

THE EFFECT OF THE PREDICT OBSERVE EXPLAIN (POE) LEARNING MODEL ON FACE-TO-FACE LEARNING (F2F) ON THE UNDERSTANDING OF SCIENCE CONCEPTS: IN THE FOURTH GRADE OF ELEMENTARY SCHOOL STUDENTS

Efrillita Sampurno¹, Fitria Wulandari¹

¹Elementary School Teacher Education, Faculty of Psychology and Educational Sciences, University of Muhammadiyah Sidoarjo, Sidoarjo, East Java, Indonesia

Article Info

Article history:

Received : 06/08/2022

Accepted : 19/07/2023

Published : 30/09/2023

Keywords:

Predict Observe Explain (POE)

Learning Model

Understanding of Science concepts

ABSTRACT

The purpose of this research to find out the effect and how much influence the learning model had on predicting and learning the effect of face-to-face learning on understanding science concepts. This research method uses quantitative experiments a type of the study Quasi Experimental Design and the form design used is a nonequivalent control group design. The results indicated that hypotheses should be tested and problem statements answered, the analysis data techniques use were the Independent Sample T Test and the N-Gain test. You can tell by looking at the average when given treatment used the learning model POE in the Post-test to get an average value of 76.49 for the experimental class and 61.36 for the control class. From the results of the Independent Samples T Test post-test scores for the experimental and control class, namely $2.721 > 1.67$ then, H_0 is reject and H_1 is accept, indicated that there is an influence and results of N-Gain experimental class give POE model indicated that is a big influence so that it can be use as a learning model. The conclusion in this study is it learning model POE in face-to-face learning is positive and significant effect understand concepts science for fourth grade elementary school student, so that it can be used as a solution in learning science at elementary school.

This is an open access article licensed under the [CC BY-SA](#) license.



Corresponding Author:

Efrillita Sampurno

¹Elementary School Teacher Education, Faculty of Psychology and Educational Sciences, University of Muhammadiyah Sidoarjo, Sidoarjo, East Java, Indonesia
Email: sampurnoefrillita346@gmail.com

1. INTRODUCTION

In the face-to-face learning process (F2F), it can be done since the issuance of the Joint Decree of the Four Ministers or at least done in January 2022 as the start of the Even Semester of the academic year F2F. However, based on the facts that occur there are general problems. This is evidenced by the fact that, as reported by the [Republika.co.id](#) news portal, limited face-to-face learning in classroom learning tends to be limited in duration (Makarim, 2021). Delivery of information and learning materials in physical classes which are limited in time duration raises concerns for educators about the quality of understanding of learning materials and learning outcomes policies. In addition, in several areas in Indonesia where previously online educators/educators were unable to activate scientific attitudes, scientific processes and scientific skills in online science learning as well as the emergence of the potential for loss of children's knowledge or learning loss (Makarim, 2021). This is reinforced by researcher observation results on class IV A and B students at SDN Rangkah Kidul Sidoarjo. Based on the statement of problems that occurred as a result of the midterm exam, when analyzed in the theme 3 Caring for

Living Creatures, there were 15 questions referring to the indicators of students understanding of concepts such as giving examples, concluding, classifying, and explaining. this shows that from 50 fourth grade students, there are 17 students or 34% who have understood the concepts in the UTS questions, while 33 students or 66% still have problems mastering the concepts in the questions. From the results of the midterm exam, we can see that there are still many students who are still lacking in understanding the concept. Based on the problem formulation above, it can be seen that the purpose of this study is to describe there is an increase and how much influence the understanding of science concepts students use the learning model in face-to-face learning POE (Predict Observe Explain) with students without using the class IV POE model at SDN Rangkah Kidul Sidoarjo. Based on data from previous research conducted by Klara Santi, Hery Kresnadi, and Rosita (Santi & Kresnadi, 2020). With the title "The Influence of the POE (Predict Observe Explain) Learning Model on the Science Process Skill of Class IV Elementary School Students." Based on analysis of pre-test and post-test data, it is concluded that there are differences in the students' final abilities compared to their initial abilities before being given treatment. It means that the application of the predict, observe explain technique has a better influence on the students science process skills. We can know this from the average pre-test score of score 67.83 and the results of the average post-test of students of 74.57. While the difference in the average value of the pre-test and post-test is 6.74. In addition, according to the results of the t-test calculation, t_{count} is 5.18 and t_{table} ($\alpha = 5\%$; $db' = 29$) is 2.031. Due to $t_{count} (5.18) > t_{table} (2.031)$, the hipotesis of this research reads: There is an effect of the application of techniques predict observe explain on the learning of natural sciences on the of fourth grade science process skills students at SDN 66 Pontianak City. This shows that the prediction, application of observation, and explain technique has a better impact on the students' science process skills. Besides that, it is line with the research conducted by Yogi Setya Novanto, et al. (Novanto et al., 2021). The title is "The effect of the POE learning model on the ability to understand the science concepts of elementary school students". This study uses a quasi experimental quantitative research design, in the form of a posttest only control design. The results of the calculations on the student's posttest with $t_{count} 2.839 > t_{table} 2.004$ indicate influencing the ability to understand scientific concepts between classes, the ability to enter into the POE learning model, direct learning of the material, and transition to Class V at MIS Ushuruddin Singkawang.

