgery takes a long time because the object's heart is very small so you have to be very careful in dividing the vertical plane of the heart. This requires student accuracy so that there are no double incisions in the vertical plane of the heart which will damage the walls of the heart chambers. This can be seen in the group that postponed surgery because their heart would be damaged if they were operated on. In contrast to Team 2 who chose to discuss with friends in their respective groups to determine the line of cardiac vertical surgery. However, because heart surgery does not require "many hands"), students who have a high sense of curiosity to prove the truth of the theory and have high self-confidence perform the surgery (in Figure 8 a and b, only one in the group performing vertical plane cardiac surgery). This is to the results of (Senisum et al., 2022) that students who have high self-confidence obtain higher results in science process skills than students who have low self-confidence, and from the results of his research, there is an interaction effect

between learning strategies and self-confidence on Biology science process skills.

Apart from high self-confidence, this modified free inquiry provides opportunities for students to be as creative as possible to collect the data needed to answer the truth of the hypotheses that they have included in the hypothesis formulation column. so to perform surgery, students are given the freedom to use any type of tool. Surgery without being given information on the use of the surgical instrument (See the surgical tools used by students in Figures 8a and 8b). By looking at the shape of the tools, students use these surgical tools properly. This is proven by the results of the surgery in the form of a structured description of the organs arranged neatly and cleanly on the surgical tray. Allowing students to be creative in their way gives a positive value to students' dissecting skills.

This is justified by Juliantine et al. (2022) where the development of creativity can be done through discovery learning and meaningful learning, and not through expository activities. Because the essence of creativity is the development of divergent and not convergent thinking skills. Divergent thinking is the process of thinking of seeing a problem from different points of view or describing a problem with several possible solutions. For the development of such abilities, supervisors need to create teaching and learning situations that provide many opportunities for students to solve problems, carry out experiments, and develop their ideas or concepts. Such a situation also demands a more democratic, open, friendly, and trusting attitude toward students. In addition, according to the research results (Wale & Bishaw, 2020), this inquiry-based learning process is also proven to be able to improve students' creative thinking skills because they face several authentic problems during learning activities.

This creativity can be seen from the researchers' observations of the various types of surgical instruments used by the practitioner to dissect the vertical heart of the object. This is by (Krenn et al., 2022) that there is a positive and significant relationship between the knowledge of physics practicum tools (X) which includes the name of the tool, the use of the tool, how to use the tool, the measuring limit of the tool, the accuracy, and error of the tool, the zero point of the tool, with students' psychomotor abilities (Y) in the form of practicum preparation, how to assemble tools, how to read tools, the accuracy of carrying out procedures, summarizing experimental data, and work safety. The results of the study prove that students who have good practicum tool knowledge have good psychomotor abilities. so with a modified free inquiry learning approach that is "modified" in the animal structure practicum guide, it can provoke student creativity which

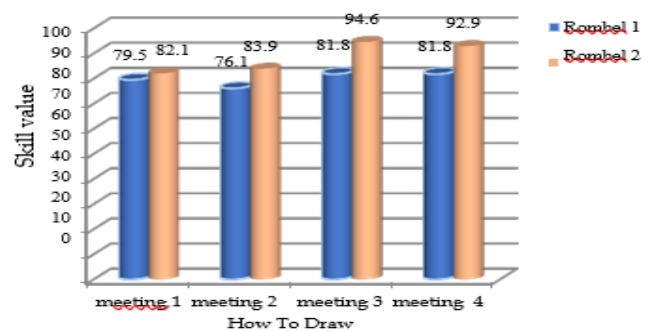
has a positive impact on self-confidence and the ability to solve problems given to improve the student's psychomotor abilities.

This surgery has different levels of difficulty, if the observed organ is small enough, you have to be very careful in dissecting, dissecting and arranging the organs and it is safer if only one or two people do it to avoid organ damage (Tarlow & Battell Lowman, 2018). Likewise with the observation of the central nervous system at meeting 4, where surgery on the skull must be very careful because the brain in the skull is very soft and very easily damaged and crushed by pressure and incisions, so the attitude of responsibility is more devoted to completing the assigned task to only the individual in question and other attitudes also have a downward effect such as discussions, because the time spent dissecting is very much so that each student is more focused on completing the table of differences, data analysis, and their respective conclusions without much discussion activity.



**Figure 8.** Dissecting the vertical plane of the heart in the respiratory and circulatory system

The skill of how to draw objects assessed in the Animal Structure practicum using a modified free inquiry-based practicum guide is (Lieberman et al., 2022); students describe the results of observations by the results of the breakdown of organ systems; Students draw objects with positions according to the practicum guide's request; Students compare network structures. The following graph shows the value of students' drawing skill abilities, described in Figure 9.



