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**PISCES****Proceeding of Integrative Science Education Seminar**Journal homepage : <https://prosiding.iainponorogo.ac.id/index.php/pisces>**Article****Analysis of Science Process Skills in Static Electricity Material Using the Discovery Learning Model at SMP Negeri 1 Siman**Wahyu Laila Agustina<sup>1\*</sup>, Rahmi Faradisya Ekapti<sup>2</sup><sup>1,2</sup>IAIN Ponorogo, Ponorogo*\*Corresponding Address: wahyulailaagustina@gmail.com***Article Info**

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**ABSTRACT**

Science process skills (KPS) are really needed by students as a form of learning outcomes that have been passed during the learning process. To improve learning outcomes and science process skills, an appropriate learning model is needed. Moreover, to convey learning material that is difficult for students to understand, such as static electricity material for class IX SMP. Static electricity material requires a student-centered learning model. So that students can understand concepts through their own learning experiences. One learning model that can be used to improve learning outcomes and science process skills is the discovery learning model. Therefore, this research aims to analyze science process skills in static electricity material using the discovery learning model at SMP Negeri 1 Siman. This research uses a qualitative method which is carried out by collecting data through observation and interviews. Observations and interviews were carried out at SMP Negeri 1 Siman on October 26 2022. The data collection process involved science subject teachers and class IX students. Scientific process skills in static electricity material are still relatively low. The skills acquired are limited to observing, concluding and communicating. Possible causes for low science process skills include limited time, suitability of the learning model to the material being taught, and less than optimal learning processes.

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**INTRODUCTION**

Science process skills (KPS) are really needed by students as a form of learning outcomes that have been passed during the learning process. Students are not only required to understand the concepts that have been taught during learning, but also must have appropriate skills regarding the concepts that have been taught by the teacher. The current situation is that there are still many students who only know the learning material, but do not yet fully

possess the skills contained in the material being taught. This is because the learning experienced by students is less meaningful. Thus, learning should be emphasized more on the process, so that students are active when learning to realize meaningful learning (Roheni, 2020).

Science process skills (KPS) are all processes that can be used to create and realize various skills that students have to filter information and improve their self-quality. Information obtained from learning outcomes in the form of scientific concepts, principles and theories can be developed through skills. Therefore, new scientific discoveries are created that can improve the quality of students in carrying out investigations during and outside of learning. This is in accordance with the opinion of Roheni (2020:40) who states that science process skills are a complex set of abilities that are usually used by scientists in carrying out scientific research into a series of learning processes. Based on this, science process skills are really needed by students in the current era.

The achievement of learning outcomes that include science process skills is greatly influenced by the learning model used by the teacher in delivering learning material. Moreover, physics learning material that is difficult for students to understand, one of which is static electricity. Static electricity material requires a student-centered learning model. So that students can understand concepts through their own learning experiences. Therefore, using the right learning model with the material presented can maximize learning outcomes and science process skills that students will acquire (Septi, 2022).

One learning model that teachers can use to improve students' learning outcomes and Science Process Skills is the discovery learning model. The discovery learning model is a learning model that is structured in detail so that students can accept the concepts taught by discovering for themselves through their experience of the problems they encounter (Maulida, 2016). Problems regarding the concept of learning material can be transferred by teachers to students. Therefore, students have the opportunity to investigate these problems until they find answers from the results of thinking and analyzing problems presented to students through problems that have been engineered by the teacher. Such learning activities will be more student-centered while the teacher only acts as a facilitator. The discovery learning model has a good impact on students, one of which is improving skills and cognitive processes and increasing students' conceptual abilities.

Seeing how important it is to choose a learning model to improve learning outcomes and Science Process Skills in the science subject of static electricity, this research will present the results of the analysis of learning activities in one of the secondary schools in Ponorogo Regency. Researchers have conducted observations at one of the secondary schools in Ponorogo Regency, namely SMP Negeri 1 Siman. The observation results show that the teacher uses a discovery learning model on static electricity material. Based on this, this research aims to determine and analyze the Science Process Skills obtained by students in class IX C of SMP Negeri 1 Siman using the discovery learning learning model on static electricity material.