In learning science, it is necessary to involve making predictions and making observations to prove these predictions (Nana, 2020). Given the importance of science subjects, I see the need for a model in the learning proces. The better the learning process, the better the product will be. So that educators needto apply learning model that can develop student understanding of science concepts. According to the aspects measured in understanding the concept, include providing explanations, giving examples, classifying, comparing, interpreting, making interesting inferences, summarizing (Anderson et al., 2001). A learning model is a plan or template that can be used to create a curriculum (long-term learning plans), design learning materials, and teach classroom learning or elsewhere. Learning model that can involve students and can foster enthusiasm for learning the in active learning process is the learning model Predict Observe Explain (POE). Indrawati & Setiawan (2009) stated that the learning model (POE) is a learning strategy in which educators can multiply the understanding of students asking them to perform three main tasks, namely predicting, observing, and providing explanations (Explain). White and Gustone (1992) state that POE an effective learning model to acquire and improve students' science concepts. Based on the description above, it is necessary to conduct research on

optimizing the ability of elementary school students in terms of understanding science concepts through a learning skills paradigm that orients students to predict, observe, and and communicate through the Predict Observe Explain (POE) learning model. One thing that can be done is by researching "The Effect of the Predict Observe Explain (POE) Learning Model on face to face Learning (F2F) on the Understanding of Science Concepts for Class IV Students at SDN Rangkah Kidul Sidoarjo". The novelty in this study is in terms of the form of the design, Which use the nonequivalent control grup design in which the experimental and control group are not chosenrandomly (Sugiyono, 2017). Whereas in the previous study, the posttest only control design was used, in which two groups were selected randomly. In terms of the variables used, there is research on it use learning model POE with diverse variables, such as student creative thinking skills, critical thinking skill, and science proces skills.

2. METHOD

This research uses experimental quantitative methods similar to type of study used by researchers, namely quasiexperimental by the form of a Nonequivalent Control Group Design (Sugiyono, 2017). The subjects in this study were class IV SDN Rangkah Kidul Sidoarjo. This study consists of 2 class, experiment class, with 25 student consisting of 13 male student and 12 female students while IV B as the control class, with 25 student consisting of 16 male student and 9 female students. The instrumented using by research scientific concept understanding sheet exam.

The simple stages of the research procedure carrid out in this study can be displayed in the form of Figure 1 as follows.

