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Correlation between Science Process Skills and Student-Tool Interactions in Surgical Practice and Microscope Observations

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Abstract: Correlation between Science Process Skills and Students' Interaction With Practicum Tools in Surgical Practice and Microscope Observations. **Objective**: This study aimed to determine whether there was a significant correlation between Science Process Skills (SPS) and Student Interaction with Practicum Tools (SIPT) when the students were conducting Surgical Practice and Microscope Observations in their practicum session. **Methods**: The design used for this study was descriptive correlational study with 11th grade high school students with a total of 58 students as the samples. **Findings:** The data were collected by using test and questionnaire as the instruments then were tested and analyzed using Spearman correlation test and Z test where the results were 0.16 (Spearman) and 1.21 (Z Test), which meant that there was no significant correlation between SPS and SIPT. **Conclusion:** As the conclusion, between SIPT and SPS, even though there was a mutual connection, it was not significant. One of the reasons was that the learning conditions at the time the research was carried out, the students must learn from home due to Covid-19 Pandemic that lessen the opportunities to learn directly at school.

Keywords: student scientific skills, science process skills, practicum, students' interaction.

Abstrak: Hubungan Keterampilan Proses Sains dan Interaksi Siswa dengan Alat Praktikum pada Praktikum Bedah dan Pengamatan Mikroskop. **Tujuan**: Penelitian ini bertujuan untuk mengetahui apakah ada hubungan yang signifikan antara Keterampilan Proses Sains (SPS) dengan Interaksi Siswa dengan Alat Praktikum (SIPT) ketika siswa melakukan Praktik Bedah dan Pengamatan Mikroskop dalam sesi praktikum mereka. **Metode**: Rancangan penelitian yang digunakan adalah penelitian deskriptif korelasional dengan sampel siswa kelas XI SMA sebanyak 58 siswa. **Temuan**: Data dikumpulkan dengan menggunakan tes dan angket sebagai instrumen kemudian diuji dan dianalisis menggunakan uji korelasi Spearman dan uji Z diperoleh hasil 0,16 (Spearman) dan 1,21 (Uji Z), yang berarti tidak terdapat hubungan yang signifikan antara SPS dan SIPT. **Kesimpulan**: Sebagai kesimpulan, antara SIPT dan SPS, meskipun ada hubungan timbal balik, tetapi tidak signifikan. Salah satu penyebabnya adalah kondisi pembelajaran pada saat penelitian dilakukan, para siswa harus belajar dari rumah akibat Pandemi Covid-19 yang mengurangi kesempatan belajar langsung di sekolah.

Kata kunci: *keterampilan ilmiah siswa, keterampilan proses sains, praktikum, interaksi Siswa.*

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INTRODUCTION

The purpose of Natural Science education is the acquisition of Natural Science knowledge by students, both as a product where students gain strong scientific skills, understanding of the surrounding environment, and as a process (Kusumaningsih, 2008). The processes that were included in the Natural Science practicum were the process of developing scientific skills, discipline, and agility/dexterity in using practicum tools. The importance of the role of practicum in the laboratory in helping students gain experience through direct involvement in the process was part of the implementation of the 2013 curriculum.

Practical activities were an inseparable part of Biology learning that requires a constructivist approach (Mulyani, Sujarwanta, & Asih 2018; Sumarmin 2019). Because through practical activities, experience will be obtained covering the cognitive, affective and psychomotor domains. In other words, by holding practical or experimental activities, students can train themselves for information, learn independently and actively create cognitive structures in interaction with their environment. Although it was possible that there were some obstacles that teachers would have (Dewi, Sunariyati, & Neneng 2014; Simamora 2018), teachers were must be able to provide some practice opportunities. They were also highly recommended to be able to follow the technology of the times that continue to advance in Biology learning, especially those related to practice or practicum (Putri & Violita 2021).

