

# The Influence of Applying the Picture and Picture (PAP) Learning Model on Student Learning Outcomes in Solar System Material

Sunaryo<sup>1\*</sup>, Hermanto<sup>1</sup>

<sup>1</sup> Fakultas Ilmu Pendidikan, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia.

Received: May 26, 2024

Revised: July 04, 2024

Accepted: August 25, 2024

Published: August 31, 2024

Corresponding Author:

Sunaryo

[sunaryo.2021@student.uny.ac.id](mailto:sunaryo.2021@student.uny.ac.id)

DOI: [10.29303/jppipa.v10iSpecialIssue.7786](https://doi.org/10.29303/jppipa.v10iSpecialIssue.7786)

© 2024 The Authors. This open access article is distributed under a (CC-BY License)



**Abstract:** The research aims to examine the effect of implementing the Picture and Picture (PAP) Learning Model on Student Learning Outcomes in Class 6 Solar System Material at SDN 1 Socongkangsi. The research was carried out at SDN 1 Socongkangsi, class VI students. The sampling technique uses a purposive area sampling method. The research used a quasi-experimental design with data collection techniques through post-tests in the form of multiple choice questions and descriptions, observation, documentation and interviews. The data obtained was analyzed using statistical tests which included normality tests, data analysis using the Paired Samples t-Test. Based on the Validity Test, the results show  $r = 0.78$   $\alpha > (0.05)$  so that all question items show valid results. Reliability test if the value  $\alpha > 0.721$  the value is reliable, namely 0.721. Then the results of the normality test, the learning outcome value is  $0.386 > \alpha (0.05)$  exceeds the significant value, then the variable value is normally distributed, followed by using the Paired Sample t-Test test, the test results -t is the learning result at a sig value of  $0.00 < \alpha (0.05)$ , so reject  $H_0$ . So it can be concluded that there is an influence of the application of the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi.

**Keywords:** Learning outcomes; Picture and picture (PAP); Solar system

## Introduction

Education is a systemic activity to improve the quality of human resources so that humans are required to continue to strive to learn, understand and master various scientific disciplines to then apply them in all aspects of life (Umar, 2014). Education is one of the most important elements of being human. Science learning is a branch of natural science that studies natural phenomena. Science is related to ways of finding out about nature so that science is not only the mastery of a collection of knowledge in the form of facts, concepts or principles but is also a process of discovery (Nuvitalia et al., 2016). Science studies all objects on the surface of the earth, in the bowels of the earth, and in outer space, both

those that can be observed by the senses and those that cannot be observed by the senses (Sukarja, 2019).

In essence, science is divided into three aspects, namely science as a process, namely all scientific activities to perfect knowledge about nature and to discover natural knowledge through scientific research (Indrawati et al., 2022). Apart from that, science is also seen as a product, namely the result of the scientific process, in the form of knowledge taught at school or outside school or reading material to disseminate knowledge (Murningsih et al., 2016). The third aspect of science is the scientific attitude, which is the positive attitude of scientists in carrying out processes and publishing scientific products (Wulandari et al., 2019). Based on the nature of science, science learning should

### How to Cite:

Sunaryo, & Hermanto. (2024). The Influence of Applying the Picture and Picture (PAP) Learning Model on Student Learning Outcomes in Solar System Material. *Jurnal Penelitian Pendidikan IPA*, 10(SpecialIssue), 496-504. <https://doi.org/10.29303/jppipa.v10iSpecialIssue.7786>

be carried out in accordance with the nature of science which includes these three aspects (Indrawati et al., 2022). So that the science teaching and learning process can develop in accordance with the nature of science, it is necessary to choose the right method (Ajri et al., 2023). One method that is appropriate and can support students' science process skills, attitudes and products is the experimental method. Learning activities using experimental methods can provide students with the opportunity to discover their own concepts through observation with reasoning, creative and effective thinking (Hidayat et al., 2023). The use of experimental methods can also develop various cognitive, affective and psychomotor abilities (Afriska et al., 2023). Science learning material is more about the process of seeing, observing and carrying out experiments (Laili et al., 2022). The experimental method is a method of providing opportunities for students individually or in groups to be trained to carry out a process or experiment. By experimenting, students find evidence of the truth of the theory of something being studied (Wihartanti et al., 2019). Learning using the experimental method trains and teaches students to learn concepts. In this way, students will discover concepts for themselves according to the results obtained during learning (Gustomo et al., 2015).