## **METHODS**

This research uses a qualitative method which is carried out by collecting data through observation and interviews. Data collection was carried out at SMP Negeri 1 Siman on October 26 2022. The data collection process involved science subject teachers and class IX students. Observations were carried out by taking samples from one of the classes when science learning was taking place, namely in class IX C. The author observed the learning process from start to finish. Interviews were conducted in a structured manner using interview guidelines that had been prepared before conducting the research. One of the questions asked to the resource person was about the learning process and level of Science

Process Skills of class IX C students. All data collected from observations and interviews were analyzed and conclusions were drawn. The steps in this research are in accordance with Miles and Huberman's theory. If summarized, the steps in conducting this research are as follows:



## RESULTS AND DISCUSSION

According to the results of observations and interviews that have been conducted, science learning in class IX C at SMP Negeri 1 Siman uses a discovery learning model with static electricity as material. Based on the RPP (Learning Implementation Plan) created and used by teachers during learning, the following is the syntax of the discovery learning model: 1) *Stimulation* (stimulation/providing stimulation) in this stage, the teacher provides stimulation that leads to static electricity material to create curiosity in the minds of students. 2) *Problem statement* (question/problem identification) in the second stage, students begin to explore the stimuli given by the teacher to students to draw hypotheses. 3) Data collection (data collection) in the third stage, students look for as much information as possible which leads to the stimulation provided by the teacher. 4) Data processing (data processing), this stage is the process of compiling the results of information searches carried out by students. 5) *Verification* (proof) in this fifth stage, students submit data results that have been compiled based on their experience in searching for data and information. 6) *Generalization* (draw a conclusion), the final stage is drawing conclusions from everything that has been done by students from the second stage to the fifth stage. The learning syntax written in the RPP (Learning Implementation Plan) is in accordance with that explained by Istiarji (2020) in his article.

When the teacher carries out the learning process on static electricity material, the teacher does not carry out the syntax of the discovery learning learning model optimally. This is due to situations and conditions that make it impossible, namely due to the limited time that teachers have in delivering learning material. This limited time was caused by the practice of Duha prayer before learning activities at SMP Negeri 1 Siman took place. So it can take up the first lesson time. This causes the learning process to produce less than optimal learning results.

Static electricity material is material that is difficult for students to understand. If the material is only delivered for a short and limited time, the learning outcomes obtained by students will be less than optimal and there could even be misconceptions between teachers and students. So only a few science process skills are obtained and are still relatively low. Learning materials that are difficult for students to understand, such as static electricity, should use more meaningful learning methods. For example, by carrying out practical work directly so that students can more easily understand the concepts of learning material. Apart from that, it is also easy for students to remember and remember.

Before delivering learning material the teacher applies literacy habits to students. This habituation is carried out by students reading the learning material first before the teacher explains it in more depth. After that, the learning activities provided by the teacher to students are to provide stimulation. This is in accordance with the first syntax in the discovery learning learning model. The stimulus given is by utilizing examples of the application of static electricity in the classroom. Students observe what the teacher exemplifies. After that the teacher gives the students the opportunity to conclude what the teacher has conveyed through. Only 25% of students can conclude what the teacher has said.

After that, the teacher asks questions so that students can identify the problem given. Before answering students look for data from the handbook to find answers to the questions given by the teacher. This activity is in accordance with the second syntax, namely the problem statement. Individually, students are able to search for data and summarize it to answer questions. After the students submit their respective answers. Almost all students were able to answer this question, although there were still some students who answered the question with incorrect answers. The teacher provides responses to the answers submitted by students. Then the teacher proves it directly by demonstrating the answer to the question in front of the class. Next, students and teachers together conclude the answers to the questions given by the teacher.

