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Abstract. Science process skills are mostly researched in previous studies, but specifically for students in Papua, these skills have not become the main focus to be fostering. Inquiry learning is present as alternative learning to train students' process skills. The research aims to foster the student process skill through inquiry science learning implementation. The research was a quasi-experimental method. Non-equivalent control group design was used. Data was collected using process skill tests. N-gain and independent t-test were used for data analysis. It was revealed that the process skill of student in the inquiry-based learning class was better compared to students in the conventional class ($p < 0.05$). Science inquiry-based learning is better fostering science process skills indicator, that is observing, formulate a problem, formulate a hypothesis, and communicating. It can be concluded that for fostering student process skills, inquiry-based science learning is the right choice. it is better compared with conventional learning.

1. Introduction

The science process skills are mostly researched in previous studies, but specifically for students in Papua, these skills have not become the main focus to be fostering. Fostering process skills for students in science classes is a must. In senior high school, especially science classes, there are biology subjects. To learn biology, process skills are essential. In biology, there are various investigative processes that must be carried out by the learner. They are in the process of collecting data, testing hypotheses, and ending concluding. This activity is a science process skill, and it can be trained through the use of Inquiry science learning [1,2]

Inquiry science learning is learning that is present to make students able to conduct investigations. In research over the past 20 years, the inquiry into learning in science education has been widely carried out and disseminated [3]. Students give a good response when they learn to use inquiry worksheets [4]. The teacher likewise, they are motivated to implement inquiry learning [5], and their skills are better than their teaching in conventional learning classes [6]. In science classes, the dominant activities that occur in training activities are inquiry activity [7], and this learning is recommended for science practice [8,9]. Effective inquiry-based science learning was used for students in biology classes [10]. To create an effective science learning environment, it is necessary to design inquiry-based science learning [11]. Inquiry-based science learning is learning that needs to be applied in biology training.

Some research by previous researchers found that learning inquiry has an impact on student learning. One of the effects of inquiry learning is the effectiveness of process skills. Inquiry learning was a good effect on the process skills of students [12–16]. However, other research shows different things. In studies conducted by previous researchers, they found that students 'process skills did not reach high categories [2,17], students' process skills mostly reached the medium level [18]. When taught for 16 hours using 8 inquiry-based lesson plans, it was found that there were no differences in process skills, when the process skills in the inquiry learning group were compared with other learning [19].

Problems revealed about process skills indicate that there are different results that are carried out by each researcher. The use of the same innovative learning in different schools is not always giving the same effect on student outcomes. Some researchers revealed that inquiry-based science learning has a good impact on fostering the process skill of students. Special for students in West Papua, the use of inquiry-based science learning needs to be done to improve student process skills. This research has two objectives, first is to describe the n-gain of each process skill indicator, and the second is to compare the average process skills of students in inquiry-based science learning and conventional learning.

2. Method

This research was carried out following the type of research of quasi-experiment. Non-equivalent control group design was used. There were two groups in this study, namely the experimental group and the control group. A total of 232 students in class X of a senior high school in Manokwari Regency, West Papua Province. They were the population in this study. They were students in the class in natural sciences interest. They were divided into 6 classes. The purposive sampling technique was used to take research samples. A total of two classes were drawn based on the sampling technique used. The two classes that were sampled were 29 students X_1 science class, and 29 students X_2 science class. X_1 was a group control, and X_2 was an experimental group. Students in the experimental group were taught to use inquiry science learning, and students in group control were used conventional learning.

Table 1. Design of non-equivalent control group

Group	Pre-test	Treatment	Post-test
Experimental group	O_1	X	O_2
Control group	O_3		O_4

The process skills test, student-book, lesson plan, and student worksheet was the instruments used. The instrument was arranged based on inquiry science learning. The instrument was validated by six validators. The following were presented by the validator.

Table 2. Validity result

Teaching Device	Validity	Criteria
Lesson plan	96.05	Very Valid
Student Worksheet	93.59	Very Valid
Student-book	88.65	Very Valid
Process skill test	89.17	Very Valid

The first data analyzed was descriptive. The analyzed aimed to describe the differences in the achievement of each Process Skill indicator in the experimental and control groups. The second analyzed was quantitative. Quantitative analyzed was used the independent sample t-test. Analysis prerequisite test using Kolmogorov Smirnov Z and Levene test. The significant level was 0.05. Decision making was H0 (there was no difference in student science process skill in both experimental and control groups) if sig. > 0.05. In other cases, H1 (there was a difference in the science process skill of the students in both experimental and control groups), was accepted

3. Result and Discussion

In this study, the author examines (1) n-gain from each of the measured process skill indicators, and (2) differences in the process skills of students in the inquiry class in science learning and conventional learning. The results obtained are presented as follows:

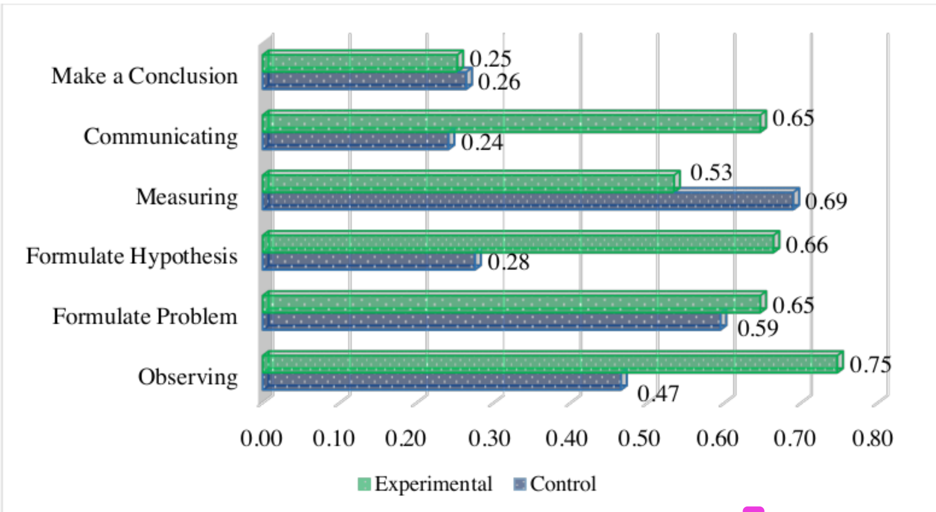

Figure 1. Differences in the achievement of n-gain of process skills between the experimental and control group

The results in Figure 1 reveal that in the experimental group there is one indicator reaching a high n-gain category, namely the observation indicator. Four indicators reached moderate n-gain categories, namely formulate a problem, formulate a hypothesis, measuring and communicating. There is one indicator that reaches the low n-gain category, namely make a conclusion. In the control group, there is no high n-gain category, but there are three moderate categories of n-gain, namely observing, formulate a problem and measuring. There were also three indicators with low n-gain categories, namely formulate a hypothesis, communicating and make a conclusion.

The results revealed that students in the inquiry class of science learning better their process skills. Students who are in the classroom with conventional learning gain lower process skills. There is one indicator that only reaches the low n-gain category in both groups, namely make a conclusion. There it appears that students in the conventional class are superior to 2 (33.33%) indicators, namely, make a conclusion and measuring. 4 (66.67%) other indicators were overtaken by students in inquiry-based science learning, namely observing, formulate a problem, Formulate a hypothesis and communicating. Ogan-Bekiroğlu and Arslan (2014) in their study found that although it did not show a significant difference, when viewed from the process skill indicator, inquiry learning showed a significant increase in the 4 indicators of science process skill compared to the control group, because there was only an increase on two science process indicators [20]. There needs to be further study of the make a conclusion indicator. If seen in the observatory achievement of indicators, the formulate a problem and formulate a hypothesis are good, then that must be followed by the indicator make a conclusion. We suspect that students have not been strong enough in making decisions to draw conclusions about the data obtained. When unable to make conclusions, it is caused by not being able to understand or link the data to make a conclusion, the existence of anomalous data, although most are not anomalies or their mindset that all data must be appropriate and there should be no anomaly [21]. Most students seem very comfortable with the fact that researchers can produce very different conclusions from different ideological positions or data types [22]. Further researchers must be able to find the cause of a low increase in the make a conclusion indicator, especially in inquiry learning.

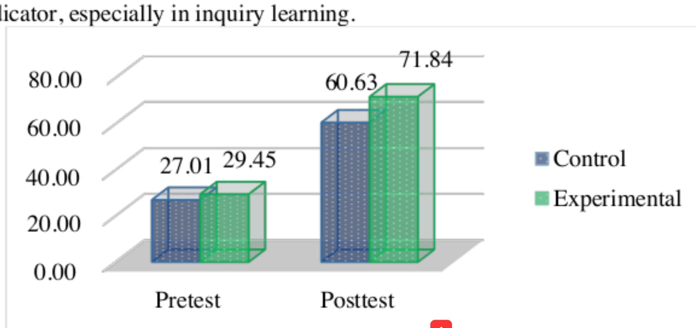

Figure 2. Differences in the achievement of pre-test and post-test process skills of students in the experimental and control class

Figure 2 showed that the average process skill in the conventional class of learning (control group) was low, while the average process skills of students in the inquiry-based science learning class (experimental group) show higher achievement. Based on the data displayed, there is evidence that biology learning using inquiry-based science learning is better for fostering student process skills. The mean process skill in inquiry-based science learning was achieving good results, while the process skills of students in conventional classes was achieving sufficient results. Proof of the difference in process skill of student was significantly shown in Table 4, but the analysis prerequisite test is done first, and the test results are shown in Tables 3 and 4.