Natural science (IPA) is a subject in elementary school (SD). Science is a natural learning concept and has a very broad relationship with human life. Science learning plays a very important role in the educational process and also in technological developments (Nuvitalia et al., 2016). Science learning is expected to be a vehicle for students to learn about themselves and the natural world around them, as well as further development in application in everyday life. Science is an individual experience that they experience in different ways for each individual (Saputra et al., 2021; Sari, 2021). The definition of science is as follows, 1. Science is a number of processes of activities to systematically collect information about the world around us, 2. Science is knowledge obtained through certain activity processes, 3. Science is characterized by the values and attitudes of scientists who use scientific processes to obtain knowledge (Febriana et al., 2023). Students are expected to understand the aims and objectives of studying science subjects (Tsamanyah et al., 2023). The low science learning outcomes are influenced by weak learning. Student activity in class is still low. Students generally stay quiet and listen to the teacher's explanation. When asked a question by the teacher, he is more silent and does not dare to answer or express an opinion. When given the opportunity to ask questions, usually no students ask. When students are given assignments, most students are more likely to choose to copy their friends rather than ask and discuss with their

friends to complete the assignment (Larasanty et al., 2020).

This is the reason why students tend to be passive and unable to understand science learning material well. The picture and picture learning model is a cooperative learning model or prioritizes groups using picture media that are paired or ordered into a logical sequence." The picture and picture learning model is very suitable for science content. So far, science has only been taught in books, making students less enthusiastic and motivated by the material taught by the teacher (Listiawan et al., 2020; Mijaya et al., 2019). The picture and picture learning model will make the science material more interesting and meaningful because students are given the opportunity to build their own knowledge through various activities such as arranging and sorting pictures (Kurniati, 2024). "This learning model has characteristics that are innovative, creative, and of course very fun" (Muliani, 2021). The picture and picture learning model is a model From the results of interviews with class VI science teachers at SDN 1 Socongkangsi, researchers found several problems that occurred during learning activities, (1) The classroom atmosphere was quiet during learning because most of the students remained silent when the teacher explained the material in front of the class (2) Students experience difficulties in solving questions because they do not fully understand and do not dare to ask questions again when delivering the material (3) in learning the teacher delivers with lectures and questions and answers, students only listen without taking notes (4) when the teacher asks students to explain the material again, students can't explain.

Based on the results of the interview, the researcher concluded that good science learning should be carried out using various models so that students are enthusiastic in learning and can make it easier for students to understand science learning so that they can improve science learning achievement. Learning achievement is an effort or activity for children to master the learning materials given by teachers at school. Learning achievement is a term that has been achieved by individuals as an effort experienced directly (Oktafiani et al., 2020). This learning has the characteristics of being active, creative and fun. Whatever model is used, it always emphasizes active students in every learning process. Innovative Muliani (2021), every lesson must provide something new, different and always attract students' interest. Creative learning. Based on the advantages of the Picture and Picture (PAP) method, a hypothesis can be put forward that the application of the picture and picture (PAP) method can improve the learning achievement of Class 1 Socongkangsi Elementary School Students. The picture and picture learning model is a cooperative learning

model or prioritizes groups using picture media that are paired or ordered into a logical sequence." The picture and picture learning model is very suitable to be applied to science material content. So far, science has only been taught using books, making students less enthusiastic and motivated by the material taught by the teacher (Wahyuni, 2022) . The picture and picture learning model will make the content of science material more interesting and meaningful because students are given the opportunity to build their own knowledge through various activities such as arranging and sorting pictures. "This learning model has characteristics that are innovative, creative, and of course very fun" (Erita, 2017; Muliani, 2021).

The picture and picture learning model is a model. learning using pictures and pairing or sorting them into logical ones. Images are very important to use to clarify understanding (Muliani, 2021). Through pictures, students learn about things they have never seen before. Pictures can help teachers achieve instructional goals because apart from being a cheap and easy to obtain medium, they can also increase student activity. In addition, students' knowledge and understanding becomes broader, clearer, and not easily forgotten (Listiawan et al., 2020). This learning has the characteristics of being active, creative, fun and innovative, every lesson must provide something new, different and always attract students' interest (Saniati et al., 2023). And creative, every lesson must arouse students' interest in learning to produce something or be able to solve a problem in learning. In the learning process there are learning objectives that each student is expected to achieve after participating in the lesson (Aisy et al., 2022). The achievement of learning objectives can be seen from student learning outcomes. By preparing images to be displayed in either card form or large format, students can see the relationship between concepts, events and figures in the lesson and students can see the relationship between the components of the material or content of the lesson being taught (Tongchai et al., 2011). With the help of image media, education will more easily overcome distractions that hinder the learning process and take over students' attention in class (Ismito, 2018). The advantages of the picture and picture learning model in learning are that it is easier for children to understand the material presented by the teacher, children can understand more quickly the material presented with pictures, children can read the pictures one by one according to the existing pictures, children can concentrate because the child By playing with pictures, children can be stronger in remembering the concepts in the pictures, attract children's attention in audio and visuals and make learning activities more fun.