Practicum in the Biology learning process is one of the learning activities that are considered adaptable and can keep up with the times (Hindriana, 2016). As the times progress, the more sophisticated the practicum tools that will be used. In addition, practicum can also make students interested in what they will learn (Sunariyati, Suatma, & Miranda 2019). Their direct involvement in the process would helping them more easily grasp what the teacher explains while the activities in it will train students' skills, both fine and gross motor skills. Biology subject was included in science group, was essentially a subject that combined products, processes, attitudes, and technology (Allum et al. 2008; Pinatuwong & Srisawasdi 2014). Those natures were interrelated and have continuity, for example, attitudes that produce processes, processes that produce products, and nowadays; all of those activity were also possible assisted by technology.

The practicum process was motoric activities that require scientific skills that played an important role in acquiring an intact understanding in Natural Science learning. It could even be said that scientific skills could determine the success of the learning process in practicum sessions. The conclusion was drawn because the ability of students to master scientific skills was the one that makes students feel the direct experience in learning Natural Science. Therefore, having good scientific skills during practicum in Natural Science learning was very important for students. Likewise, the use of the practicum tools, because with the help of practicum tools students are able to understand abstract material. The practicum tools are the tools that could be observed by the eyes and ears with the help of movement, making it easier for students to remember and to process learning more efficiently and effectively (Widayanti & Yuberti, 2018).

One tool that very common in laboratory practice is Microscope. Microscopic observation was an activity of observing an object that is microscopic (small). Observing a microscope helps students practice accuracy and patience, because in an effort to find a very small object, it is necessary to calculate and measure the exact distance from the microscope (Prasetya, 2017;

Rampado, Tjäderhane, Friedman, & Hamstra, 2004). For example, if a student is going to observe an animal cell, he must place it in the middle of the observation table by sliding the slide holder up, down, left, and right using the roller provided. If it is in the middle, the student must lower and raise the tube by turning the screw roughly. If they have found the shadow of the object being observed but it is not yet clearly visible, students can turn the fine screw to clarify and refine the shadow they will see. Through all activities to find these objects using a microscope, students train themselves to be careful and disciplined. Being careful was an absolute requirement in using it because students have to look at pictures carefully in order to be able to distinguish and equate objects in the microscope, and be discipline because students must be careful using a microscope so that the preparations observed and the microscope used are not damaged or misused.

Practicum activities could develop scientific skills and scientific process skills in the laboratory providing hands-on experience, the first experience to students, so as to change students' perceptions of important things. There were several types of skills that could be trained for students in Biology learning practicum including that the students could provide or make preparations, use a microscope (Romlah, 2009), and used various types of surgical instruments such as surgical scissors, tweezers, scalpels, and others. Biological surgery practice was a part that could be said to be important and determines students' mastery (Casey et al., 2011; Wahidin, 2020), because it was not only a core learning activity that could help the students to explore the process directly, this activity could also beneficial in improving their scientific skills. Scientific skills that included gross and fine motor skills also came into practice, but overall, fine motor skills were fully at work in this surgical activity. This was needed so that students could, example, cut neatly and according to the instructions.

Practicum activities require the ability of science process skills (SPS), agility in moving, skills in sorting motion, focus on movement activities, and nimbleness in moving movements based on understanding scientific concepts. SPS process would also improve students' motoric skills which in turn it could also help students understand learning quickly. It would help them to understand what they were doing because a learning process that involved practice will be easier to understand. The SPS that were learned in Biology learning or practicum would develop various skills such as (Ango, 2002; Rauf, Rasul, Mansor, Othman, & Lyndon, 2013; Sudarisman, 2010): (1) Observing or the ability to observe and is something that cannot be separated from efforts to improve students' process skills; (2) Hypothesizing, that is an attempt to predict an answer to a question. The question is intended to be a benchmark in the practicum process that will be carried out, where students are expected to be able to estimate a theory; (3) Predicting, that was where students think and look ahead or predict things that might happen to the subject if students take certain steps; (4) Questioning. In practicum students are required to ask questions to the teacher at, before and after practicum so that students understand the practicum process they are doing and also understand what they are looking for and for what; (5) Experimenting, this was the core activity of the practicum where students were trained in their scientific skills to test their hypotheses, such as identifying variables and or comparing between variables; and (6) Communicating, which was the ability or activity that was carried out at the end of the activity or in the middle of the practicum, but was is usually done at the end of the practical activity. In practicum, communicating activities are where

students discuss the results of their practicum, present the results of their practicum in front of other groups of friends, and also to the teacher, where the teacher can straighten and justify the results of their discussion.

