Improvement science process skills of high school students through learning models scientific inquiry

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Abstract. This study's background is based on the fact that teachers in learning still apply conventional learning, which causes poor science process skills in students. This study aims to improve students' science process skills taught using the scientific inquiry learning model. This research method is a quasi-experiment. The population in this study were all students of class X SMA, with 130 students. Sampling was done by random cluster sampling. The instrument used was an essay with a total of 8 questions. The results of this study obtained an average pretest value of 41.05 and an average post-test score of 63.31. So it can be concluded that the scientific inquiry learning model effectively increases curiosity and science process skills in students.

1. Introduction
Process skills are a learning process designed to find facts, build concepts and theories with the students' intellectual skills and scientific attitudes (Desnita, F, et al. 2017).

(Martaida .T et al.,2017) states that Science Process Skills (SPS) is an ability that involves intellectual or cognitive abilities, social and manual. Cognitive skills are involved because by doing science process skills, students use their minds. Manual skills are involved in science process skills because they involve tools and materials, measuring, assembling, or assembling tools. Social skills are also involved in process skills because they interact with each other in carrying out teaching and learning activities, for example, discussing observations. Process skills need to be developed through direct experiences as learning experiences. Through direct experience, a person can better appreciate the process or activity that is being carried out.

Based on the description above, it can be concluded that science process skills are fundamental for every student to use scientific methods in developing science and are expected to acquire new knowledge or develop the knowledge they already have.

The results of the initial study at high school in Medan, the teaching process in the classroom, have not developed students' science process skills. Practical activities are rarely carried out because the laboratory equipment is damaged and incomplete. So it is necessary to make improvements in the learning realm. The learning model that is believed to improve student SPS is the scientific inquiry learning model. The scientific inquiry model is designed to involve students in truly original investigation problems by exposing students to exposing student's investigations, helping students identify conceptual and methodological problems in the field, and inviting students to be able to design ways to solve these problems (Fitriani et al.,2020; Siregar et al. 2020)
Previous research states that the scientific inquiry model can improve student science process skills is research by Kristina and Bukit.N,2016), which states that students' science process skills using the scientific inquiry model are better than science process skills using conventional learning models. Students' science process skills in the curiosity group above the average are better than the science process skills of students in the curiosity group below the average, there is an interaction between the scientific inquiry learning model and the conventional learning model. science process skills. (Aisyah, et al.,2020) stated that science process skills learned by the scientific inquiry model were better than conventional learning, science process skills of students who had upper group logical thinking skills were better than students who had lower group logical thinking skills. There is an interaction between the scientific inquiry learning model and the conventional learning model on science process skills. (Solikin, et al. 2020) stated that inquiry learning could we could’ve students' science process skills. In line with (Remziye et al. 2011; Simanullang et al. 2020) stated, the inquiry teaching method significantly improved students' attitudes and science process skills, affecting students' science process skills. This is because, in the inquiry teaching and learning process, there are steps that can foster process skills.

2. Research Methods
The location of this research is in Medan 8 Public Senior High School. This study’s population were all class X students of SMA Negeri 8 Medan in the 2019/2020 academic year. Cluster random sampling is the technique used in this study. The design in this study is a Two Group Pretest-Posttest Design, and the method used is a quasi-experiment. Essay questions are an instrument in this study. The data collected includes the SPS test score. This data is collected in each learning process. Test result data were analyzed using inferential statistics.

3. Results and Discussion

![Figure 1. Results of pretest and posttest in scientific inquiry learning](image)

In the scientific inquiry learning model, students can actively look for something with the thinking process. Teachers need to direct students to develop students' thinking skills through teacher and student interactions through problems that students often face in these materials. Also, besides the ability of students to answer each question is part of the thinking process. Therefore, the teacher's ability to ask questions in each step - the learning steps are essential.

Students' science process skills can be improved through the scientific inquiry learning model's phases because students are directed to work with scientific methods, make observations, formulate hypotheses, take measurements, and draw conclusions. This is because the scientific inquiry model affects student SPS through each of the learning phases. In the first phase, the teacher presents problems that students often face by following the subject matter taught. In this phase, students must understand the problems they are experiencing and understand the work steps in practicum to solve problems in groups. Students are guided by the teacher to collect information from the experiment on student worksheets in the second phase. In this phase, students are required to work together in carrying out all activities, so that this activity will create a different experience for these students. In
the third phase, the teacher guides students to conduct experiments, organize data, observe changes that occur, and direct students to ask questions. In this phase, students are required to understand the appropriate questions to experiment correctly. In the fourth phase, the teacher guides students to organize data, explain, and make conclusions. Each phase that students go through can improve science process skills based on experimental experiences they have gone through.

Based on Figure 1, it has been found that students who were taught with the scientific inquiry learning model, namely in the experimental class, obtained average pretest and posttest scores for science process skills of 41.05 and 63.31, respectively. Students taught by conventional learning received average pretest and posttest scores of science process skills of 44.65 and 51.45. For the average pretest value, the test was carried out so that the normality test value was 0.132, the homogeneity test was 0.664, and the hypothesis test was 0.057. Meanwhile, the average posttest score tested, and the homogeneity test value was 0.108, the homogeneity test was 0.625, and the hypothesis test was 0.000.

Science process skills in the experimental class can be improved if the scientific inquiry learning model is applied (Ulfah et al. 2018). The increase in science process skills is because student activity in learning increases after applying the scientific inquiry learning model; this is in line with research conducted by (Kristina, Bukit.N, 2018); (Fitriani et al., 2020; Fitriyani et al., 2020). They show that science process skills in students show better results after applying the scientific inquiry learning model during the learning process.

4. Conclusions
The conclusion was that through the application of the phases in the scientific inquiry learning model students' science process skills could improve.

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