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# THE EFFECT OF POE (PREDICT-OBSERVE-EXPLAIN) LEARNING MODEL ON LEARNING OUTCOMES AND STUDENT RETENTION ON PLANT TISSUE

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**ABSTRACT**

This study aims to determine the effect of the POE learning model on student learning outcomes and retention. This study uses a quantitative approach with a pre-test, posttest, and retest design. The type of research used is a quasi-experimental research with a research sample of class XI students at SMA Negeri 1 Aek Natas in the 2020/2021 learning year. The sampling technique used simple random sampling. The data analysis technique used is to test the hypothesis using the T-test at a significant level of α = 5%. If the price of the F-count is greater than Ftable, then H0 is rejected, and Ha is accepted. Learning outcomes are measured by giving a posttest to students, while retention is measured by providing a retest for 14 days two times. The mean of learning outcomes in the experimental class was 83.88, while the mean learning outcomes in the control class were 78 so that there was a difference in learning outcomes between the control class and the experimental class by 5.88 points. The average retention 1 in the experimental class was 97.07%, while the average retention 1 in the control class was 88.06%, so that there was a point difference of 9.01%. The second retention means results in the experimental class obtained 95.77%, while in the control class, it was 79.53% so that there was a point differential of 16.24%. The experimental class decreased retention points 1 to 2 by 1.3% and for the control class by 8.53%. This study indicates that there is an effect of the POE (Predict-Observe-Explain) learning model on student learning outcomes and retention of plant tissue material.

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## INTRODUCTION

In the whole process of education in schools, learning activities are the most basic activities. This means that the success or failure of achieving educational goals depends a lot on how students experience the learning process. For example, learning is memorizing facts, but someone who learns will be marked by making progress in various aspects such as behavior and science (Tutiliana, 2017). Learning will become more meaningful only when students can construct knowledge in their way, transfer the same and use it in new learning situations (Sreerekha et al., 2016).

Learning activities are a series of activities or student involvement in the learning process, including asking questions, answering teacher questions, giving opinions, doing homework/assignments, excelling in front of the class, and working teams (Yanto dan Edi, 2014). Every learning activity will end with learning outcomes. Learning outcomes are also abilities obtained after learning activities by achieving learning goals which are also changes in student behavior after experiencing learning activities Rosyid dan Mustajab (2019). Teachers can use learning outcomes to see the extent to which students understand a learning material, while for students learning outcomes can be used to improve their ways of learning, for those teachers should analyze student learning outcomes, and it is necessary to measure learning outcomes (Karwono dan Mularsih, 2017). The factors that determine learning outcomes are internal factors (internal factors) and external factors (factors that come from outside oneself), for example family, school, and community (Darmadi, 2017). The categorization of learning consists of three domains, namely cognitive, affective and psychomotor (Jihad, 2012). In this study, learning outcomes are seen from the cognitive domain, which is defined as the ability to absorb the meaning of the material or material being studied (Concept Understanding) (Jufri, 2013). This research is also expected to provide benefits to teachers in choosing learning methods to assist students in improving student learning outcomes.

In the learning process, students can retain or commonly referred to as memory. Retention (memory) is a phase in the act of learning that emphasizes the retention of new information that can be obtained and the transfer of that information from short-term memory and long-term memory. Thus, memory is information over time that involves encoding, storing, and retrieving information from memory. In general, experts view that memory works in three stages of the process, namely entering messages in memory or storage and recalling the information or retrieval (Sardjana dan Ardika, 2016).

Student retention is the process of remembering a new understanding of behavior obtained after receiving information. Good retention power is one of the needs of every student to learn optimally. This is because student learning outcomes in class are measured based on assignments whose process cannot be separated from remembering, so with a good memory, students will learn easily and achieve optimal results (Lubis dan Simatupang, 2014). If the teacher can apply the learning process well, students will have good retention so that the level of student understanding of the learning material will be better (Nursyamsi dan Corebima, 2016). Learning that is expected is learning that can activate students and make students happy in biology lessons to find something meaningful with what they learn. Biology subject is one part of natural science that emphasizes giving students direct knowledge naturally, namely giving that is directed at the achievement of skills in natural contexts.

Whether or not a lesson is achieved is strongly influenced by the learning model, method, and learning approach applied by the teacher so that the teacher is required to consider the learning model, learning method, and approach to be used when teaching-learning materials. A learning model is a form of learning illustrated from beginning to end which the teacher explicitly presents. In other words, the learning model is a wrapper or frame from the application of an approach, method, and learning technique (Komalasari, 2013). For this reason, the role of the teacher in the classroom is not enough to provide information, but more importantly, it is a motivator, facilitator, decision-maker, lifelong learning, and learning organizer (Silalahi dan Hasruddin, 2016).