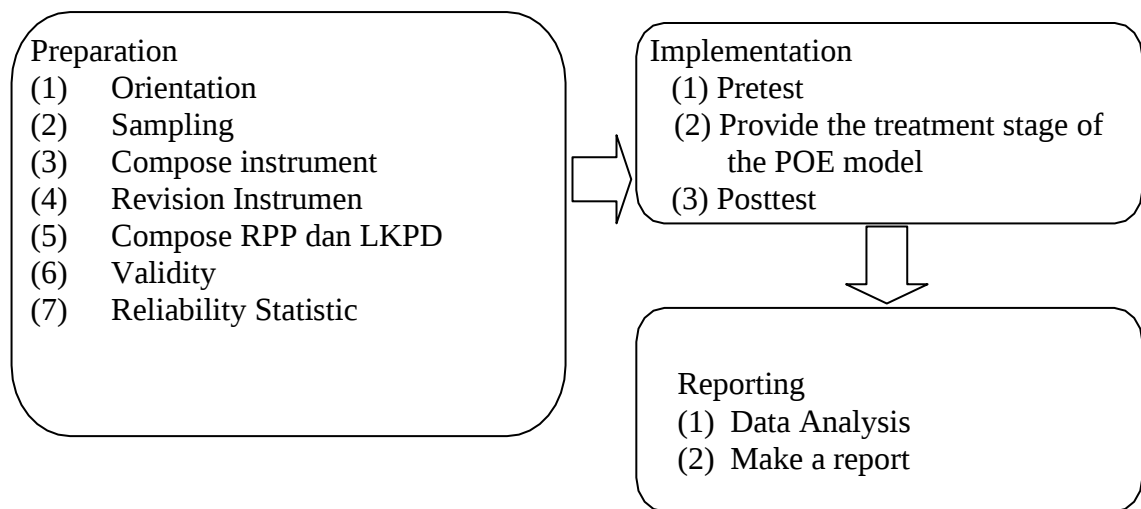


Figure 1. Research Procedure

Calculation of logical validity test using Aiken's V coefficient quantification with the following formula (Azwar, 2012) :

$$V = \sum s/[n(c - 1)] \quad [1]$$

By using the above formula, to test the logical validity based on the Aikens'V criteria table, it shows that the learning device has two raters for the Aiken's V coefficient quantification test. So that $V > 0.8$ has a high level of validity.

Table 1. Construct Validity of Two Validators

No.	Device Type	Percentage	Eligibility Criteria
1.	Syllabus	91,67%	Very Valid
2.	RPP	93,75%	Very Valid
3.	Study Materials	96,87%	Very Valid
4.	LKPD	96,15%	Very Valid
5.	<i>Pre-Test and Post-Test</i>	96,43%	Very Valid

Table 2. Output *Reliability Statistics Alpha Cronbach's* SPSS 25

Reliability Statistics	
Cronbach's Alpha	N of Item
.880	24

The researcher used instrument form of a science concept understanding test sheet. Before using the instrument in this study, it needs to be validated by experts or expert judgment. In data collection techniques, such as pretest and posttest. This test technique is used to find out the results for fourth grade students. In testing to the answer problem formulation and hypotheses, the researcher using the Independent Samples T test and the NGain test. In this study, two group use were, the name experimental and control group. Meanwhile, to answer the problem formulation, the researcher uses the influence criteria table (Hake, 1998) to categorize the influence value based on the NGain test, namely:

Table 3. NGain Effect Criteria

NGain Value	Criteria
$g < 0,3$	Low
$0,3-0,7$	Medium
$g > 0,7$	High

The above criteria are used by researchers to determine the criteria for the effect of the research results. If the NGain is less than 0.3, then the criteria are classified as low criteria. If the NGain is 0.3 to 0.7, then the NGain criteria are moderate. And if the NGain value is greater than 0.7, then it is classified as high criteria.

3. RESULTS AND DISCUSSION

Based on these results and discussion before giving treatment or treatment to students, researchers need to carry out an observation. This carried out with the problems of class IV students. After knowing the problems in the class, the researchers carried out a learning activity used the POE learning models.

The technique in data collection used in research is provision science concept understanding test questions to students in the form of pre-test and post-test in experiments and controls class. The following table shows data value of the pre-test results of the experimental

and control class of students before giving treatment:

Table 4. The results scores pre-test for the experimental and control class

Statistic	Pre Test Value	
	Eksperiment Class	Control Class
Highest Score	83.3	71
Lowest Score	37.5	29.2
Mean	52.08	45.0
Median	50	45.8
Mode	38	41.7
Variance	204.61	119.10
Standard Deviation	14.30	10.91

After the researchers carried out the pretest, they gave treatment to the students. Researchers used POE (Predict Observe Explain) learning models in face to face classes. After further treatment, the researcher asked questions in the form a post-test to determine student learning outcomes afterwards being given treatment. The follow shows table posttest results of experiment and control class of students after giving treatment:

Table 5. The results of score pre-test for experiment and control class

Statistic	Post Test Value	
	Eksperiment Class	Control Class
Highest Score	100	91.7
Lowest Score	50	37.5
Mean	76.49	61.36
Median	75	63
Mode	100	62.5
Variance	487.63	259.89
Standard Deviation	22.08	16.12

In Table 5, it can be seen this is an experiment class showed better concept understanding achievement as a control class.

