Literature Review: Analysisi of Learning Models to Improve Students; Science Process Skills

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Abstract
The aim of the research is to determine the effectiveness of the student center-based learning model for improving science process skills in elementary schools. This research uses a literature review research design with a descriptive qualitative approach. The data in this research is secondary data. Data collection techniques use literature studies related to national journals and international journals that match the research focus. This research analyzes search results originating from the Erics, DOAJ, and Google Scholar databases. Based on the results of research conducted on 21 articles, both national and international, it can be stated that the three learning models can improve students' science process skills. So it can be concluded that the predict observe explain, Project Based Learning, and inquiry models are able to improve students' science process skills.
Keywords: *Science, process skills, learning models*

Abstrak
Tujuan penelitian adalah untuk mengetahui efektivitas model pembelajaran berbasis student center terhadap peningkatan keterampilan proses sains di sekolah dasar. Penelitian ini menggunakan desain penelitian literatur review dengan pendekatan deskriptif kualitatif. Data dalam penelitian ini adalah data sekunder. Teknik pengumpulan data menggunakan studi literatur terkait jurnal nasional dan jurnal internasional yang sesuai dengan fokus penelitian. Penelitian ini menganalisis hasil pencarian yang berasal dari database Erics, DOAJ, dan Google Scholar. Berdasarkan hasil penelitian yang dilakukan terhadap 21 artikel baik nasional maupun internasional dapat dikatakan bahwa ketiga model pembelajaran tersebut dapat meningkatkan keterampilan proses sains siswa. Jadi dapat disimpulkan bahwa model prediksi observasi, penjelasan, Project Based Learning, dan inkuiri mampu meningkatkan keterampilan proses sains siswa.
Kata kunci: *IPA, keterampilan proses, model pembelajaran*

INTRODUCTION

Natural science is one of the subjects that students must take since elementary school. This aims to introduce and provide understanding or knowledge for students about the process of events that they experience in everyday life. To be able to understand this, students need to master science process skills. Science process skills are all the abilities that students need to acquire, develop and apply scientific concepts, principles, laws and theories in the form of mental, physical and social abilities (Yuliati, 2016).

Science process skills in learning are basic skills that students must have in developing their potential in the learning process (Lusidawaty et al., 2020). Science process skills are classified into basic KPS and integrated KPS. Several indicators of basic KPS include, observation, inference, measurement, communicating, classifying and predicting (Aldi & Ismail, 2023). These basic skills are important for students to master to help make it easier for them to understand concepts in science learning. In recent years, science process skills and scientific attitudes have been widely considered to be important factors influencing student achievement and their future career choices (Irwanto, 2022).

However, in reality, there are several problems that cause students' science process skills to not be formed optimally. When the learning process takes place, there are still students who lack focus and have no interest in participating in learning, teachers who are still less than optimal in providing appropriate and enjoyable learning for students, thus causing a lack of students' understanding of science learning concepts. Guna Utama et al. (2019), stated that the majority of elementary school students in Indonesia have not mastered science concepts and have not been able to apply these concepts in real life. Dervia Jaya et al. (2022), said that the factors causing low science process skills are that students are not encouraged to solve their own problems, students are not directly involved, students are not trained enough to work together and find their own concepts to analyze a problem.

Based on the problems above, the use of a student center learning model can be used as the best solution to overcome these problems. There are several learning models that can involve students directly during the learning process. First, the predict observe explain learning model is a learning model that gives students the opportunity to develop their knowledge and the opportunity to think, search, find and explain examples of the application of concepts that have been learned independently, including discussing with other friends (Pane et al., 2020). Second, the project based learning model is a form of learning that not only emphasizes mastery of material concepts, but also implements the role of knowledge and technology in various social lives and fosters a sense of social responsibility for the impact of science in society (Ismail et al., 2021). Third, the inquiry learning model is a learning model that will provide new learning experiences for students with teacher guidance and guidance using appropriate procedures to improve the quality of student learning (Jundu et al., 2020). These three models can provide meaningful learning for students, this is because this model will involve students directly.

Based on the results of research conducted by Tanjung et al. (2022), stated that after implementing the POE learning model, students' science process skills in the experimental class were 74%, while in the control class the percentage was only 41%. So the KPS scores of students in the experimental class are higher than those in the control class.