To overcome those challenges, it is necessary to have a learning model and the use of fun learning media to be more interested and active in the learning process. Cooperative learning can be one of the teacher's choices in carrying out the learning process because the cooperative learning model can solve problems to activate student learning to realize learning activities in students. This learning emphasizes cooperation in groups so that there is a positive dependence between students with one another (Sihaloho dan Hasairin, 2016).

Based on the interviews with biology teachers at SMA Negeri 1 Aek Natas, it shows that

teachers have used learning models in the learning process, but the learning models are still not perfect. They still use the lecture method more often with the help of PowerPoint slides. Responding to these problems, the teacher is required to improve teaching that emphasizes students to acquire their knowledge with the help or guidance of the teacher. Students are not fully involved in learning and are not trained to explore students' prior knowledge, process information, make appropriate decisions, and solve problems. Students are only recipients of the information. This causes students to become bored, passive, less able to use their ideas, and students' retention of learning materials is still low. As a result, many students have not reached the Minimum Completeness Criteria (KKM) set by the SMA Negeri 1 Aek school. Natas is 75.

Teaching as above needs to be changed so that the teaching and learning process is carried out well and optimal learning outcomes. One way that can be done to improve student learning outcomes is to implement innovative learning models used by teachers. The learning model has a significant role in teaching and learning activities. Students' ability to understand lessons can be influenced by selecting relevant, effective, and efficient learning models to be applied so that they are expected to be able to get better learning outcomes.

The above background encourages the author to examine the Effect of the POE (Predict-Observe-Explain) Learning Model on Learning Outcomes and Student Retention on Plant Network Materials at SMA Negeri 1 Aek Natas Kab. Laura for the academic year 2020/2021.

## RESEARCH METHOD

This research was carried out at SMA Negeri 1 Aek Natas, located on Jalan Lintas Sumatra, Aek Pamingke Village, Aek Natas District, Labuhan Batu Utara Regency, Postal Code 21455. The time of the study was carried out from September to October 2020. This study used a quantitative approach method, while The type of research used in this study is quasi-experimental research (quasi-experimental) that uses one experimental class and a control class as a reference.

The object of this research is the students of class XI at SMA Negeri 1 Aek Natas. The data collection technique in this study involved two classes, namely the experimental class, and the control class, which were given different treatments. The experimental class was treated using the POE (Predict-Observe-Explain) model, while the control class was treated using the direct learning model. The research design used in this study was Pre-test, Post-test, and Re-test. In this study, the data analysis used in this study is to test the hypothesis by testing the T-test at a significance level of = 5%. If the F-count value is higher than F-table, then H0 is rejected, and Ha is accepted (Sudjana, 2002).

## RESULT AND DISCUSSION

Based on the results of the data obtained in this study, the learning outcomes scores of class XI students of SMA Negeri 1 Aek Natas, namely the learning outcomes of students who received teaching with the POE (Predict-Observe-Explain) learning model and students who received teaching with direct learning models and retention of the two classes can be seen in Table 1.

Table 1. Student Pretest Learning Results Data

| Skor | Kontrol | | Eksperimen | | Kategori |
|---|---|---|---|---|---|
| | F | % | F | % | |
| 48 – 52 | 4 | 11,42 | 3 | 8,82 | Tidak Tuntas |
| 53 – 57 | 2 | 5,71 | 4 | 11,76 | Tidak Tuntas |
| 58 – 62 | 3 | 8,58 | 2 | 5,88 | Tidak Tuntas |
| 63 – 67 | 7 | 20 | 4 | 11,77 | Tidak Tuntas |
| 68 - 72 | 19 | 54,29 | 21 | 61,77 | Tidak Tuntas |
| Jumlah | 35 | 100 | 34 | 100 | |

Based on table 1, it can be concluded that both the control class as many as 35 students and the experimental class as many as 34 students overall fall into the incomplete category in the pre-test conducted. The post-test learning outcomes data for control and experimental class students are presented in Table 2.