Next, the teacher provides LKPD (Learner Worksheets) for students to work on in groups. Considering limited time, the teacher only divided groups based on the students' seating order. Each group consists of 2 tables, namely 4 people, the group division carried out by the teacher is not heterogeneous, considering that time is very limited. The LKPD (Student Worksheet) provided consists of only 3 questions. The questions given are a type of problem solving questions regarding static electricity. Students work with their groups to solve problems and collect data and information to answer the LKPD questions. This is in accordance with the syntax of the third and fourth discovery learning models, namely data collection and data processing. The students have not yet finished answering all the questions because the learning time is almost up. So the teacher only requires students to do 2 questions. There is not enough time to discuss and conclude the LKPD (Student Worksheet) questions that the students have worked on.

If we look at the learning process and flow, the teacher does not carry out the syntax of the discovery learning learning model optimally. From the learning process that has been carried out on static electricity material in class IX C of SMP Negeri 1 Siman, if analyzed in depth, students only know and understand the concept. Even that is not all students, there are still some students who only know about it. If it is related to students' knowledge abilities according to Bloom's taxonomy, then the abilities of class IX C students at SMP Negeri 1 Siman in static electricity material are in positions C1 and C2, namely remember and understand. Even though Bloom's taxonomic level reaches position C6. C1 to C3 levels can be classified in the LOTS (Lower Order Thinking Skills) category. Meanwhile levels C4 to C6 can be classified in the HOTS (High Order Thinking Skills) category. It can be concluded that the ability of class IX C students in learning static electricity material that has been carried out is still in the LOTS (Lower Order Thinking Skills) category.

The level of knowledge ability in Bloom's taxonomy is also related to science process skills. Science process skills are skills in acquiring knowledge and communicating it in the form of action and still using thought and reason to do something. If students already have knowledge skills based on Bloom's taxonomy, it will be easier for students to acquire science process skills. According to Sutrisno, the types of science process skills in physics learning are (1) observing, (2) classifying (3) communicating, (4) taking measurements, (5) asking questions, (6) formulating hypotheses, (7) planning investigation/experiment, and (8) concluding information (Murdani, 2020).

From this presentation, if analyzed, the science process skills that students have after receiving static electricity material using the discovery learning learning model are observing, communicating and concluding information. These skills are obtained by students from their experience in answering questions, observing demonstrations presented by the teacher, searching for information through handbooks, creating answer hypotheses, and concluding information to answer questions and questions from the teacher. Apart from that, you also communicate the results of the answers both verbally and non-verbally. Therefore, scientific process skills in static electricity are still relatively low.

The possible cause of low science process skills is the lack of optimal learning processes carried out. The time limitations experienced by teachers in delivering learning material and accompanying students during learning also has an impact on the science process skills that students acquire. Apart from that, choosing a learning model that is adapted to the learning material also has an influence. In the learning carried out, students did not get practical experience in the application of static electricity. So it is only natural that the ability of the scientific process is limited to observing, concluding and communicating.

Based on these things, there are several ways that might be done to improve the Science Process Skills (KPS) of class IX C students at SMP N 1 Siman. One way is to choose an appropriate learning model. To improve Science Process Skills (KPS) in static electricity material, teachers need to teach direct practice on how static electricity works and circuits. So to grow Science Process Skills (KPS) in static electricity material is to use a project-based learning model. Apart from choosing the right learning model, teachers must be able to manage the class and prepare a RPP (Learning Implementation Plan) by adapting to the activity schedule that is routinely carried out at school. Just like the Dhuha prayer which is routinely carried out every morning, this will definitely take up the first class period. So teachers must be able to adjust learning while still prioritizing the learning objectives that must be achieved that day.

## CONCLUSION

Science process skills (KPS) are really needed by students as a form of learning outcomes that have been passed during the learning process. Science process skills are skills in acquiring knowledge and communicating it in the form of action and still using thought and reason to do something. Based on observations made, the science process skills that students have after receiving static electricity material using the discovery learning learning model are observing, communicating and concluding information. These skills are obtained by students from their experience in answering questions, observing demonstrations presented by the teacher, searching for information through handbooks, creating answer hypotheses, and concluding information to answer questions and questions from the teacher. Because science process skills are only limited to that, the science process skills of class IX C students at SMP Negeri 1 Siman in Static Electricity material are still relatively low. As for ways to improve Science Process Skills, one of them is by choosing the right learning model and optimizing the learning process while still managing the class well.