So the research is interested in researching the Picture and Picture (PAP) learning model. This research aims to improve student learning outcomes. Therefore, researchers collaborating with teachers will conduct research that encourages researchers and teachers to jointly try to conduct research in the form of experimental research using the Picture and Picture (PAP) application learning model. This model is a learning approach that allows students to be more active and responsible with the title The Influence of the Application of the Picture and Picture (PAP) Learning Model on Student Learning Outcomes on Solar System Material Class 6 SDN 1 Socongkangsi.

**Method**

The research was carried out at SDN 1 Secongkangsi. For class VI students on solar system material for the even semester of the 2022/2023 academic year. The sample selection used the purposive area sampling method, namely determining the sample based on specific criteria for the object that the researcher hoped for (Marginingsih, 2017). The criteria addressed are that the sample used must be homogeneous and have recommendations from the teacher. Researchers used two classes as samples, namely the control class (X2) and the experimental class (X1). In the experimental class, learning treatment was given using the picture and picture (PAP) learning model, while the control class was not given learning treatment (but used conventional learning).

The quasi-experimental research design is that the researcher does not carry out randomization in determining research group subjects (Yusuf, 2016). The researcher used two classes as samples and the design used was a post-test only control design, where the post-test was held after learning was carried out to determine the effect of the treatment. The post-test only control design research design can be seen in Table 1.

**Table 1.** Post-test Only Control Design Research Design

Class	Treatment	Posttest
Experiment	X1	O1
Control	X2	O2

The data collection technique uses a multiple choice test containing 10 questions. Apart from that, observations take the form of sheets given to observers to make observations during the learning process, documentation related to photos of activities during the research, as well as interviews with science teachers at the school regarding learning activities, methods, models and media commonly used during learning.

Data analysis techniques use measurement of learning outcomes, especially in the cognitive or

knowledge domain. After the results are obtained, they are then categorized into the percentage of completeness in accordance with the K13 guidelines which have been adjusted to the minimum completeness criteria (KKM) at the school, namely 70. The percentage of completeness is shown in Table 2.

**Table 2.** Percentage of Completeness

Value	Completeness
≥ 70	Complete
< 70	Not Complete

Furthermore, the post-test data that has been obtained will be analyzed using the Paired sample t test to find out whether learning after using the PBL model assisted by phet simulation media has an influence on student learning outcomes or not. The data must be tested for normality first before carrying out the t-test to decide which test will be used next.

The method used in this article is quantitative research. The examination model used is a pre-test and post-test using a Likert scale estimate. The population in this logic work is 50 students from class SDN 1 Secongkangsi, taking samples using a purposive examination procedure so that the number of tests is 25 students from class VI A and 25 from class B. This concentration is for one purpose only, class to be given inspirational treatment. Information collection uses 10 question items to measure student learning outcomes. Formed into an inspirational testing instrument that is estimated using a Likert scale. This exam was directed to the researchers using a purposive examination procedure, the sample used was 25 students from a student population of 25 students taken from class VI of SDN 1 Secongkangsi. The implementation was carried out during 1 meeting. Before learning begins, a pre-test is given and after treatment, a post-test is given.

*Data Processin*

In this research, in the initial stage, a descriptive test was carried out with the aim of providing an overview of the variables used, such as minimum value, maximum value, average and standard deviation in each study. Descriptive statistical analysis shows an overview of the conditions and characteristics of respondents' answers for each construct or variable studied. The data is analyzed using SPSS, so that data that has been tabulated in Excel can be directly transferred to the t-test statistical formula. Sudjana (2016) said that to create a list of frequency distribution tables with the same class length, first carry out the following processing.

In this research, students' learning outcomes were measured before and after learning, namely Pre-Test and Post-Test. Data analysis uses descriptive analysis

techniques. The results of the analysis are shown in Table 1. Measurement of student learning outcomes aims to test the effectiveness of implementing the Picture and Picture (PAP) learning model. The measurement data were analyzed using descriptive statistics. The average pretest score for the control class was 31.40 while the average post-test score for the control class was 67.89. For the experimental class the pretest score was 336.48 while the average post-test score was 85.48 which shows an increase. So, it can be concluded that there are differences in learning outcomes before and after in the experimental class and the control class. According to the results, the highest score was obtained in the experimental class. This means that the Picture and Picture (PAP) learning model is more effective than conventional learning.