Based on the results of research conducted by Hanim et al. (2022), it can be stated that the project based learning (PjBL) model has an influence on students' science process skills. Students, both male and female, showed a positive and happy response to the implementation of PjBL STEM in science learning. According to students, learning is interesting and motivating; can help understand teaching material,

form creative attitudes, and students become increasingly aware of the importance of protecting the environment.

Based on the results of research conducted by Sulistiyono (2020), the following conclusions were obtained: The guided inquiry learning model is effective for improving students' science process skills. The understanding of concepts between the experimental class and the control class is different because students learn through experience as a source of learning or learning, not just material that comes from the teacher and during the learning process students are assisted with practicums which can make it easier for students to understand the subject matter.

In this literature review, the author will explain several student-centered learning models to improve students' science process skills.

METHOD

The type of research used in this research is a literature review or literature study with a descriptive qualitative approach. Literature review is a literature review method that identifies, examines, evaluates, and interprets all available research (Afsari et al., 2021). This literature review aims to conduct a literature review to find previous research that is related to the research (Nur & Noviardila, 2021). This research was conducted in november 2023. This research was carried out by analyzing international and national journals originating from the Erics, DOAJ, and Google Scholar databases, which will then be concluded into new ideas. From various articles, researchers selected 21 articles that were closely related to the keywords used. The journal used as a source in this research is a journal that discusses several student center learning models, including the predict observe explain model, PjBL, and inquiry model.

RESULTS AND DISCUSSION

Literature review research is an initial step taken by researchers in preparing a research plan that will be used to explore theories or expert opinions related to the topic to be researched. These theories can be obtained from books, journals, publications related to the topic of discussion. This literature review is not only part of the theoretical basis, but can also be used as a reference to produce new research which will provide something different from the results of previous research.

In this research, the researcher discusses the results of research conducted by previous researchers regarding the effectiveness of the student center-based learning model, namely in this research the researcher examines three learning models, namely the POE model, PjBL, and the inquiry learning model. Researchers refer to articles that have been displayed. The data display contains 21 articles that match the title based on the results of research conducted previously and published in national and international journals, 11 articles discussing the POE learning model, 6 articles discussing the Inkiri learning model, and 4 articles regarding the PjBL learning model.

Based on searches carried out by researchers in international and national journals accessed on Erics, DOAJ, Google Schooler, the results obtained can be seen in the following table:

Table 1. Literature Review of Learning Models

Researcher and Year	Journal	Research result
Eka Sri Rahmawati,	Educational and Psychological Conference in the	Science process skills increase and it can be concluded that the use of the POE learning model is effective for the science

2018	4.0 era	process skills of class VIII SMP students.
Kurniawan et al., 2022	Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education)	The application of the predict-observe-explain (POE) model has proven to be influential improve students' science process skills on the human digestive system material.nIn addition, the science process skills of students taught by the POE model were higher in comparison students taught with conventional learning.
Pane et al., 2020	Jurnal Pendidikan Matematika dan IPA	The results of the research reveal that the POE learning model can develop students' understanding of concepts and science process skills. POE models have stimulating learning syntax students to be more active in learning, for example, students are given opportunity to develop their knowledge and the opportunity to think, search, discover, and explain example of the application of that concept have studied independently, including discussions with other colleagues
Marcelina* et al., 2022	Jurnal Pendidikan Sains Indonesia (*Indonesian Journal of Science Education*)	Implementation of learning using a POE-based model problems can provide direct experience to students through use and development of science process skills. Learning that carried out has trained students to use and develop Science process skills include making predictions, conducting experiments, process/analyze data, and communicate experimental results.
Guna Utama et al., 2019	Jurnal Pendidikan dan Pembelajaan IPA Indonesia	There are significant differences in science process skills between students take part in learning with the POE learning model and students who follow conventional learning. Science process skills of students who follow learning with the POE learning model is better than students who follow it conventional learning.
Nurlaili et al., 2019	*Journal of The Indonesian Society of Integrated Chemistry*	This research was carried out over 3 meetings and the results were that at the first meeting the category was quite good with a percentage of 62.50%, at the second meeting it had increased to 70.49% with a good category and at the third meeting it had increased again with a percentage of