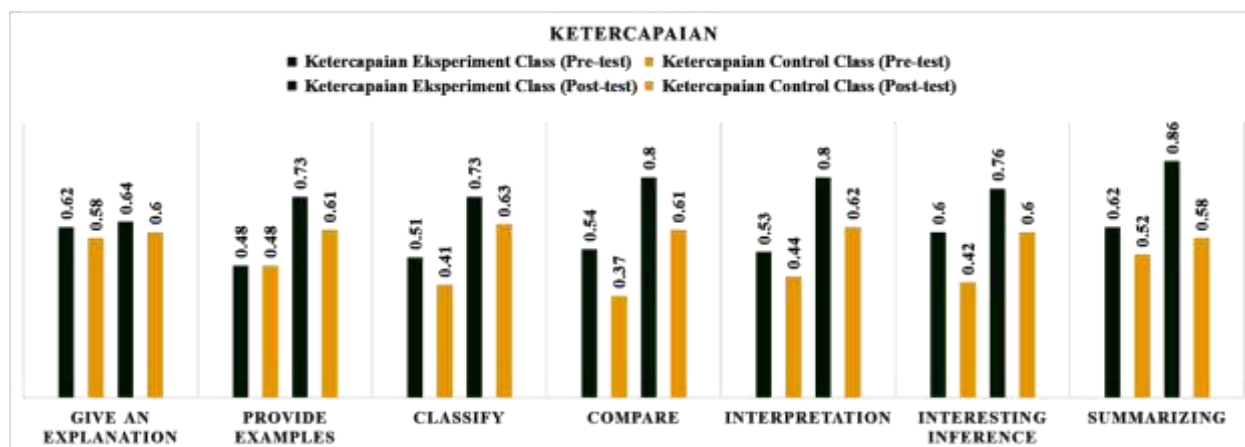


Figure 2. Graph of the level of achievement of the indicators for understanding students science concepts with pre-test & post-test score (experiment and control Class)

In Figure 2. The graph of the level of achievement of the indicators for understanding the science concept of students the result of the pre-test and post-test of experiment and control class are known to has a significant effect on rate performance indicators of scientific concept understanding of experimental and control class.

3.1. There is an Influence of the Predict Observe Explain (POE) Learning Model on Face-to-Face Learning (F2F) on the Understanding of Science Concepts for Class IV Students at SDN Rangkah Kidul Sidoarjo

In this study, before performing calculations on hypothesis testing, I need to test the normality of the data using Kolmogorov-Smirnov statistics. The results show that the statistical values obtained have significant value greater than 0.05. It means data on understanding the science concept is normal distribution. The following result of normality testing are present in Table 6.

Table 6. Normality Test Based on Learning Model and Understanding of Science Concepts

Tests of Normality				
	Class	Kolmogorov-Smirnov		
		Statistic	df	Sig.
(Pre-test)	Eksperiment	.165	25	.077
	Control	.110	25	.200
(Post-Test)	Eksperiment	.160	25	.096
	Control	.159	25	.103

After tested the normality test, found data were normally distribute. Then the test homogeneity can be carried out on the basis of decision making: (Arifin, 2014) if Levene's statistical significance based on the mean is greater than 0.05. This shows that the variance in understanding the science concept is homogeneous. The following result of test homogeneity present in Table 7.

Table 7. Test Homogeneity Based on Learning Model POE and Understanding of Science Concept

Test of Homogeneity of Variance					
		Levene	df1	df2	Sig.
		Statistic			
(Pre-test)	Based on Mean	2.246	1	48	.141
	Based on Median	1.329	1	48	.255
	Based on Median and with adjusted df	1.329	1	42.278	.255
	Based on trimmed mean	2.057	1	48	.158
(Post-Test)	Based on Mean	2.182	1	48	.146
	Based on Median	1.969	1	48	.167
	Based on Median and with adjusted df	1.969	1	47.703	.167
	Based on trimmed mean	2.108	1	48	.153

After the test data distributed normal and homogeneity, the step next is testing the hypothesis to determine the effect and how much influence it has on students understand science concepts using the POE (Predict Observe Explain) learning model in face-to-face learning (F2F) with students without using the model of POE Class IV at SDN Rangkah Kidul Sidoarjo.