**Table 3.** Descriptive Analysis

Analysis data	Minimum	Maximum	Average ( $\bar{x}$ )	Standard Deviation
Pre-Exp	11	61	36.48	13.257
Post-Exp	76	93	85.48	4.908
Pre-Con	10	61	31.40	11.779
Post-Con	46	82	67.89	9.798

*Validity and Reliability Test*

Validity test uses the Pearson Correlation method. Question items are said to be valid if the Pearson coefficient is more than the r-table. Apart from that, it can be seen from the significance value, if the significance value is less than  $\alpha$  (0.05) then the question item is considered valid. Following are the results of the validity test for each question item for all variables (Riduwan, 2015). The validity test is intended to find out whether the instrument used really measures what it is supposed to measure. Validity is tested through Confirmatory Factor analysis. If  $R_{count} > 0.50$  the question item is valid (Ghozali, 2018). Validity testing is carried out using the product moment correlation formula. The calculated r is obtained from the SPSS version 26 output results, this value is then compared with the table r value from the statistics book. Complete validity testing can be seen in Table 4 which shows that everything used to measure the items used in this research has a correlation coefficient that is greater than the r-table, which is for a sample of 25 students at VI SDN 1 Secongkangsi class VI C by using different classes with 10 questions, the r-table value is 0.78 with a significance level of 0.05 or 5%. The resulting calculated r-value is presented in Table 4. These results show that all of these indicators are valid.

Based on the table 4, all question items have valid items because  $R_{count} > R_{Table}$ . This means that the instrument is able to measure what is desired and capable disclose the researched data accurately.



**Table 4.** Pre-Test Validity Test Results of Learning Results

Question Items	R <sub>table</sub>	Person Correlation	Description
1	0.396	0.79	Valid
2	0.396	0.62	Valid
3	0.396	0.82	Valid
4	0.396	0.51	Valid
5	0.396	0.43	Valid
6	0.396	0.44	Valid
7	0.396	0.49	Valid
8	0.396	0.63	Valid
9	0.396	0.87	Valid
10	0.396	0.73	Valid

**Table 5.** Post-Test Validity Test Results of Learning Results

Question Items	R <sub>table</sub>	Person Correlation	Description
1	0.396	0.78	Valid
2	0.396	0.59	Valid
3	0.396	0.69	Valid
4	0.396	0.67	Valid
5	0.396	0.83	Valid
6	0.396	0.75	Valid
7	0.396	0.83	Valid
8	0.396	0.80	Valid
9	0.396	0.54	Valid
10	0.396	0.69	Valid

Based on the table 5, all question items have valid items because  $R_{count} > R_{Table}$ . This means that the instrument is able to measure what is desired and is able to reveal the data studied accurately. Based on Table 3, the results of the validity test on all learning outcome variable items with a total of 10 items each show that the Pearson coefficient value is more than the r-table 0.78 and the significance value is less than  $\alpha$  (0.05). So all question items in the questionnaire to represent all variables in this research are valid. Then proceed with the reliability test, namely the reliability or consistency or trustworthiness value of a measuring instrument. Researchers used the Cronbach's Alpha method to test the reliability value of each item from all variables. A variable is said to be reliable if it provides a Cronbach's Alpha value  $> 0.70$ . Following are the results of the reliability test.

**Table 6.** Pre-Test Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.721	10

Based on Table 6, the results of the Pre-Test reliability test can be seen that the Cronbach's Alpha value for all variables is more than 0.70. So it can be concluded that all question items from all variables are reliable or consistent. Because all items for each variable are valid and reliable.

**Table 7.** Post-Test Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.723	10

Based on Table 7, the results of the post-Test reliability test can be seen that the Cronbach's Alpha value for all variables is more than 0.70. So it can be concluded that all question items from all variables are reliable or consistent. Because all items for each variable are valid and reliable, the next analysis can be continued.

*Normality Test*

The researcher tested normality using the Shapiro Wilk test, because the sample in the study was less than 30. The hypothesis underlying the data normality test was:

H<sub>0</sub>: Data is normally distributed

H<sub>1</sub>: Data is not normally distributed

The following are the results of the normality test of the learning motivation variable.

**Table 8.** Data Normality Test Results

Variables	Class	Shapiro Wilk test statistics	Sig. Value
learning	Experiment	0.873	0.357
outcomes	Control	0.736	0.239

Based on Table 8, it shows that changes in learning outcomes have a significance value of more than  $\alpha$  (0.05), so the decision to accept H<sub>0</sub> is obtained. It can be concluded that the learning outcome variables are normally distributed. Then the analysis can be continued using the t-test.