		87.01 % in the very good category. This proves that the POE learning model has a very strong positive influence on improving students' science process skills.
Erdem Özcan & Uyanık, 2022	*Journal of Pedagogical Research*	The results of this research revealed that when the POE learning model was implemented, students participated very actively in learning and aroused very high curiosity.
Fatihah et al., 2022	JTK: Jurnal Tadris Kimiya	The POE model developed has the potential to improve students' understanding of concepts and science process skills. It was also revealed that the POE model can be used as an alternative learning strategy for teachers to make chemistry learning effective
Muslimin & Saehana, 2018	Jurnal Pendidikan fisika	In this study, we compared the POE model with the discovery model, and found that the higher POE model had the potential to improve students' science process skills.
Hardianti & Permatasari, 2023	Unnes Science Education Journal	By applying the POE model, students' science process skills can be improved very well, especially in observing indicators. A small number of students managed to reach the level of mastering basic KPS well.
Rahmawati et al., 2022	Jurnal Basicedu	Science process skills were successfully improved by applying the POE model and using video-based interactive multimedia. The research results revealed that this model was effective because it was able to lead students to achieve minimum completion criteria and practice science process skills.
Siahaan et al., 2020	Jurnal Basicedu	In this research, a guided inquiry model is applied. The results obtained were that in KPS students did not get a significant difference after being treated with this model, but increased significantly in their ability to understand science concepts.
Dinar Rahmawati,	Prosiding Konferensi Ilmiah	This research obtained results that revealed that the guided inquiry model was effective

2020	Dasar	in improving the science process skills of third grade elementary school students.
Tanjung & Rahmatilla, 2020	Jurnal Hasil Kajian, Inovasi, dan Aplikasi Pendidikan Fisika	The use of the Inquiry training model can improve students' science process skills, but has shortcomings in time management which requires a long time, thus slightly disrupting the continuity of the learning process.
Aprilia & Anggaryani, 2023	PENDIPA Journal of Science Education	This research used a STEM-based guided inquiry model and obtained results that this model could be implemented well and significantly increase students' KPS.
Kurniawati, 2021	Primary: Jurnal Pendidikan Guru Sekolah Dasar	Through the use of the guided inquiry model, researchers revealed that this model can improve science process skills and create a pleasant learning atmosphere for students, so that students are increasingly motivated to learn, because with this model students are directly involved in observation and experimental activities.
JUFRI ANDI et al., 2023	Jurnal Eduscience (JES)	This research uses Android-based media with a guided inquiry model Researchers revealed that the use of Android-based media with a guided inquiry model had a high impaction the science process skills of class X students and can be categorized as higher and more effective than use of the guided inquiry model without using media.
Firdaus et al., 2020	Journal of Environment and Management	The use of the PjBL learning model can improve students' science process skills, because students can see and observe directly and play an active role in creating projects directed by the teacher.
Amsikan, 2022	Paedagogia	In this study, the PjBL model was used with the results obtained, namely that the PjBL model can improve science process skills with a percentage of 88.7% in the good category.
Yuniasih et al., 2022		The application of the project based learning model can improve the science process skills of elementary school students. This shows that the model Project based learning can be used as an

Nurdiansah & Makiyah, 2021	Jurnal Pendidikan Fisika dan Teknologi	This research uses a laboratory-based hybrid project based learning module with the results obtained revealing that this model is able to improve process skills science students.

The results of the study of this third learning model show that in its application it both has a positive influence in improving students' science process skills. Panel et al. (2020), revealed that in the process of learning activities that apply the POE learning model, there is a learning syntax that stimulates students to be more active in learning, for example students are given the opportunity to develop their knowledge and the opportunity to think, search, find and explain examples of the application of the concept. have studied independently, including discussions with other colleagues. Suryaningsih & Nisa (2021), in their research, revealed that the PjBL learning model can generally improve students' science process skills in the high category based on 4 indicators, namely Critical Thinking, Curiosity, Science Literacy, and Analytical Thinking. Meanwhile, for the inquiry learning model, in research conducted by Kurniawati (2020), through the use of the guided inquiry model, researchers revealed that this model can improve science process skills and create a pleasant learning atmosphere for students, so that students become more motivated. for learning, because with this model students are directly involved in observation and experimentation activities.

CONCLUSION

Based on the literature above, it can be concluded that the predict observe explain model, Project Based Learning, and inquiry model are able to improve students' science process skills, because in their application students are required to be directly involved in carrying out experimental activities and can make research plans, record findings, debate, discuss, and make decisions. This is in line with the components of science process skills, where students will be directed to design and carry out experiments. So it can be concluded that this learning model is effective in improving students' science process skills.

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