However, students' SPS were considered still low. There were several researches that have been done related to the skills (Alhudaya, 2017; Asy'ari & Fitriani, 2017; Rosidi, 2016). Anam (2014) conducted research on thirty (30) representative students and their 4 types of process skills were below average. Most of the students were lack in the ability of observing, planning experiments, classifying, and making tables. They were also not proficient enough in concluding skills. Likewise, Sukarno et al. (2013) stated that the science process skills of junior high school students were still low in making conclusions, observing, predicting, measuring and classifying skills.

Knowing the importance of students' SPS, it is considered important to carry out a study that tests the skills of students. By some understanding of the students' SPS, the teachers could provide some activities which could help them improving the skills. One of the ways that might help it was the familiarity with the tools. Hopefully, by having some understanding about the tools being used in laboratory, the students will not have much difficulties in doing the practicum. That familiarity could be developed by having interactions with the tools. However, whether or not that students' interactions with practicum tools (SIPT) would help the students' science process skills was still need further research. Therefore, in this study, to find out the correlation between SPS and SIPT will be the main objective. Another objective of this study was to find out its significance and some of students' perspectives. To limit the study, the tools that would be part of the research were those which were used in surgical practice and microscope observation.

METHODS

This research was descriptive correlational study that was to connect the results of the SPS test and SIPT. Initially, the research would be conducted in school where the researcher will carry out direct and manual observations. However, due to the Covid-19 pandemic, observations at the school could not be carried out that in results, the way the data was collected was changed also.

This research used purposive sampling method because the researcher needed an accessible sample in that specific situation. The population was 11th grade students of a public Senior High School in Tangerang Selatan. While the samples (58 student) were the students who voluntarily fill out the online form that has been distributed. The study was conducted for about four months, started from the administration work including giving the consent form and permission matters, developing the instruments, until the writing steps.

This study used two types of instruments in collecting data, namely test questions to determine SPS and questionnaires to determine the SIPT, as well as to find out the opinions or perspectives of students about the practicum process and to find out the difficulties they might encountered in the research process. To test the scientific skills of students, the instrument used was in the form of a test of SPS in the form of their understanding and knowledge in practicum. The test questions were designed in such a way as to be a form of test to obtain written information about the ability of students in this c ase their SPS in carrying out practicum. The test was an adaptation from had been developed by Kurniawan et al. (2019) and then was adjusted to meet the need.

Meanwhile, to find out the interaction of students with practicum tools (SIPT) during their study at school, the researchers used a questionnaire in the form of a Likert scale of 1-4 with a range from difficult to easy. Some

Table 1 SPS blueprint

No	Skills	Explanation
1	Observing	To find out students' ability in observing, they were asked to look at several groups of pictures and choose the correct answer of the question
2	Hypothesizing	The students were given a statement of an experiment and asked what would happen next, they would to think about what results were likely to occur in the experiment.
3	Predicting	This question is related to question number 2, where students have to really guess what will happen next based on the results of the answers to the hypotheses that they have answered in question number 2.
4	Identifying variables	This question would ask the students to recognize and understand what variables/objects were needed in certain experiments.
5	Linking between variables	This question requires students to know the relationship of one variable to another variable, in the question there are pictures and possible similarities between these variables.
6	Designing investigations	There would be some experimental steps that were presented randomly, and then the students were asked to rank the best design to carrying out the experiment.
7	Concluding	It would be related to question number 5, where students should conclude both the variables and the steps of activities .

questions on the questionnaire added criteria to the difficulty of convenience, the questionnaire also criteria the frequency of use, and the introduction of surgical instruments. In the questionnaire, in addition to information about the SIPT, researchers would also obtain information about the opinions and perspectives of students regarding the implementation of the practicum.