*T-test*

In this section we will review whether there are significant differences in the two tests. After implementing the Picture and Picture (PAP) learning model, it is more effective in improving student learning outcomes. Analysis uses statistical testing, namely the Paired Samples t-Test, where the aim is to compare the values of samples that are not paired with each other. Paired sample t-test t-test is used to test whether the mean of a variable is statistically significantly different when compared with the known mean value as an assumed or hypothesized value. In this study, we wanted to find out whether the average learning outcome scores were different or not. The hypothesis in this research is:

H<sub>0</sub> = There is an influence of the application of the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi.

$H_1$  = There is no effect of implementing the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi.

The following are the results of the paired sample t-test t-test analysis.

**Table 9.** Paired Sample t-Test Results

Variables	Statistic-t	Sig. Value.
learning outcomes	18.976	0.000

Based on Table 9, the results of the t-test on learning outcomes show a significance value of less than 0.05, so reject  $H_0$ . Based on the test results in the equal variances assumed section, it appears that the value of  $Sig.(2-tailed) < \alpha$  is  $0.001 < 0.05$ . So, the decision taken is to reject  $H_0$  and the final conclusion is that there is an influence of the application of the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi.

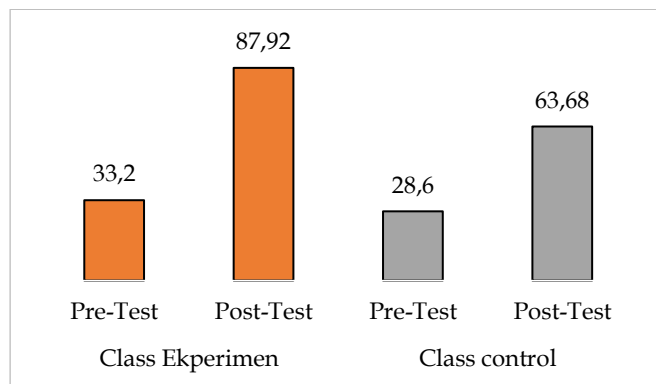
*Discussion*

From the description of this research, researchers used pre-test and post-test learning outcomes in the experimental class and control class. The learning objective uses the Picture and Picture Learning model to help improve student learning outcomes. Before researchers carry out research, researchers first validate the research instruments needed during learning. From the validator's opinions and suggestions, it can be concluded that the entire research instrument prepared by the researcher has reached the valid validation category. Then test the validation of the questions and reliability. The results of the items tested were valid and reliable.

The results obtained from the data above show the influence of the application of the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi. After testing the hypothesis using the t test of 0.001. After testing the hypothesis, there is an influence of the application of the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi.

Based on the results of data processing, graphic results of student learning outcomes can be seen before and after learning. Based on figure 1, it can be seen that learning outcomes increase before using the picture and picture (PAP) learning model. The measurement data were analyzed using descriptive statistics. The average pretest score for the control class was 28.60, while the average post-test score for the control class was 63.68. For the experimental class the pretest score was 33.20 while the average post-test score was 87.92 which shows an increase. So, it can be concluded that there are

differences in learning outcomes before and after in the experimental class and the control class. According to the results above, the highest score was obtained in the experimental class. This means that learning using the picture and picture (PAP) learning model is more effective than using conventional learning.



**Figure 1.** Learning outcomes graph

So, it can be concluded that there are differences in student learning outcomes before and after learning using the picture and picture (PAP) learning model. Validity test results show  $r = 0.78 < (0.05)$  so that everything shows valid results, so from the dependability test if the value is  $> 0.70$ , the value is reliable, to be precise 0.72, from the consequences of the legitimacy and quality test unwavering, all factors are solid/predictable because they matter for each variable.

Then a normality test was carried out before solving using the t-test, the regularity test results for the inspiration value were  $0.386 > value (0.05)$ . This value shows that the independent factor is more important than the large value, so the variable value is usually adjusted, then use the t-test. Based on the test results in the equal variances assumed section, it appears that the  $Sig (2-tailed) < \alpha$  value is  $0.001 < 0.05$ . So, the decision taken is to reject  $H_0$  and the final conclusion is that there is an influence of the application of the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi.

The conclusion is that there is a significant difference in the average value of student learning outcomes between the two classes. Because the score obtained by the experimental class was higher than the control class, it was concluded that learning used the picture and picture (PAP) learning model to improve the learning outcomes of 6th grade elementary school students on Electric Circuit material. Based on the post-test scores and statistical test results obtained, it can be said that the Picture and Picture (PAP) learning model has proven to be efficient and has an influence on student learning outcomes.