Testing the effect after giving treatment is carried out by researchers use the Independent Samples T test and N gain test formulas. The following are results of pre-test and post-test hypotheses for control and experimental classes use an independent samples t-test:

Table 8. Output *Test of Independent Samples Test*

Independent Sample T-Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
(Pre-test)	Equal variances assumed	2.246	.141	2.553	48	.014	9.172	3.593	1.948	16.396
	Equal variances not assumed			2.553	44.511	.014	9.172	3.593	1.933	16.411
(Post-Test)	Equal variances assumed	2.182	.146	2.721	48	.009	14.160	5.204	3.697	24.623
	Equal variances not assumed			2.721	46.362	.009	14.160	5.204	3.687	24.633

Based on table 8. the result the pretest hypothesis test for control and experimental classes above, be conclud that if the value sig is $0.014 < 0.05$ and tcount $2.553 > t$ table 1.67, then H_0 reject and H_1 accept. While the result of the posttest hypothesis test for the above control and experimental class, we can conclude that the values of sig from our study are namely $0.009 < 0.05$ and tcount $2.721 > t$ table 1.67, then H_0 is reject and H_1 is accept. As a result, H_1 is accepted so that it can be that there is a influence on the learning model Predict Observe Explain (POE) on the understanding of the science concept of fourth grade students at SDN Rangkah Kidul Sidoarjo. This causes the average value after the test should be higher than the value before the test.

3.2. There is a large effect of understanding science concepts on student who used the Predict Observe Explain (POE) learning model in face-to-face learning (F2F) with students without used the model POE for Class IV at SDN Rangkah Kidul Sidoarjo

In calculating the magnitude of the influence, the researcher uses the N Gain influence criteria table using the results from excel and the SPSS 25 program. The following is the NGain data in the Experimental and Control Class :

Table 9. Output NGain Eksperiment Class and Control Class SPSS version 25

	Descriptives		Statistic	Std. Error
	Class			
NGain_Score	Eksperiment	Mean	1.00	.12753
	Control	Mean	.449	.06872

In table 9, Based on Ngain score test calculation results using SPSS version 25, it show the magnitude of the effect for the experimental class $1.00 > 0.7$, meaning that it is included in the high criteria. While the Ngain score test calculation results show that the magnitude of the effect for the control class is $0.3 \leq 0.45 \leq 0.7$, meaning that it is included in the medium criteria. The statement above shows that in the experimental class, given the model POE. there is a big influence so that it can be used as a learning model during the learning.

Based on results trial calculations of the impact on Independent Samples T-test, it is found that there is an influence between the Understanding of science concept of student who use learning model POE (Predict Observe Explain) in face-to-face (F2F) class and class IV of student SDN Rangkah Kidul Sidoarjo not using POE model. This is in line with research (Nurliana et al., 2019), which can be seen that there is a significant influence on understanding science concepts for classes that use the POE learning model compared to classes that use direct learning or called direct instruction, the ability to understand science concepts of students in control class. The experiment class due to differences the treatment of the two classes. This is consistent with research findings (Novanto et al., 2021) that there is also an influence on students ability to understand scientific concepts between classes receiving a POE learning model and a direct learning model for thermal materials, and transfer to Class V of MIS Ushuruddin Singkawang. Based on results research, be submitted some suggestions, for improvement the quality of learning Science Nature (IPA) forward as follows with empirical evidence from this study reveals that understanding the concept of students learning with models Predict Observe Explain learning (POE) better than comprehension the concept of student learning with models traditional learning, so teachers use models Predict Observe Explain learning (POE) as an alternative to improve understanding of the concept of IPA student (Sudiadnyani, P., & Garminah, 2013)

While the formulation of the problem of the influence of researchers using the large influence criteria table. In fact, shows an increase in each indicator of understanding science concepts, both pre-test and posttest, between the experimental and control class. This is consistent with research findings (Wardani, 2013) that students are increasing mastery of concepts that can seen from the comparison of scores average and consistent with research finding (Fatimatuzzohrah et al., 2020), both POE and conventional learning models can effectively increase mastery of science concepts for class IV Kayangan, but the increase in the average N-gain value for the experiment class that used the model POE is compared to high control class.

