Science Process Skills Profile of Non-Science Undergraduate Student in Universitas Negeri Surabaya

U A Deta¹,*, I Prakoso¹, P Z R Agustina¹, R N Fadillah¹, N A Lestari¹, M Yantidewi¹, S Admoko¹, A Zainuddin¹, A Nursailiyah², and B K Prahani¹

¹ Department of Physics, Universitas Negeri Surabaya, Indonesia
² SMA Wahid Hasyim 4 Waru, Sidoarjo, Indonesia

Abstract. Science process skills are an ability to apply scientific methods in understanding, developing and discovering science. The importance of learning science process skills is to make students easier to solve problems in their daily life. The purpose of this research is to find out the science process skills profile of non-science undergraduate students. The object of this research is non-science undergraduate students in Universitas Negeri Surabaya. It’s using the descriptive qualitative method, and the data obtained from the questionnaire and interview. The result of this research is non-science undergraduate students didn’t accustom to analyzing a problem using science process skills. It’s according to the results of surveys and interviews that are less than optimal. Therefore, the conclusion is science process skills need to train to non-science students because it helps in solving problems in everyday life through a scientific fact.

1. Introduction
Process skills are more focus on the science field. Though this skill has advantages when combined with previous abilities. In daily life, humans must have problems. It can be easy or hard to solve. These problems are closely related to science. Even non-science problem, it can be analyzed and solved using science. Therefore, humans don’t understand to use scientific process analysis to solve their problems. So, science process skills must be learned by non-science undergraduate students, although they don’t have it in their lectures [1].

Prastowo held the research about science process skill but only in schools with natural science class [2]. In otherwise, the science process skills of the other majors are unknown [2]. The result from its research is the students have difficulty or not accustomed to using these skills. Based on the previous skills, mistakes often occur if using science process skills. Therefore, we need more understanding of scientific methods [3]. The scientific method is closely associated with science process skills [4]. In this research, the subject is non-science undergraduate students because they study more about sociality. However, this is interesting to discuss because the science process skills can help to solve problems appropriately in daily life or society. Although they don’t need to study science deeply, they need to know scientific methods.

From the other research, science process skills with process-oriented were effective to reduce alternative concepts that exist in daily life [5]. That is because it is prioritizing the outcome process. The approach that use to improve knowledge of science process skills can be made in a mixed class [6]. It
means not only the sciences class but also all of the class from the other major can learn it. Science Process Skill Based Learning can influence various aspects of students' abilities. It can be students' skills and beliefs in scientific literacy [7]. So, science process skills have many advantage for the students.

The level of science process skills positively influences learning outcomes. Therefore, the syntax of the chosen research must be known correctly [8]. Even in this modern era, innovate new things are needed to improve students' abilities and skills better [9]. Science process skills can develop students' conceptual knowledge and inquiry abilities [10]. And the inquiry-based learning also can improve students' skills and confidence [11], so they can compete with others in daily life.

The implication of science process skills is to train students' thinking skills [7]. So, when students find problems, they can solve it by thinking correctly. Unfortunately, science process skills are usually applied in exact science [12] even though it is beneficial in daily life. Therefore, the purpose of this research is to find out the science process skills profile of non-science undergraduate students. It is not only useful for students who learn science, but also for everyone.

2. Methods
This research used the descriptive qualitative method. This method is used to study and analyze science process skills of Non-Science Undergraduate Students at Surabaya State University. The research subjects were students of the Management Study Program, Surabaya State University. This research was carried out in April 2019. Data obtained by questionnaire and interview. The questionnaire contained text about science process skills and ten research questions related to the topic in the survey. The interview is used to fully understand students' scientific process skills, especially in scientific methods. Data were analyzed quantitatively and qualitatively. Quantitative analysis was performed for questionnaire data, while qualitative analysis used for interview results.

3. Results and Discussion
Based on the results of a questionnaire by non-science undergraduate students related to problems in daily life that can be analyzed as profile science process skills, it shows in Figure 1.

![Graph of the relationship between questions and the number of right and wrong students' answers](image.png)

**Figure 1.** Graph of the relationship between questions and the number of right and wrong students' answers
Based on Figure 1, it is known that non-science undergraduate students are still weak in science process skills, especially the scientific method. These can be identified based on their answers, and almost answers are wrong. There are ten multiple-choice questions in which five questions can answer correctly, and five other questions are still wrong.

Five wrong answers questions related to scientific methods, which includes formulating hypotheses, determining variables, formulating problems, coherent steps, formulating conclusions, etc. They are still weak and not accustomed to doing it. However, this scientific method is supportive in solving problems in any case. Questions can be answered with a definite step, and the right thinking is not just solving it, but also still leaving new issues.

Based on the wrong answer, we can analyze the problems that are mostly solved incorrectly by non-science undergraduate students. From the questionnaire provided, there is a reading text before the question. From that text, they can find out the right answer. The version of the passage is related to the scientific method that occurs in daily life. For example, the text about cooking bread is becoming more common for all people, although they don’t study science. The following discussion is discussed only for questions that mostly answered incorrectly.