Based on Table 2, it was found that the lowest post-test score for the control class was 56, and the highest score was 96, with an average of 78. Meanwhile, for the experimental class, the lowest score was 68, and the highest score was 96, with an average of 83.88. In line with the research results obtained, the use of the POE (Predict-Observe-Explain) learning model influences

student learning outcomes, where these results are obtained by comparing the learning outcomes (post-test) obtained by the control class using the Direct learning model with the class. Experiments using the POE (Predict-Observe-Explain) learning model. Where the average control class learning outcomes obtained is 78 while for the experimental class obtained an average of 83.88 from these data, student learning outcomes using POE (Predict-Observe-Explain) are higher than the average student learning outcomes using direct learning, where there is a difference of 5.88. In addition, it is also proven by the results of hypothesis testing that have been carried out, which obtained t-count 2,443 > t-table 2,035 and obtained sig. 0.020 < 0.05, which causes the hypothesis to be accepted.

Table 2. Data on Post-test Learning Outcomes of Control and Experiment Class Students

| Data | Control | Experiment |
|---|---|---|
| Sampel | 35 | 34 |
| Mean | 78 | 83,88 |
| minimum | 56 | 68 |
| maksimum | 96 | 96 |
| Std. deviation | 11.536 | 8,441 |
| Varians | 133.091 | 71,258 |

This result is in line with the relevant research conducted by Puriyandari et al. (2014), Juniati (2009) and Shofiah et al. (2017) Fakrikha et al. (2015). The results of the study showed an increase in student learning outcomes and differences in learning outcomes for the control and experimental classes using the POE (Predict-Observe-Explain) learning model. Data on learning outcomes for retest 1 (Table 3) students in control and experimental classes and data on learning outcomes for retest 2 (Table 4) for students in control and experimental classes.

Table 3. Learning Outcomes Data Re-test 1 Control and Experiment Class Students

| Data | Control | Experiment |
|---|---|---|
| Sampel | 35 | 34 |
| Mean | 68,65 | 81,29 |
| minimum | 48 | 68 |
| maksimum | 84 | 92 |
| Std. deviation | 7,86 | 7,150 |
| Varians | 61,832 | 51,123 |

Based on Table 3, it is found that the lowest value of re-test 1 for the control class is 48, and the highest value is 84, with an average of 68.65. while for the experimental class, the lowest score was 68, and the highest score was 92, with an average of 81.29.

Table 4. Data on Re-test Learning Outcomes for 2 Control and Experiment Class Students

| Data | Control | Experiment |
|---|---|---|
| Sampel | 35 | 34 |
| Mean | 62,06 | 80,12 |
| minimum | 42 | 68 |
| maksimum | 80 | 88 |
| Std. deviation | 10.90 | 6,27 |
| Varians | 118.91 | 39,26 |

Based on Table 4, it is found that the lowest value of re-test 2 for the control class is 42, and the highest value is 80, with an average of 62.06. while for the experimental class, the lowest score was 68, and the highest score was 88, with an average of 80.12. Furthermore, data regarding the Learning Outcomes of Retention 1 (Table 5) and Retention 2 (Table 6) of Control and Experiment Class Students are presented.

Table 5. Data on Learning Outcomes of Retention 1 Students of Control and Experiment Class

| Data | Control | Experiment |
|---|---|---|
| Sampel | 35 | 34 |
| Mean | 88,06 | 97.07 |
| minimum | 75 | 91 |
| maksimum | 95 | 100 |
| Std. deviation | 4,97 | 3,12 |
| Varians | 24,73 | 9,72 |

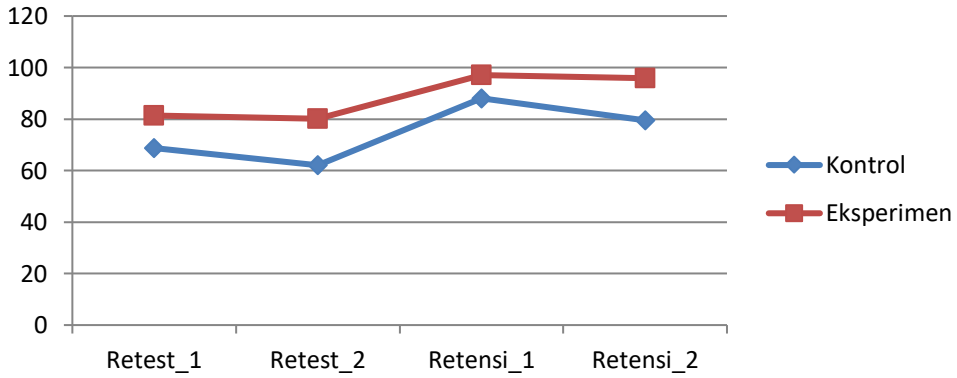
Based on Table 5, it is found that the lowest value of retention level 1 for the control class is 75% and the highest value is 95% with an average of 88.06%. Meanwhile, for the experimental class, the lowest 1 student retention rate was 91% and the highest score was 100% with an average of 97.07%.