Based on results of NGain calculation according to (Hake, 1998) from this we can conclude that it is an experimental class there is a high level of influence on understanding of the science concept Students who uses the Learning Model Predict Observe Explain (POE) In Class IV at SDN Rangkah Kidul Sidoarjo, while in the control class there is a moderate influence on the understanding of science concept learner use the Learning Model Predict Observe Explain (POE) in Face-to-Face Learning (F2F) Class IV at SDN Rangkah Kidul Sidoarjo. This is consistent with research (Harjanto, 2018), shows app of the POE learning models found to improve understanding of science learning concept in Class IV Durian Payun Primary School, Bandar

Lampung. Consistent with research finding (Wulandari, 2018) which are shown from the results of the Ngain value, there is a moderate influence on understanding science concepts.

4. CONCLUSION

Based on the result of the research and discussion, it can be conclude, namely that is an effect of Predict Observe Explain (POE) learning model in Face-to-Face Learning (F2F) on the Understanding of fourth grade of elementary school students Science Concepts. This can be seen from the results of the pre-test experimental and control class sig. namely $0.014 < 0.05$ and $t_{count} 2.553 > t_{table} 1.67$, where H_0 is reject and H_1 is accept, while the results of the post-test hypothesis test of the experimental class and control class show the value of sig namely $0.009 < 0.05$ and $t_{count} 2.721 > t_{table} 1.67$. So that it can be seen this is a effect of the Predict Observe Explain (POE) learning model on understanding the science concepts of fourthgrade students at SDN Rangkah Kidul Sidoarjo. There is a big influence on the understanding of science concepts for students who used the Predict Observe Explain (POE) learning model in Face-to-Face learning (F2F) with students without using the POE Model for Class IV at SDN Rangkah Kidul Sidoarjo. This can be seen from the average value for each increase in the indicators of understanding the science concept both from the results of pretest and posttest in experimental and control class. In addition, it also be from results of the NGain value that the effect on experimental class is $1.00 > 0.7$ with high criteria. The statement above shows that in the experimental class give the model predict observe explain there is a big influence so that it can be used as a learning model during the learning. The conclusion of study inlearning model POE in face-to-face learning is a positive and significant effect understanding of science concepts for fourth grade elementary student, so that it can be used as a solution in science learning in elementary schools.

REFERENCES

- Anderson, L. W., Krathwohl Peter W Airasian, D. R., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., Rath, J., & Wittrock, M. C. (2001). *Taxonomy For Assessing*
- Arifin, J. (2014). SPSS 24 Untuk Penelitian dan Skripsi. <https://doi.org/717050941>
- Anderson, L. W. (1995). *International encyclopedia of teaching and teacher education, 2nd ed.* Oxford, UK: Pergamon Press.
- Azwar. (2012). Reliabilitas dan Validitas Edisi 4. 111.
- Artawan, I. M. D., Jampel, I. N., & Riastini, P. N. (2015). Pengaruh Model Pembelajaran Predict-Discuss-Explain-Observe-Discuss-Explain Terhadap Sikap Ilmiah Siswa. *Mimbar Pgsd Undiksha*, 2(1).
- Aida, T. N., Anggoro, S., & Andriani, A. (2019). Analisis berpikir kritis siswa melalui model POE (predict-observe-explain) di sekolah dasar. *Jurnal Elementaria Edukasia*, 2(2), 164-172.
- Amirullah, G., Suciati, R., Susilo, S., & Handayani, D. (2019). Pengaruh Strategi Predict Observe Explain (POE) Terhadap Kemampuan Berpikir Kritis Siswa: The Impact of Predict Observe Explain (POE) strategy against student's critical thinking ability. *BIODIK*, 5(2), 173-180.
- Amal, A., & Kune, S. (2018, July). Peranan Pembelajaran IPA Berorientasi POE (Predict, Observe, Explain) untuk Meningkatkan Keterampilan Proses dan Hasil Belajar di Sekolah Dasar. In *Prosiding Seminar Nasional Pendidikan* (Vol. 1, No. 1).
- Banjarnahor, J. A., & Silitonga, M. (2018). Perbedaan Hasil Belajar dan Aktivitas Siswa dengan