The data were analyzed using descriptive statistics correlation test, by knowing the factors that could be the focus of attention for the formation of good teaching and learning quality including: teachers, learning tools, curriculum, teaching methods, and the students themselves. The correlation analysis technique used was the Spearman correlation technique because in this study we would see a connection between SPS and SIPT. However, since the number of data obtained was more than 30, the Spearman calculation was continued by calculating the Z test or counting 2 sides.

■ RESULT AND DISCUSSIONS

SPS test results

The data in this study were the SPS of students and SIPT. Both were primary data which were taken by giving questionnaires to 11th grade students of a Senior High School in Tangerang Selatan. The SPS assessment uses 14 questions and the average score was found in 56.8. At this early stage it could be said that the results of the two questionnaires were in a fairly balanced position, that was, both were in the middle less.

This first SPS test was made to see the students' observation ability. The results shown that the student's observational ability was higher in the microscope observation practicum compared to the surgery practicum. In surgery practicum, the students that failed were outnumbered almost by half of those who were able to give correct response while in microscope observation, more than half of the students gave correct answer and far higher than those answered incorrectly. The second one was made to see the

hypothetical abilities of students for both topics. The results shown that many students answered correctly on both questions with a fairly high average. Based on these, it could be said that most of the students possessed good hypothetical abilities in both topics.

The next one was the one that made to see the predictive ability of students in practicum. The results obtained were both questions got a high average value. It could be stated that most of the students in this study had high ability in predicting in both microscope observation and practical surgery. Meanwhile, different trend occurred with the next ability that was Variable identification. The results of the SPS test in the form of identifying variables shown that the average results were inversely proportional where the highest average of those who answered correctly was in the microscope practicum, while the highest average of those who answered incorrectly was in the surgical practicum. Therefore, in could be said that students' skills in identifying variables in surgical practicum were very low and need to be developed.

In the test questions the relationship between variables also showed a clear inverse, where the highest average value with the correct answer was found in the surgical practicum and the highest average value with the wrong answer was found in the microscope practicum. It meant that the students were more able to connect the variable relationship in surgical practicum than in microscope observation. The next one in SPS test was Designing Investigation. In the SPS test for designing an investigation, the average score was equally high for both practicums. Meanwhile, the last question in this test was regarding the aspect of drawing conclusions, the results obtained were inversely proportional. The high average value of those who answered incorrectly was in the microscope practicum while the high average value of those who answered correctly was in the surgery practicum. It could be said that students' ability in drawing conclusion for microscope practicum were very low.

In our modern society, possessing some amount of scientific literacy as part of 21st century skills is unavoidable to support our survival. The rapid improvement in science and technology will require us to have some basic science process skills, such as making observation and prediction, able to classify, some understanding in measuring and using numbers, drawing inferences and conclusions, being able to communicate and to relate space and time (Turiman, Omar, Daud, & Osman, 2012). Accordingly, observation is one of a very crucial ability that students must have to be literally literate in science, because they need to be able to directly relate what they learned in class before they apply it into practice. The ability to observe will lead the students to draw some conclusion of the phenomena (Suhaesa, Andayani, Muti'ah, & Anwar, 2019). Therefore, since the students' observation skills in Surgery practicum were still low and below average, it need to be improved to support the practice activities.

When the students have adequate ability in observing, they would be able to draw conclusion to some extent (Suhaesa et al., 2019), and then by relating it with other phenomena and prior knowledge, they are supposed to be able to have to create their own hypothetical concept related to the topic given (Weng, Lin, & She, 2017). This ability is essential as the basis stepping stone for further actions including predicting. The students will have some ground to start the projects and predict what action should be taken or what tools to be prepared.

As parts of the skills, recognizing and relating variables are very essential in the process. By recognizing the variables, the next steps of the process will be more easily to understand. Variables' relation will require the students'

previous mentioned abilities in SPS. Even though some may still argue about the positive effect of SPS, the agreement than the importance of the ability in recognizing and relating the variables in science practice as part of SPS was undeniable (Gultepe, 2016). Accordingly, it is important to improve the students' ability that related to variables' recognition and relationship. These abilities will surely be needed in most of the steps of the practices, especially in drawing the conclusions. Whereas the results in this study showed that it was still low especially in microscope observation activities, the science teachers should support the effort to help the students no matter what to acquire this ability as part of SPS (Yakar & Baykara, 2014), because it is important to help the students drawing the conclusion after their observation.