**Figure 9.** Assessment of skills in how to draw objects

In the graph shown in Figure 9, it is described the beginning to the final meeting of the Animal Structure practicum using a modified free inquiry-based practicum guide, Group 2 gets a higher score than Group 1, but Group 1 shows an increase in activity value from an effective predicate to a very high predicate. effective, while Rombel 2 from the beginning to the final meeting always get an assessment with a very effective predicate. The skills of how to dissect and how draw observational objects are the main skills in practicum observations of the digestive system, respiratory system and circulatory system, excretory system and reproductive system, and central nervous system. so students must be able to master good surgical techniques and strategies.

This method of dissecting is only informed by the supervisor on the symmetry section of the animal body in general, because basically by using a modified free inquiry-based Animal Structure practicum guide, students must be able to find out for themselves the knowledge they want to know because of the general way of dissection, decomposition of organs and preparation the organs have also been included in the practicum guide in the form of diagrams images so that the independence of the students and the group itself must be realized by building self-confidence to start surgery without guidance, so here the supervisor will become a facilitator, by directing students by asking questions that lead to the condition of the visceral organs if they do the wrong surgery. Puspitasari et al. (2018) that one way to develop creativity is to give questions that hone the mind, where students it is easier to think creatively when we ask higher level questions, namely questions that require students to use previously learned information in new ways.

This dissecting skill is a skill related to observing the series of Vertebrata body systems by comparing (differentiating) the organ systems and organ structures of each Vertebrata, so to observe the series of body systems and organ structures, students must dissect objects that are used as model animals from the Vertebrata, then decomposes them in a complete series, and arranges them in a series in a surgical tray. This dissecting skill is one of the students' psychographic efforts to obtain answers to the problems that have been given in the formulation of the problem in the modified free inquiry-based animal structure practicum guide so that students are required to have the ability to think critically about the body structure of the practicum object starting with observing the body parts (Darling-Hammond et al., 2020).

Outsiders start their surgery in their group without special guidance for surgery. Training children to think critically is very good for learning, this is by the results of (Fajari et al., 2020) where students' critical thinking

skills can be improved by giving them training in problem-solving, analysis, evaluation, and self-regulation because findings research has suggested that the effort to develop interpretation, analysis, evaluation and self-regulation skills of students is less than 37%.



**Figure 10.** Dissecting objects: a and b are pictures of practicum groups doing surgery



**Figure 11.** Arranging system circuits and drawing objects

The students' surgical skills can be seen in Figures 10a, 10b, and 11. In Figures 10a and 10b, 2 groups of class 1 students who are carrying out surgery to observe the organs that make up the excretory system and reproductive system are presented, whereas in group 4 (looks closely at Figure 10b) it can be seen that 3 students are dissecting frogs, two of them are making surgical lines, and one other person is holding the integument of a frog that has been skinned. In Figure 11, the observed organ systems are arranged on a surgical tray in a structured and neat series.

Students' skills in how to draw objects show better scores, whereas class 2 is almost close to a perfect score (92.9) with an assessment of how to draw both groups getting very effective criteria. Looking at Figure 3, it can be seen that the students in the group are drawing the Vertebrate respiration system which is directly observed from the object. This proves that the Animal Structure practicum using a modified free inquiry approach in which there is a developed practicum guide has fostered students' skills, both from their dissecting skills and their drawing skills. so the modified free inquiry-based Animal Structure practicum guide is very effective to be used as teaching material (Rahmi et al., 2020).

Giving inquiry in this guide is very good for fostering activeness and student activity in practicum activities. This opinion is approved by (Ramadani et al.,



2021) because the use of inquiry in the learning process is to train students to carry out various activities, namely observation, investigation, experimentation, and comparing findings with one another. so the general purpose of inquiry is to help students develop intellectual skills and other skills.

## Conclusion

Based on the results obtained, the modified free inquiry-based animal structure practicum guide is a very effective guide for increasing student attitude and skill activities in practicum activities, with an attitude activity value of 81.65 (very effective criterion) and a skill activity value of 80.81 (very effective criterion).

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## Author Contributions

Conceptualization, N. N., M. M. Z., Y. Z., and E. R.; methodology, N. N.; validation, M. M. Z., and E. R.; formal analysis, Y. Z.; investigation, N. N and N. N.; resources, M. M. Z. and E. R.; data curation, Y.Z: writing—original draft preparation, Y. Z and E. R.; writing—review and editing, M. M. Z.: visualization, N. N. and E. R.; supervision, M. M. Z.; project administration, Y. Z.; funding acquisition, N. N. and Y. Z. All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors declare no conflict of interest.

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