**Question 4:**
John examined the data and found that the control variable worked best in this experiment, the cake fluffy perfectly when the sugar is 50 grams. The control variable is cake ingredients other than sugar. But no better than 100 gram sugar. What will happen if the cake is given 250 grams of sugar?
- A. The size of bread with 250g sugar is the same as the size of bread with 50g sugar
- B. The size of bread with 250g of sugar expands more than bread with 50g of sugar
- C. The size of bread with 250g sugar cannot expand much than bread with 50g sugar
- D. The size of the bread is equally not expanding

Non-Science Undergraduate Students are expected to be able to predict an action that treated differently than before. Which is not just predicting but needs to considered before or after the test. Many students mistakenly formulated their hypotheses. It can because they did not know very well the previous treatment, so to predict the new result with manipulation variables they still confused.

Therefore, it is important to know part of the scientific method. One of which is formulating a hypothesis because hypothesizing is something that is commonly used in everyday life. However, a hypothesis is not only to predict the results, but also to consider before and after.

**Question 5:**
Consider the following picture. (from the reading text)
The right question for the above event is ...
- A. How did the bread come about?
- B. What will happen to the two breads?
- C. Why is the bread has different size?
- D. Who cooks the bread?

From question 5, it can find out skill to formulate a problem according to the issue discussed. In this case, it is not a new thing for a student, and actually, they know this. However, they are still confused about how to formulate a problem. It shows from the question above. There are still many non-science undergraduate students answer incorrectly. The aim of formulating the problem is to facilitate us in solving and answering problems.

**Question 6:**
Based on John's problem above who wants to prove whether the dose of sugar can affect the size of the bread, so John hypothesizes that ...
A. Bread has nothing to do with sugar
B. Sugar does not affect bread size
C. Bread expands because of sugar
D. If more sugar is added, the bread will rise higher

The results and conclusions must follow the formulation of the problem. If the problem formulation is not appropriate with the issues, the results and discussion will be different. It is important to non-science undergraduate students when they encounter a problem, so, they can formulate it well in any case. Therefore, learning science process skills is very important, especially learning about the scientific method.

Question 7:
In the above problem, when John conducts an experiment related to bread, when he has obtained the data, what should he do next ...
A. Draw conclusions
B. Communicating in class
C. Creating a table of experimental data
D. Repeat the experiment

Based on question 7 above, it related to the step of science process skills. It is the scientific method. This step is a process to achieve something, so the steps must be arranged precisely and coherently. As the science process skills, it has some steps. It is starting from asking questions, submitting hypotheses, controlling variables, conducting experiments, drawing conclusions and communicating. Based on the research questionnaire, it is known that the comparison between guided inquiry and traditional teaching methods is different. This difference lies in the syntaxes in guided inquiry learning that are more complex and support science process skills than traditional teaching methods [13]. Which with today's complex problems, there needs to be guided inquiry, not just classical methods. Therefore, it is suitable to be used and even developed into a meta-synthesis in Science Process Skills [14].

The steps above must be completed entirely so that the results and discussion are maximum and complete. If there are steps that are not carried out, it will hamper other or the results and discussion will not be optimal and good. If it is related to daily problems, it takes some steps to solve the problem so that the problem is resolved correctly without creating new problems. For this reason, it is necessary to learn about the science process skills.

Beside used qualitative descriptive, this research also used quantitative descriptive. It is obtained data based on the percentage of questionnaire answers to undergraduate students in non-science programs. The percentage of correct answers obtained by non-science undergraduate students is 60%, and 40% of non-science undergraduate students' answers are wrong. It is not good enough because half of the overall problem is still incorrect, especially related to scientific methods of science process skills.

Based on an interview with undergraduate students about science process skills with the guided inquiry model, it can solve problems in daily life. They do not overthink about the cause and effect that will occur. However, it is due to the lack of knowledge about the scientific method, and they don’t accustom to solving problems in detail with the preparations needed. They solve problems with social science without using other methods. According to the research by Amirotun [12], science process skills can improve thinking skills. It shows from interviews of non-science undergraduate students who have less thinking skills related to a scientific matter.

Non-scientific undergraduate students think that the scientific method only wastes their time in the sense of thinking deeply without knowing that the scientific method or science process skills can help solve their problems completely and precisely. Besides, with the scientific method, they can use high thinking skills. Some problems cannot be solved only from opinion, but scientific proofs can strengthen the opinion. For this reason, non-science undergraduate students must learn about science process skills that have many advantages.
4. Conclusion

Based on the results and discussion, non-science undergraduate students are still not accustomed to using scientific methods of science process skills. That is because, in lectures, they do not learn about science process skills. They only focus on their sociality. Besides, non-science undergraduate students do not know the advantages and importance of science process skills in solving problems in their daily life. Moreover, they do not see that science process skills can be combined with other knowledge, so that an appropriate combination is created to solve problems. For this reason, science process skills need to be trained not only in science but also in other areas of knowledge.

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