From all the discussions above, improving student achievement cannot be successful if it is not supported by improving the teacher's teaching process at each meeting. This increase in learning achievement is influenced by the benchmark results of improving the teacher's teaching and learning process in the classroom. The success of implementing the Picture and Picture (PAP) learning model to improve student learning achievement has several factors that influence it, including a conducive classroom atmosphere that supports the implementation of this type of teaching and learning process activities. The application of the Picture and Picture (PAP) learning model can also improve student achievement in class because student activities have been conditioned in accordance with the objectives that have been prepared. In carrying out this type of learning, success cannot be separated from the teacher's ability to carry out the learning process in class with mastery of the material and the stages of the Picture and Picture (PAP) learning model. So it can be seen that the picture and picture learning model is a learning method that presents pictures that in accordance with the learning material, competency information, so that students can sort the images so that they are systematic.

According to Erita (2017), the Picture and Picture learning model is a learning model that uses pictures and is paired/arranged in a logical sequence. By using the Picture and Picture learning model the learning process will be more fun and meaningful.

Research using the Picture and Picture learning model was carried out by Rahmawati (2016), from Ganesha University with the journal title "The Influence of Portfolio-Based Picture and Picture Learning Models on Student Science Learning Outcomes". In his research, it was found that the portfolio-based Picture and Picture learning model made a significant difference to the science learning outcomes of class V students at SD Gugus II Abiansemal District for the 2017/2018 academic year. It can be seen from the average gain score for the science learning outcomes of experimental class students that it is higher than the average science learning outcomes for the control class. The same research was conducted by Nova (2017) from the Biak Teacher Training and Education College with the journal title "Application of the Picture and Picture Model to Improve Social Studies Learning Outcomes in Class V of Kakaskasen Catholic Elementary School". In his research, it was found that the application of the Picture and Picture model could improve social studies learning outcomes for fifth grade students at Kakaskasen Catholic Elementary School.

Thus, according to the explanation above, this means that the Picture and Picture (PAP) learning model is more effective than conventional learning.

## Conclusion

Based on the results of the research and data processing that has been carried out, it can be concluded that there is an influence of the application of the Picture and Picture (PAP) Learning Model on Student Learning Outcomes in Class 6 Solar System Material at SDN 1 Socongkangsi. Based on the test results in the equal variances assumed section, it appears that the value of Sig. (2-tailed)  $< \alpha$  i.e.  $0.001 < 0.05$ . So, the decision taken is to reject  $H_0$  and the final conclusion is that there is an influence of the application of the Picture and Picture (PAP) learning model on student learning outcomes in class 6 solar system material at SDN 1 Socongkangsi.

## Acknowledgments

Thank you to God who has given me health and grace so that the writer can finish this research well, further thanks to the supervisor, and to the principal of SDN 1 Socongkangsi along with the teachers and students as well as thanks to my family for their support to me.

## Author Contributions

Sunaryo Conceptualized the research ide, designed of methodology, analyzed data, management and coordination responsibility Hemanto.

## Funding

This research was funded by Riset (Universitas Negeri Yogyakarta).

## Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study.

## References

- Afriska, M., Siregar, P. H., Pratiwi, I., Muhammadiyah, U., Utara, S., Belajar, M., & Surya, T. (2023). Analisis Pemanfaatan Dari Media Pembelajaran Kreatif Pada Materi Tata Surya Terhadap Minat Belajar Siswa Kelas IV Di SD Terpadu Muhammadiyah 36. *Education Journal of Indonesia*, 4(May), 23–27. <https://doi.org/10.30596/eji.v4i1.3094>
- Aisy, M. R., & Ismah, I. (2022). Pengaruh Model Pembelajaran Kooperatif Tipe Picture and Picture Terhadap Kemampuan Berfikir Kreatif Matematika Materi Aljabar. *FIBONACCI: Jurnal Pendidikan Matematika Dan Matematika*, 7(2), 85. <https://doi.org/10.24853/fbc.7.2.85-90>
- Ajri, A. S., & Diyana, T. N. (2023). Pengembangan e-modul berbasis problem based learning berbantuan liveworksheets untuk mengoptimalkan keterampilan pemecahan masalah. *Jurnal Kajian Pendidikan IPA*, 3(2), 223. <https://doi.org/10.52434/jkpi.v3i2.2377>