SIPT results

Because the SIPT (Student Interaction with Practicum Tools) questionnaire used linear values with a range of 1-4, the highest score would be 40. In this study, the average SIPT score was 21.4, which means that there were fewer middle positions. Regarding the Students' fluency to use the microscope, it was found that there were 32 students or as many as 55.2 percent of students claimed that they could use the microscope easily by following the instructions. It meant less than half of the students were not fluent enough in using it. However, 6.9% stated that they were able to use the microscope properly even without instructions, slightly different from those who could not use it at all.

Meanwhile, for the ability in finding the objects by using microscope of 40X lens, 27 students or 46%, stated they were able to do it easily. It was a bit higher than those who needed more time in finding the object (39%). In the ability to use fine screws on the microscope, there were as many as 58% or 34 students said that they could easily use them on the microscope. None of the students stated that they cannot use them at all (0%). The next one was about the students' ability to find objects on a microscope with 100X lens. The result showed that there were 29 students could easily find objects on a microscope with 100X lens, or as much as 50%, while there was only one student who could not use it at all. 24 (41.4%) students were able to find the objects with some difficulties, while 4 students could find them even without following the instructions.

In terms of getting light for a non-electric microscope, the students did not find it difficult to adjust the light on the microscope. As many as 60% of the students stated that it was easy to get light for a non-electric microscope lighting. Only one student or 1.7% could not do it. Meanwhile, regarding students' ability to carry out surgical practicum, 30 students or 51.7% stated that it was some difficulties to carry out surgical practicum. Meant they were able to do it but it took more time than those 14 students who claimed they were able to do it even though they still have a little bit difficulty, so they could carry out the process faster.

For students' ability in surgery practicum, as many as 25 students (43%) experienced more difficulties in surgery practicum in the incision section or cutting surgical objects than 27.7% or 16 students who got only a little difficulty. However, none of the students got no difficulty at all while the rest (29.3%) claimed that they were have serious difficulties in conducting the practices that might lead to failure in results. Meanwhile, in acknowledging the types of organs in the object of the practicum, there were as many as 29 students (50%) stated that they had more difficulty. The number was much higher than those who had to struggle to know those type of organs. Furthermore, there were 26 students (44%) who did not really recognize surgical instruments and took more time to be able to know the names

and the functions. It was slightly higher than the number of those 22 students who could do faster to recognize those surgical tools (37%). Only 3 students could directly recognize the tools while 7 others took the longest time and sometimes need help or hints. The last one was the one that regarding the performing incision. The result showed there were 33 students (56%) could perform a follow-up incision to dissect instead of starting a new incision. Based on this, it could be seen that more than half of the students could finish their practice without re-do it, while they were 6 students who might need to re-start the process.

One of the characteristics of learning Biology was that it seeks to recognize real life processes in their environment wherever they are (Zion, 2004). One way to make students feel the process was to use or utilize appropriate learning media. Usually, for the sciences, media introduction or direct experience could be obtained through direct activities in the laboratory (Chamany, Allen, & Tanner, 2008). Thus, it could be said that the two were interrelated, that activities in the lab would strengthen students' theoretical understanding, and their understanding would help the process of activities in practicum.

The use of media in the laboratory to gain direct experience could be done using actual objects, or the use of practical tools in laboratory activities (Sudarisman, 2010). The presence of media in Natural Science learning, especially Biology, had a very important role. Biology material that was difficult to show in real terms could be because it was abstract, microscopic in size, and was difficult to convey in words, would become easier if it was delivered in a practical or practical way (Atilla, 2012). It was also stated in the study that the majority of activities in practice or practicum were very interesting for students.