Table 6. Data on Retention Learning Outcomes for 2 Control and Experiment Class Students

| Data | Control | Experiment |
|---|---|---|
| Sampel | 35 | 34 |
| Mean | 79,53 | 95,77 |
| minimum | 58 | 87 |
| maksimum | 89 | 100 |
| Std. deviation | 7,567 | 3,711 |
| Varians | 57,257 | 13,771 |

Based on Table 6, it is found that the lowest value of retention level 2 for the control class is 58%, and the highest value is 89%, with an average of 79.53%. Meanwhile, for the experimental class, the lowest two student's retention rate was 87%,

and the highest score was 100%, with an average of 95.77%. The graph of the difference in Retention 1 and 2 for Control and Experiment Classes is presented in Figure 1.




**Gambar 1.** Grafik Perbedaan Retensi 1 dan 2 Kelas Kontrol dan Eksperimen

The research and data analysis results showed that the POE (Predict-Observe-Explain) learning model influenced learning outcomes and student retention on plant tissue material at SMA Negeri 1 Aek Natas Kab. Labura T.P 2020/2021.

In proving the effect of using the POE (Predict-Observe-Explain) learning model, it can be seen in the re-tests that have been carried out on both control and experimental class students, which have been accumulated into student retention scores in the form of percentages. The average retention of 1 control class students is 88.06% while the experimental class retention is 97.07%, where there is a difference of 9.01% points for retention 2, the control class retention average is 79.53%, and for two classes, experimental retention results obtained an average of 95.77% where there is a difference of 16.24% points. For the control class, there is a decrease of 8.53%. In the experimental class, there is a decrease of 1.3%. Data can also be proven by testing the hypothesis on the first retention, which has been carried out t-count 9.570 > t-table 2.035 and sig. 0.00 <0.05. Meanwhile, for the second retention obtained t-count 12,078 > t-table 2,035 and sig 0,00<0,05. Therefore, the hypothesis can be said to be accepted. These differences occurred because of differences in treatment in the control and experimental classes, where the control class used a direct learning model, and the experimental class used the POE (Predict-Observe-Explain) learning model.

This is in line with the relevant research conducted by Shofiah et al. (2017) which states that by using the POE (Predict-Observe-Explain) learning model, student retention results are increased. In line with the research conducted by Liputo et al. (2020) his research states that using the POE (Predict-Observe-Explain) learning model can improve student learning outcomes. In line with the research conducted by Luci (2016) in his research which states that there is an influence of the Predict-Observe-Explain (POE) learning model on students' critical thinking skills. In line with the research conducted by Hidayah dan Yuberti (2018) in their research, there is an effect of the Predict-Observe-Explain learning model on students' learning process skills.

## CONCLUSION

Based on the research results obtained, it can be concluded that there is an effect of the POE (Predict-Observe-Explain) learning model on student learning outcomes on tissue material in plants in class XI IPA SMA Negeri 1 Aek Natas for the 2020/2021 academic year. There is an effect of the POE (Predict-Observe-Explain) learning model on student retention on tissue material in plants in class XI IPA SMA Negeri 1 Aek Natas for the 2020/2021 academic year.

## REFERENCE

Darmadi. (2017). *Pengembangan Model dan Metode Pembelajaran dalam Dinamika Belajar Siswa*. Yogyakarta: Deepublish.

Fakrikha, I.L., Redjeki, T., & Utomo, B.S. (2015). Pene rapan Model Pembelajaran *Predict-Observe-Explain* (POE) Disertai Eksperimen Pada Materi Pokok Hidrolisis Garam Untuk Meningkatkan Aktivitas Dan Prestasi Belajar Siswa Kelas XI MIA 3 SMA Negeri 4

Surakarta Tahun Pelajaran 2014/2015. *Jurnal Pendidikan Kimia (JPK)*, 4(4), 95-102.

Hidayah, A. & Yuberti. (2018). Pengaruh Model Pembelajaran POE (*Predict-Observe-Explain*) Terhadap Keterampilan Proses Belajar Fisika Siswa Pokok Bahasan Suhu dan Kalor. *Indonesian Journal of Science and Mathematics Education*.