- Menggunakan Model Pembelajaran Predict-Observe-Explain (POE) dan Model Direct Instruction. *Jurnal Pelita Pendidikan*, 6(3).
- Bahroini, L., & Agustin, U. S. (2017). Pengaruh Model Pembelajaran Predict-Observe-Explain terhadap Kemampuan Berpikir Kreatif. *JKPM (Jurnal Kajian Pendidikan Matematika)*, 3(1), 99-104.
- Fathiara, A., Badarudin, B., & Muslim, A. H. (2019). Meningkatkan keterampilan berpikir kritis dan gemar membaca peserta didik melalui model predict observe explain berbasis literasi. *Muallimuna: Jurnal Madrasah Ibtidaiyah*, 4(2), 92-101.
- Fatimatuzzohrah, S., Jufri, A. W., & Mertha, I. W. (2020). Efektivitas Penerapan Model Pembelajaran POE (Predict-Observe-Explain) Untuk Meningkatkan Penguasaan Konsep IPA. *Jurnal Pijar Mipa*, 15(4), 351–356. <https://doi.org/10.29303/jpm.v15i4.1653>
- Gultom, E. C. (2018). Penerapan Model Pembelajaran Predict, Observe, Explain (POE) pada Materi Larutan Elektrolit dan Non Elektrolit untuk Meningkatkan Keterampilan Proses Sains, Sikap Ilmiah dan Kemampuan Kognitif Siswa. *Quantum: Jurnal Inovasi Pendidikan Sains*, 9(1), 76-83.
- Hake. (1998). *Analyzing Change Gain*. 1(1), 3. <https://doi.org/10.24036/ekj.v1.i1.a10>
- Harjanto, A. (2018). Model Predict Observe Explain Untuk Meningkatkan Pemahaman Konsep Siswa Pada Pembelajaran Ilmu Pengetahuan Alam Di Kelas Iv Sekolah Dasar. *JIPGSD*, 34(7), 94–95.
- Hong, J. C., Hsiao, H. S., Chen, P. H., Lu, C. C., Tai, K. H., & Tsai, C. R. (2021). Critical attitude and ability associated with students' self-confidence and attitude toward “predict-observe-explain” online science inquiry learning. *Computers and Education*, 166, 104172. <https://doi.org/10.1016/j.compedu.2021.104172>
- Indrawati, W. S. (2009). *Pembelajaran Aktif, Kreatif, Efektif dan Menyenangkan Untuk Guru SD*. Pusat Pengembangan Dan Pemberdayaan Pendidik Dan Tenaga Kependidikan Ilmu Pengetahuan Alam (PPPPTK IPA), 45.
- Islamiyah, B. M. W., Al Idrus, S. W., & Anwar, Y. A. S. (2019). Pengaruh Model Pembelajaran Predict, Observe and Explain (POE) Terhadap Kemampuan Berpikir Kritis Siswa. *Chemistry Education Practice*, 2(2), 14-20.
- Krathwohl, A. D. R. (1964). The taxonomy of educational objectives: Its use in curriculum building. In C. M. Lindvall (Ed.), *Defining educational objectives* (pp. 19-36). Pitts burgh: University of Pittsburg
- Makarim, N. (2021). SKB 4 menteri panduan penyelenggaraan pembelajaran di masa pandemi. 26. <https://setkab.go.id/pemerintah-terbitkan-skb-4-menteri-panduan-pembelajaran-di-masa-pandemi/>
- Muliawati, N. P. C., Ardana, I. K., & Negara, I. G. A. O. (2013). Pengaruh Model Pembelajaran Predict-Observe-Explainterdahap Hasil Belajar Ipa Siswa Kelas V Sd Di Gugus Ubud. *Mimbar Pgsd Undiksha*, 1(1).
- Malik, D. A. (2013). *Pengantar Statistika Pendidikan Teori dan Aplikasi*.
- Mulyana, Siagian, N., Basid, A., Saimroh, Sovitriana, R., Habibah, N., Saepudin, J., Maimunah, M. A., Muaripin, & Oktavian, C. N. (2020). *Pembelajaran Jarak Jauh Era Covid-19*. In *Litbangdiklat Press*. www.balitbangdiklat.kemenag.go.id
- Mergendoller, Mufidah, R. N., Education, C. E., Maret, U. S., Efendi, A., Maret, U. S., Budiyanto, C. W., & Maret, U. S. (2019). *I ndonesian J ournal of I nformatics E ducation The Effectiveness of Android Based Digital Arithmetic Learning Media*. 3(2).