Excellent performance will of course become the main goal, including in practicum activities. To support the ideal, one of the requirements is how good our interactions with our surroundings and the equipment. The ability to recognize both form and function of practicum tools will surely become the key for the student to perform their best in the practices (Hofstein & Lunetta, 2004). In general, the result of study of the study showed that even though some of the students had no difficulties both in recognizing and understanding the function of practicum tools as well as in using the tools, there were still some others that underperformed. Other study that related in lab tools interaction showed that the familiarity with the tools would help the students greatly in performing the practice (Kozma, Chin, Russell, & Marx, 2000), especially in boosting students' confidence and motivation. However, to make the students familiar with the tools will require the frequency of the interaction (Bell, Urhahne, Schanze, & Ploetzner, 2010), and this can become a problem since the access to the lab would need specific permit. In addition, in the pandemic situation, where even the access to schools was very limited, the chance to be more familiar with the tools very unlikely to occur. However, with the ICT development, there were some ways that may help the students to get some acquaintances with the tool, such as through YouTube or Augmented Reality program (Balamuralithara & Wood, 2009).

Correlation of SPS and SIPT Test Results

The Spearman correlation test was used to find out whether there was a correlation between the two variables, after the descriptive data was converted into a ranking form. Then the results were obtained as below:

Based on the SPSS output, it was known that N or the number of research data was 58,

Table2. Correlation of SPS and SIPT test results

Correlations

			X	Y
Spearman's rho	X	Correlation Coefficient	1.000	.160
		Sig. (2-tailed)	.	.229
		N	58	58
	Y	Correlation Coefficient	.160	1.000
		Sig. (2-tailed)	.229	.
		N	58	58

then the value of sig. (2-tailed) was 0.229. It could be concluded that there was no significant relationship between SPS and SIPT. This was because to obtain significant results, sig. 2-tailed at 0.005. Meanwhile for the correlation coefficient of 0.160 then this indicated a low relationship or correlation between SPS and SIPT, because to get the exact correlation coefficient is 1.

Next, the calculations based on the Spearman correlation formula was performed using the Excel application. The results obtained was 0.16 which indicated the correlation did not occur significantly. Because the number of samples exceeded 30, the calculation using the Z formula should be conducted. The significant value used in this study was 95%, therefore the alpha value or error was 5% or 0.05. based on Z table, the result was 1.21, which showed some consistency with the previous result, that there was no high correlation between the two variables.

From the results of the SPS and SIPT samples that have been calculated per indicator, the following results have been obtained, it was found that there seems to be a correlation between SPS and SIPT in the initial samples. Both variables were in a bit more of the middle position. This showed that there was a possibility that activities using practicum tools (SIPT) were correlated or related to students' scientific skills (SPS). However, it was still difficult to directly state that if the SPS was high then the must be high and vice versa. Nevertheless, after all these two things were related, that students may be helped by their abilities in doing practice if they interact a lot more with lab equipment, and it could also be said that students would be able to interact with lab tools more easily or be more familiar if they had sufficient SPS (Feyzioglu, 2009). Therefore, it could be said that these two could be correlated not only one-sidedly, not only SPS on SIPT or SIPT on SPS. Therefore, studies in various conditions should be conducted to get more valid results.

It could be said that scientific activities or activities carried out in the laboratory based on SPS and SIPT would affect the ability of students (Seyhan, 2015). Thus, students could have better mastery and understanding about what they had learned in theory when they also conducted activities or practices in the lab or apply what they had learned in class. This was expected to increase the attitudes, knowledge and skills of students (Emda, 2017).

Therefore, one way to empower the potential of students was to provide a laboratory. The laboratory was needed as a means of increasing the knowledge and skills of students in science or science learning activities (Seyhan, 2015). The laboratory was one of the learning infrastructures that could be used as a place to train participants in understanding concepts and

improve skills in conducting scientific experiments. It was also mentioned that in Natural Science education, laboratory activities were an integral part of teaching and learning activities because activities in the laboratory provide convenience for participants in understanding what they learn the material through a scientific work approach (Emda, 2017).