- Erita, E. (2017). Pengaruh Model Pembelajaran. *Economica*, 6(1), 72-86. <https://doi.org/10.22202/economica.2017.v6.i1.1941>
- Febriana, R. N., Suryani, D. I., & Taufik, A. N. (2023). Pengembangan E-Modul Berbasis Socio-Scientific Issues pada Tema Food Loss and Food Waste untuk Melatih Kemampuan Berpikir Kritis. *Jurnal Pendidikan Mipa*, 13(2), 445-453. <https://doi.org/10.37630/jpm.v13i2.1004>
- Ghozali, I. (2018). *Aplikasi Analisis Multivariate dengan Program IBM SPSS 25*. Semarang: Badan Penerbit Universitas Diponegoro.
- Gustomo, A., & Sudarman. (2015). Hasil Belajar Siswa Pada Kompetensi Memperbaiki Unit Kopling Dan Komponen-Komponen Sistem Pengoperasian. *Jurnal Pendidikan Teknik Mesin*, 15(2), 59-63. <https://doi.org/10.15294/jptm.v15i2.9143>
- Hidayat, M., Santoso, G., Mega Lestari, N., & Muhammadiyah Jakarta, U. (2023). Pengembangan E-Modul Berbasis Web untuk Mendukung Kemampuan Representasi Matematis untuk Meningkatkan Karakter Mandiri dan Critical Thinking. *Jurnal Pendidikan Transformatif (JPT)*, 2(3), 521-540. <https://doi.org/10.9000/jpt.v2i4.635>
- Indrawati, E. S., & Nurpatri, Y. (2022). Problematika Pembelajaran IPA Terpadu (Kendala Guru Dalam Pengajaran IPA Terpadu). *Educativo: Jurnal Pendidikan*, 1(1), 226-234. <https://doi.org/10.56248/educativo.v1i1.31>
- Ismi, I. (2018). Meningkatkan Hasil Belajar Siswa Sekolah Dasar Tentang Konsep Tata Surya Melalui Penggunaan Media Picture and Picture. *Jurnal Langsat*, 5(2), 1-8. Retrieved from <https://www.rumahjurnal.net/index.php/langsat/article/view/514>
- Kurniati, H. (2024). Penggunaan Media Gambar pada Materi Sistem Tata Surya untuk Meningkatkan Hasil Belajar Siswa Madrasah Ibtidiah Negeri 2 Mataram Tahun Ajaran 2023-2024. *Jurnal Biologi Dan Pendidikan Biologi*, 1(1), 44-47. Retrieved from <https://otusedujournal.ac.id/index.php/oej/index>
- Laili, C. N., Mahardika, I. K., & Ridlo, Z. R. (2022). Pengaruh Penggunaan Media Interaktif Powtoon Disertai LKPD Terhadap Hasil Belajar Siswa SMP. *Jurnal Pendidikan Fisika*, 11(1), 26. <https://doi.org/10.24114/jpf.v11i1.34607>
- Larasanty, N. K. P. I., & Putra, D. B. K. N. S. (2020). Meningkatkan Kompetensi Pengetahuan IPA Dengan Menggunakan Model Pembelajaran Predict Observe Explain Berbasis Berpikir Kreatif. *Mimbar Ilmu*, 25(3), 391-400. Retrieved from <https://ejournal.undiksha.ac.id/index.php/MI/article/view/25598>
- Listiawan, A., Pratama, H., & Puspitasari, Y. D. (2020). Penerapan Model Pembelajaran Picture and Picture (Pap) Pada Pelajaran Ipa Dengan Materi Tata Surya Untuk Meningkatkan Prestasi Belajar Siswa Smpn 5 Nganjuk Tahun Pelajaran 2019/2020. *Journal of Natural Science and Applications*, 1(1). Retrieved from <https://journal.stkipnganjuk.ac.id/index.php/jonsea/article/view/450/375>
- Mijaya, N. P. A. P., Sudiatmika, A. A. I. A. R., & Selamat, K. (2019). Profil Literasi Sains Siswa Smp Melalui Model Pembelajaran Levels of Inquiry. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, 2(2), 161. <https://doi.org/10.23887/jppsi.v2i2.19385>
- Muliani, D. E. (2021). Implementation of problem based learning with cmaptools media to increase problem solving abilities. *Gravity: Jurnal Ilmiah Penelitian Dan Pembelajaran Fisika*, 7(1), 298-302. <https://doi.org/10.30870/gravity.v7i1.9136>
- Murningsih, I. M. T., Mulyani, B., & Masykuri, M. (2016). Capaian Kompetensi Dengan Penerapan Model Pembelajaran Inkuiri Terbimbing Pada Kompetensi Dasar Kelarutan Dan Hasil Kali Kelarutan. *Prosiding Seminar Nasional Pendidikan Sains (SNPS)*, 291-298. Retrieved from <https://media.neliti.com/media/publications/173216-ID-capaian-kompetensi-pengetahuan-dengan-pe.pdf>
- Nova. (2017). Pengaruh Model Pembelajaran Picture and Picture Terhadap Hasil Belajar Siswa Berbantu Handout Pada Aplikasi Hasil Penelitian Bioherbisida. *Jurnal Eduscience*, 1(2), 374. Retrieved from <http://www.ejournal-jp3.com/index.php/Pendidikan/article/download/1155/1049/>
- Nuvitalia, D., Patonah, S., Saptaningrum, E., & Rusilowati, A. (2016). Alamat korespondensi: Gedung D6 Lantai 1, Kampus Unnes Sekaran. *Upej*, 5(2), 50229. Retrieved from <http://journal.unnes.ac.id/sju/index.php/upej>
- Oktafiani, D., Nulhakim, L., & Alamsyah, T. P. (2020). Pengembangan Media Pembelajaran IPA Berbasis Multimedia Interaktif Menggunakan Adobe Flash pada Kelas IV. *MIMBAR PGSD Undiksha*, 8(3), 527-540. <https://doi.org/10.23887/jpgsd.v8i3.29261>
- Rahmawati, Y. (2016). Penilaian Kinerja Badan Arbitrase Pasar Modal Indonesia Dengan Metode Total Quality Management (TQM). *Jurnal Cita Hukum*, 4(2), 241-266. <https://doi.org/10.15408/jch.v4i2.3671>
- Riduwan. (2015). *Dasar-Dasar Statistika*. Bandung: Alfabeta.
- Saniati, S., & Witarsa, R. (2023). Analisis Pembelajaran