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## REFERENCES

- Ayuhans, M.M., Susantini, E., Nurita, T. (2016). Peningkatan Keterampilan Proses Sains Siswa dengan Penerapan Model Pembelajaran *Discovery Learning* pada Sub Materi Fotosintesi dan Respirasi pada Siswa Kelas VII. *Jurnal E-Pensa*, 4(2), 1-9.
- Dari, Fadilah Wulan., Ahamd, Syafri. (2020). Model Discovery Learning Sebagai Upaya Meningkatkan Kemampuan Berpikir Kritis Siswa SD. *Jurnal Pendidikan Tambbusai*. 4(2), 1469-1479.

- Elvanisi, A., Hidayat, S., Fadillah, E.N. (2018). Analisis Keterampilan Keterampilan Sains Siswa Sekolah Menengah Atas, *Jurnal Inovasi Pendidikan*, 4(2), 245-252.
- Harsani, Azura Carolina. (2021). Kajian Keterampilan Proses Sains Pada Buku Teks Pelajaran Fisika SMA Kelas XII. Skripsi. Diperoleh dari <http://repository.unp.ac.id/id/eprint/31088>
- Istiarji, Dani. (2020, November). *Discovery Learning dan Pembelajaran IPA Materi Klasifikasi Makhluk Hidup*. Diakses dari <https://ayoguruberbagi.kemdikbud.go.id>
- Lete, M., Sutopo., Yuliati, Lia. (2016). Peningkatan Keterampilan Proses Sains Siswa melalui Pembelajaran *Discovery* Topik Tekanan Hidrostatik. *Pros. Semnas Pend. IPA Pascasarjana UM*, 1(2), 1020-1032.
- Maulida, L., Melati, H. A., Hadi, L. (2016). Pengaruh *Discovery Learning* Terhadap Keterampilan Proses Sains dan Motivasi Belajar Siswa Kelas XI IPA, *Jurnal Pendidikan Pembelajaran Khatulistiwa*, 5(9), 1-11.
- Murdani, Eka. (2020). Hakikat Fisika dan Keterampilan Proses Sains, *Jurnal Filsafat Indonesia*, 3(3), 72-80.
- Roheni, A., Sutresna, Y., Ilmiyati, N. (2020). Penerapan Model *Discovery Learning* untuk Meningkatkan Sikap Ilmiah dan Keterampilan Proses Sains, *Bioed: Jurnal Pendidikan Biologi*, 8(2), 40-45.
- Saddia, Andi. (2020). Penerapan Model *Discovery Learning* untuk Meningkatkan Aktivitas Belajar dan Hasil Belajar Peserta Didik pada Materi Listrik Statis Kelas IX SMP Negeri 8 Makassar, *Jurnal Fisika dan Pembelajarannya (PHYDAGOGIC)*, 3(1), 15-24.
- Salamah, U., Mursal, M. (2018). Meningkatkan Keterampilan Proses Sains Peserta Didik Menggunakan Metode Eksperimen Berbasis Inkuiri pada Materi Kalor, *Jurnal Pendidikan Sains Indonesia*, 5(1), 59-65.
- Septi, S. E., Deswalman., Maison., Kurniawan, D. A., (2022). Pengaruh Model Pembelajaran *Discovery Learning* Terhadap Keterampilan Proses Sains Siswa Pada Mata Pelajaran Fisika di SMAN 10 Kota Jambi. *Jurnal Phi: Jurnal Pendidikan Fisika dan Fisika Terapan*, 3(2), 10-18.
- Taufiq, H.A., Muhiddin, N.Y., Yunus, R.S. (2018). Pengaruh Model Pembelajaran *Discovery Learning* Terhadap Hasil Belajar Peserta Didik Kelas IX SMP Negeri 31 Makassar pada Materi Listrik Statis, *Jurnal IPA Terpadu*, 2(1), 1-6.