In the early stages of the study, it was found that the position of the results seemed to be in the middle for the two so that it showed as if they were correlated with each other. This was still supported when calculating using the Spearman correlation, where the numbers obtained could be said to be correlated but not high or insignificant. The results of the calculation of the two variables were found to be correlated, both when calculated using Excel or SPSS, eventhough it was not high. Thus, at the initial conclusion it could be said that there was a correlation but not high between students' SPS and SIPT. It was indeed some influence that affects each other between those two for some degree based on how the condition (Myers & Dyer, 2006). Therefore, it could be said that the activities of students in the lab or in the practicum have a considerable influence on the student's SPS.

This not high correlation result could be understood by trying to look at the data obtained in more detail. It was found out that where not all students had the same value for the two variables (for example if the value of variable 1 was high and variable 2 was also high). Some students have scores that were quite far apart between the two variables (for example, the SIPT score was low but the SPS was high or vice versa). The inconsistency results between variables could lead to the less significant relationship between between SIPT and SPS (Artun, Durukan, & Temur, 2020).

To be able to understand why this condition occurs, deeper consideration and analysis would be needed including by trying to see the relationship between the items in the two questionnaires. The first example could be analysis in number 6.A in SPS. The number contained questions about the results of microscope observations, that was to find out whether students understand the role, workings, and components of the microscope. This question related to question number 1 on the SIPT form, which was about whether students find it easy or find it difficult to use or operate a microscope. As many as 42 of 58 students answered question no. 6.A correctly and 32 of 58 students stated that it was easy to use a microscope (SIPT question no. 1). Thus, it could be seen the relationship or correlation between the two. The students understand how to use a microscope, students have ease of operation, or it could also be said that students who feel accustomed to using a microscope or find it was easy to use it woud understand better how it works and understand the components on microscope.

Based at the conditions as mentioned above, for the time being, it could be seen that there was a positive influence of students' habits or interactions in the lab on students' scientific process abilities. This was because in science education, laboratory activities were an integral part of teaching and learning activities, and laboratory activities also make it easier for participants to understand what they have learned through a scientific work approach like practicum and other scientific trials (Feyzioglu, 2009). Students should also be given the opportunity to experiment with physical objects such as lab tools and materials, which are supported by interactions with peers and assisted by questions from the teacher (Bakti & Sunarno, 2013). Besides, previous activities that related to the skills were required would help students to be able to operate lab equipment better. In the learning process, students should get a learning experience to get maximum understanding. Learning experiences

were all processes, events and activities experienced by students to gain knowledge, skills and attitudes (Istikharah & Simatupang, 2017). In addition, after going through the learning process, students are expected to acquire the knowledge or knowledge they have learned with better understanding.

A different example showing the possibility that leads to lack of correlation could be seen in number 6.B in SPS, which was a question regarding veterinary procedures. This question aimed to find out whether students understand how to cut, split, and autopsy animals properly and according to procedures. This question was answered correctly by 51 out of 58 students. The question was related to the question in SIPT No. 6, which was about the difficulties or convenience of students in carrying out the process of veterinary surgery. From 58 students, 30 (more than 50%) stated that it was not easy or felt that there were difficulties in conducting the process. From these results, it seemed that there was a discrepancy between SIPT and students' SPS, where students had a high enough score SPS in veterinary surgery, but have low interaction with the process.

This inconsistency also occurred in number 3.B in the SPS question with the question of understanding the shape and characteristics of cartilaginous animals using picture media. There were 48 students who answered correctly out of 58 students. The question was related to SIPT question number 8 with a question regarding knowledge about the types of cartilaginous and true fish. From 58 students, there were 29 students who stated that it was not easy (a little difficult to distinguish) the type of animal and 22 students who stated that it was quite easy to know the type of animal, while the remaining 7 students stated that it was difficult. From these results it could be seen that there was no consistency because the students' SPS was higher than the SIPT.