Table 3. The normality and homogeneity test result

Group	N	Data	Mean	SD	Kolmogorov Z	Levene Test
Experimental	29	Pre-test	29.45	15.98	0.390	0.109
		Pos-ttest	71.84	17.77	0.250	
Control	29	Pre-test	27.01	18.32	0.407	0.848
		Pos-ttest	60.63	17.27	0.578	

Table 3 showed that the process skill data for the two groups in this study were fulfilling the normality criteria ($p > 0.05$). Table 3 shows the pre-test data is fulfilling the homogeneity criteria, where $0.109 > 0.05$. Post-test data also showed $0.848 > 0.05$, which indicates that the post-test data is homogeneity

Table 4. The result of t-test of process skill

Data	Equal variances	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre-test	Equal variances assumed	-0.541	56	0.591	-2.44241	4.51405
	Equal variance not assumed	-0.541	54.987	0.591	-2.44241	4.51405
Post-test	Equal variances assumed	-2.435	56	0.018	-11.20621	4.60188
	Equal variance not assumed	-2.435	55.955	0.018	-11.20621	4.60188

The data in Table 4 presents that before the implementation of inquiry-based science learning, the process skills of students between the two groups were the same. The sig column for the pre-test data showed $0.591 > 0.05$, which indicates that there were no significant differences between the two groups. Post-test data shows that $0.018 < 0.05$. This result revealed that there were significant differences in process skills between the two groups. Students' process skills in inquiry-based science learning class are achieving higher results, while the process skill of student in conventional classroom learning is achieving lower results.

Inquiry science learning has a good impact on building process skills from students. Mean process skills of students in inquiry-based of science class learning reached an average of 71.84. Based on this mean, there are 4 trained skill process indicators better than in conventional learning classes. Even though, in the conventional learning class, there are 2 indicators that are well trained compared to inquiry class science learning. The results of previous research showed that there was a significant difference between the control and experimental groups [23,24], but there were other researchers who showed no difference [19]. In our research, we found that students in eastern Indonesia, more specifically in the Manokwari area, their process skills can be fostered to be better using inquiry science learning. Although not all indicators measured show better results compared to conventional learning, but we assume that four of the six indicators that are well implemented in inquiry-based science learning class, there are revealed that inquiry science learning is the right learning in developing process skills of students.

Good learning is learning that can shape students better. Variation in the learning process is important [25]. Inquiry-based science learning is presented in the class for solutions to problems that occur in conventional classes. The inquiry is one of active, effective and efficient learning in the investigation process [26]. Inquiry-based learning encourages the activity of students to ask questions that are relevant to the subject matter delivered by the teacher. Submission of material begins with giving problems to students, then students make observations to solve the problem. Compared to conventional classes, this activity is not done well. The process skill test results show that indicators of observing and formulated problems in inquiry class students in science learning are good, while students in conventional classes show lower results. Specifically, the indicator observes, the test results show a high increase in class inquiry learning.

Fostering student skills through the inquiry science learning implementation shows good results. The results of this study support the research of previous researchers, where they found inquiry learning is effective against the process skill of students [27,28]. The learning process carried out becomes more effective, students can find out for themselves the concepts of the material they are studying, and they can design investigative activities to actively solve problems against natural phenomena that occur around them. students do a good analysis of the various results they get. In inquiry learning, students can design, conduct experiments, conduct tests and analyze [29]. Although indicators of make a inclusion in this study have a low increase, inquiry science learning is better than conventional learning. Scientists have the same data and following the same procedure can reach different conclusions [30]. We suspect that there are other factors that influence, so this indicator does not achieve maximum improvement. Scientists can be influenced by culture, beliefs, interests, background, previous theories [31]. In the future, researchers will then be able to examine the factors that cause the indicator to make a conclusion that did not experience a good increase in the inquiry class in science learning.

4. Conclusion

Based on the results obtained and explained in the discussion, it can be concluded that the process skill student in inquiry-based science learning class is better compared to students in the conventional class. Learning science inquiry is a better fostering science process skills indicator, that is observing, formulate a problem, formulate a hypothesis, and communicating. In fostering student process skills, inquiry-based science learning is the right choice. It is better compared to conventional learning. The limitation in this study is that the researcher does not examine more deeply the factors that influence the make a conclusion indicator only reaching the low n-gain category. Researchers can then examine the limitations of this study.

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