Jihad, A. (2012). *Evaluasi Pembelajaran*. Yogjakarta: Multi Presindo.

Jufri, W. (2013). *Belajar dan Pembelajaran Sains*. Bandung; Pustaka Reka Cipta.

Karwono & Mularsih, H. (2017). *Belajar dan Pembelajaran Serta Pemanfaatan Sumber Belajar*. Depok: Raja Grafindo Parsada.

Komalasari, K. (2013). *Pembelajaran Konstektual*. Bandung: Refika Aditama.

Liputo, A., Ischak, N., & Suleman, N. (2020). Pengaruh Model Pembelajaran *Predict-Observe-Explain* (POE) Terhadap Hasil Belajar Siswa Pada Materi Termokimia Suatu Penelitian di MAN 1 Kabupaten Gorontalo. *Jurnal Entropi*, 13(2), 151-156.

Lubis, F.N. & Simatupang, Z. (2014). Peningkatan Daya Retensi Siswa Terhadap Konsep-Konsep Biologi Melalui Pemanfaatan Media Adobe Flash Pada Model Pembelajaran Langsung. *Prosiding Seminar Nasional Biologi dan Pembelajarannya*.

Nursyamsi, S.Y. & Corebima A.D. (2016). The Effect of Numbered Heads Together (NHT) Learning Strategy on The Retention of Senior High School Students in Muara Badak, East Kalimantan, Indonesia. *European Journal of Education Studies*, 2(5), 47-58.

Puriyandari, D., Martini, K.S., & Utomo, S.B. (2014). Pengaruh Model Pembelajaran Prediction Explanation (POE) Dilengkapi Lembar Kerja Siswa (LKS) Untuk Meningkatkan Sikap Ilmiah dan Prestasi Belajar Materi Kelarutan dan Hasil Kali Kelarutan Siswa Kelas XI IPA Semester Genap SMA Negeri 1 Ngemplak Tahun Pembelajaran 2012/2013. *Jurnal Kimia (JPK)*, 3(1), 26.

Rosyid, M.Z. & Mustajab, A. (2019). *Prestasi Belajar*. Malang: CV Literasi Nusantara Abadi.

Sardjana, A. & Ardika, Y. (2016). Efektivitas Metode Mnemonic Ditinjau Dari Daya Ingat dan Hasil Belajar Matematika Siswa SMK Kelas X. *Jurnal Matematika Kreatif-Inovatif*, 7(1), 66-73.

Shofiah, I.R., Bektiarso, S., & Supriadi, B. (2017). Penerapan Model POE (Predict Observe Explain) dengan metode Eksperimen Terhadap Hasil Belajar IPA dan Retensi Siswa di SMP. *Jurnal Pendidikan Fisika*, 6(4), 356-363.

Sihaloho, I. & Hasairin, A. (2016). Perbandingan Model Kooperatif Tipe Jigsaw dengan Tipe Two Stay Two Stray Menggunakan Audiovisual Terhadap Hasil Belajar Siswa Pada Materi Sistem Reproduksi Manusia di SMA Negeri 1 Panguruan. *Jurnal Pelita Pendidikan*, 4(3), 51-57.

Silalahi, R.R. & Hasruddin. (2016). Perbandingan Model Pembelajaran Kooperatif Tipe NHT dengan STAD Terhadap Hasil Belajar Siswa Pada Materi Sistem Pencernaan Manusia. *Jurnal Pelita Pendidikan*, 4(2), 53-60.

Sreerekha, S., Raj, A.R., & Sankar, S. (2016). Effect of Secondary School Students. International *Journal of education & Teaching Analyticts*, 1(1), 1-5.

Sudjana. (2002). *Metode Statistika*. Bandung: Tarsito.

Tutiliana. (2017). Pengaruh Penerapan Model Pembelajaran Contextual Teaching And Learning (CTL) Terhadap Hasil Belajar dan Retensi Siswa Pada Materi Sistem Hormon Manusia di Kelas XI SMA Negeri 1 Peusangan Kabupaten Bireuren. *Jurnal Pendidikan Almuslim*, (5), 34-40.

Yanto, S.H. & Edi, S. (2014). The Effect of Predict Observe Explain Strategy (POE) on students Activity and Learning Outcome on Human Respiratory System Sub Topic in Grade XI Science Program at SMA Negeri 15 Medan Academic Year 2013/2014. *Proceeding: The first International Seminar On Trends in Science And Science Education*. ISBN 978-602-9115-37-6.