The imbalance between SPS and SIPT could be caused by several factors. Not all students gain a thorough understanding through practicum. They could also gain deep understanding through other activities uch as reading books in the library or watching science videos or any other sources. Difficulties or problems in practicum usually had several other factors that influenced the students' and activities, those factors were from the tool, place or practicum lab, or sometimes from the teacher concerned (Atilla, 2012). Surgical practicum was a technique or learning ability to dissect or open the inside of an animal to study the animal's organs (Merta, Bachtiar, & Syachrudin, 2019). The surgery practicum trained students' motoric skills, especially fine motor skills and students' precision in performing surgery, so that mistakes do not occur such as cutting the nerves of the subject animal or cutting the organs that students would learn. In theory and understanding, maybe students could imagine or mention the procedure. However, when they had to deal directly with it, it turned out that there were several factors that could make it difficult for students to implement what they have learned in class.

Some of the factors that could become obstacles include, firstly, from the laboratory lab tools themselves, such as, surgical instruments used to dissect fish in life organization material practicums were not yet available in the laboratory, or surgical equipment is available but incomplete because there was some equipment that were needed were missing (Suliastyarini, Yolida, & Marpaung, 2017) or improperly storaged. Practical tools were very important to facilitate and strengthen students' understanding of what they have learned in the field of science, namely biology, facilities and infrastructure are very important because they affect the quality of learning (Gökmen, Gürkan, & Katircioglu, 2021). Complete facilities and infrastructure really support the learning process, and if all the facilities needed

in teaching and learning activities were well provided, the learning process could run smoothly and optimally (Hofstein & Lunetta, 2004). Other factors that could also affect the difficulty of students in carrying out practicum using the tools were, for example, there were still many students who were not able to use a microscope. In addition, sometimes there were groups of students who used microscopes without following procedures on using them, causing other students to be unfamiliar or accustomed to operating them properly. This in addition could cause results that did not meet what was expected, even worse, it could cause some of the microscopes to be damaged.

Then the second factor was the environmental factor or the place to do the practicum, namely the laboratory. One of the incidents that sometimes happened was that the practicum activities that should be carried out inside the laboratory were conducted outside the laboratory or only by oral or picture explanation, so it could not bring maximum result. This could happen because the laboratory at the school was not adequate to carry out surgical activities. Surgical practicum was best done indoors or in a laboratory, this was necessary so that students felt comfortable when conducting the process (Dewi et al., 2014). Another factor related to the constraints of practicum tools was when one of the teachers did not tidy up or did not instruct the students to tidy up their practicum tools (Suliastyarini et al., 2017), so that in the future when they want to use the tools, they would some difficulties to find them.

The problems in using practical tools for SIPT were caused by the above factors such as environmental factors, student factors, infrastructure factors, and teacher factors or it could be caused because they have never practiced or experimented or approached directly. Especially in this pandemic situation, where most activities were noy be able to be conducted, the opportunities to experience lab practices was even smaller. However, students could learn sbout the skill from other sources (Yang & Heh, 2007), such as watch shows on YouTube, using IT simulation application or other educational programs, and read books related to practicum or animal anatomy in the school library. Thus, they would still gain an understanding of how to use practicum tools and improve their SPS.

CONCLUSIONS

From the results of the discussion of the data findings, it could be said that correlation between SPS and SIPT was not as high as expected. It could be seen based on this study that eventhough the students had a quite number of interactions with practicum tools, it did not guarantee that their SPS would be high. It was because some factors that might influence the process, including that when the study was conducted, the teaching learning condition was conducted through online learning, so the chances to administer direct lab practicum was very slim to almost impossible. The students were encouraged to watch and learnt the process through videos, both on YouTube, Augmented Reality, and on their Learning Management System.

Developing SPS and SIPT will indirectly develop discipline, perseverance, and precision to some extent. With consistent guidance, especially form the teachers and lab staffs, it is hoped that it will construct some better characters and habits. As it was mentioned, the study was conducted during pandemic, where the situation was unfavorable for ideal teaching learning process and hindered the students to directly experience the practicum activities. The result can be different if the schools reopened for teaching learning activities where the students can have

more access to directly experience lab activities. In addition, with the rapid movement in technology, the process acquiring the knowledge can be maximized by applying Flipped Learning or Project Based Learning.

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