- Nana. (2020). Penggunaan Model Poe2We Dalam Pembelajaran Ipa Untuk Meningkatkan Sikap Ilmiah Dan Hasil Belajar. <https://doi.org/10.31219/osf.io/dcs96>
- Novanto, Y. S., Anitra, R., & Wulandari, F. (2021). Pengaruh Model Pembelajaran Poe Terhadap Kemampuan Pemahaman Konsep Ipa Siswa Sd. *ORBITA: Jurnal Kajian, Inovasi Dan Aplikasi Pendidikan Fisika*, 7(1), 205. <https://doi.org/10.31764/orbita.v7i1.4665>
- Nurliana, A., Rodiyana, R., & Haryanti, Y. D. (2019). Pengaruh Model Pembelajaran POE (Predict, Observe, Explain) terhadap Pemahaman Konsep IPA Siswa Sekolah Dasar. *Seminar Nasional Pendidikan FKIP UNMA*, 776–786.
- Nurlatifah, E. (2014). Penerapan Model Pembelajaran Predict-Observe-Explain (Poe) Untuk Meningkatkan Motivasi Belajar Siswa Pada Pembelajaran Ipa Tentang Alat Peredaran Darah Manusia: Ptk Di Kelas V SD Negeri 3 Cikalongwetan Kabupaten Bandung Barat Tahun Ajaran 2013/2014 (Doctoral dissertation, Universitas Pendidikan Indonesia).
- Prabawa, K. A., Suarni, N. K., & Margunayasa, I. G. (2014). Pengaruh Model Pembelajaran Predict-Observe-Explain Terhadap Hasil Belajar IPA Siswa Kelas IV SDN di Desa Ringdikit. *Mimbar Pgsd Undiksha*, 2(1).
- Rosidah, ani dan yeni dwi. (2021). *Pengaruh Model Pembelajaran Predict-Observe-Explain Terhadap keterampilan proses sains. Article*, 3.
- Santi, K., & Kresnadi, H. (2018). Proses Sains Siswa Kelas Iv. 149–150.
- Sugiyono, P. D. (2017). Metode penelitian pendidikan pendekatan kuantitatif.pdf. In *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif Dan R&D*.
- Shofiah, R. I., Bektiarso, S., & Supriadi, B. (2021). Penerapan Model POE (Predict-Observe-Explain) dengan Metode Eksperimen Terhadap Hasil Belajar IPA & Retensi Siswa. 6(4), 356–363.
- Santoso, S. (2018). *Mahir Statistik Multivariat Dengan SPSS*. PT Elex Media Komputindo. <https://doi.org/718051071>
- Sari, M. M., Rosilawati, I., & Efkar, T. (2013). Peningkatan Keterampilan Mengkomunikasikan dan Menyimpulkan Melalui Model Pembelajaran Predict-Observe-Explan. *Jurnal Pendidikan dan Pembelajaran Kimia*, 2(2).
- Sudiadnyani, P., & Garminah, D. N. S. N. N. (2013). Pengaruh model pembelajaran Predict-Observe-Explain (POE) terhadap pemahaman konsep IPA siswa kelas IV SD di Kelurahan Banyuasri. *Mimbar PGSD Undiksha*, 1(1).
- White and Gustone. 1992. *Probling Understanding*. Hongkong : Graficraft TyposettersLtd.
- Wardani, A. A. K. (2017). Penggunaan Model Pembelajaran Predict-Observer-Explain (Poe) Untuk Meningkatkan Keterampilan Proses Sains Dan Penguasaan Konsep Siswa Pada Materi Ekosistem. 1–9.
- Widyaningrum, R., Sarwanto., & Karyanto, P. (2013). Pengembangan Modul Berorientasi POE (Predict Observe Explain) Berwawasan Lingkungan pada Materi Pencemaran untuk Meningkatkan Hasil Belajar Peserta didik. *Jurnal Bioedukasi*.1(6), 100-117.
- Wulandari, F. (2018). Pengaruh Model Pembelajaran Predict-Observe-Explain Terhadap Pemahaman Konsep Ipa Mahasiswa Pgsd Universitas Muhammadiyah Sidoarjo. *Jurnal Pendidikan Dasar Nusantara*, 3(2), 167. <https://doi.org/10.29407/jpdpn.v3i2.11780>