- Planet pada Siswa Kelas VI Sekolah Dasar. *Journal of Education Research*, 4(1), 283-289. <https://doi.org/10.37985/jer.v4i1.160>
- Saputra, I. P. A. A., Jampel, I. N., & Suwatra, I. I. W. (2021). Pengembangan Instrumen Penilaian Kompetensi Pengetahuan Ipa Siswa Sd Kelas V. *Journal for Lesson and Learning Studies*, 4(1), 13-19. <https://doi.org/10.23887/jlls.v4i1.29794>
- Sari, M. D. A. (2021). Peningkatan Hasil Belajar IPA Materi Rangkaian Listrik Melalui Penerapan Metode Eksperimen di Kelas VI Sekolah Dasar Negeri Pakualam 01 Tahun Pelajaran 2019/2020. *Educatif Journal of Education Research*, 3(1), 188-193. <https://doi.org/10.36654/educatif.v3i1.167>
- Sudjana, N. (2016). *Penilaian hasil proses belajar mengajar*. Bandung: Rosdikarya.
- Sukarja, W. (2019). Penggunaan Model Pembelajaran Make a Match Sebagai Upaya Meningkatkan Prestasi Belajar Agama Hindu. *Mimbar Ilmu*, 24(3), 338. <https://doi.org/10.23887/mi.v24i3.21468>
- Tongchai, A., Sharma, M. D., Johnston, I. D., Arayathanikul, K., & Soankwan, C. (2011). Consistency of students' conceptions of wave propagation: Findings from a conceptual survey in mechanical waves. *Physical Review Special Topics - Physics Education Research*, 7(2), 1-11. <https://doi.org/10.1103/PhysRevSTPER.7.020101>
- Tsamanyah, Z. A., Fauziah, A. P., Dallion, E., & Hadi, W. (2023). Peningkatan Hasil Belajar Ipa Materi Tata Surya Melalui Model Pembelajaran Berorientasi Proyek Pada Siswa Kelas Vi Sdn Cengkareng Barat 05. *Kompetensi*, 16(2), 34-44. <https://doi.org/10.36277/kompetensi.v16i2.164>
- Umar. (2014). Media Pendidikan " Peran dan Fungsinya Dalam Pembelajaran. *Jurnal Tarbawiyah*, 11(1), 133-135. Retrieved from <https://e-journal.metrouniv.ac.id/tarbawiyah/article/view/364>
- Wahyuni, S. (2022). Peningkatan Aktivitas dan Hasil Belajar Sistem Informasi Manajemen Mapel PAP dengan Model Pembelajaran Inqudis. *Jurnal Penelitian Pendidikan Indonesia (JPPi)*, 7(2), 1-8. Retrieved from <https://i-rpp.com/index.php/jpp/article/view/1377>
- Wihartanti, L. V., Prasetya Wibawa, R., Astuti, R. I., & Pangestu, B. A. (2019). Penggunaan Aplikasi Quizizz Berbasis Smartphone Dalam Membangun Kemampuan Berpikir Kritis Mahasiswa. *Seminar Nasional Pendidikan Dan Pembelajaran 2019*, 362-368. Retrieved from <https://seminar.umpo.ac.id/index.php/SNPP2019/article/view/335>
- Wulandari, C., Yogica, R., Hartanto, I., & Syamsurizal, S. (2019). The Effect of Cooperatif Learning Type Snowball Throwing Model Containing Science Literacy on Students' Learning Competencies in Human Excretory System Material. *Jurnal Atrium Pendidikan Biologi*, 4(2), 103. <https://doi.org/10.24036/apb.v4i2.5907>