JUPE : Jurnal Pendidikan Mandala
Vol. 10 No. 4 Desember 2025
P-ISSN: 2548-5555, *E-ISSN:* 2656-6745
DOI: *https://ejournal.mandalanursa.org/index.php/JUPE/index*

Improving Engineering Students' Learning Outcomes in Electrical Engineering Materials with *Team Assisted Indovidualization Model*

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Article Info
Article history:
Accepted: 04 November 2025
Publish: 01 December 2025

Keywords:
learning outcomes,
Dynamic electricity,
Team Assisted Individualization.

Abstract
Low student learning outcomes were a problem in this classroom action research. This was evident in the students' lack of understanding of the material, their rapid boredom, and their lack of active participation in learning activities due to the lack of diverse learning methods. The purpose of this research was to improve student learning outcomes through learning models. Team Assisted Individualization on dynamic electricity material. This type of research is classroom action research conducted over two cycles on 12 second-semester students of the D3 Electrical Engineering study program at Muhammadiyah University of Tegal. Observations and written tests are the data obtained in this study. Data analysis is calculated based on a percentage scale and a predetermined table of conceptual understanding interpretations. The results of this study prove that the use of the model Team Assisted Individualization can improve student learning outcomes since cycle I with a percentage of 67% in the good category, then in cycle II it became 92% in the very good category. So, it can be concluded that with the learning model Team Assisted Individualization, Student learning outcomes on the Dynamic Electricity material can be increased.

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1. INTRODUCTION

Education is a learning process undertaken by each individual to obtain information they do not yet know. By knowing, the individual will change their way of thinking to be better in order to achieve it, not only in their level of understanding but also in their behavior and skills. This is in line with what was stated by Susanto (2016) that education is a deliberate action carried out in a conscious situation to acquire knowledge and ideas that may lead to changes in behavior in thoughts, feelings, or actions. Therefore, education plays a very necessary role for every individual, so that it can be achieved and implemented properly without negative impacts on the individual or their surrounding environment.

Ideal learning is a teaching and learning activity that can make students more active in learning activities in class; not only students, but educators can also be more active in making learning strategy plans that they will use when teaching in class (Munandar et al., 2024).

Mastery of concepts is essential for both pupils and students. Factors that shape students' concepts include those gained from daily experiences and the educational process. Students' differing experiences can lead to concepts that are consistent with or different from those of scientists. Vilmala, 2022). The concepts that emerge from students' thinking are often different and divergent from scientific concepts, according to science. These differences in students' concepts regarding scientific concepts are referred to as misconceptions (Onol, 2021).

Misconceptions about basic scientific ideas and subsequent, more complex concepts

significantly impact students' learning processes and outcomes (Kirbulut & Geban, 2014). Students construct concepts in their minds through their own observations, and the results are interpreted as scientific truths in a meaningful way. They can demonstrate alternative ideas or conceptions that contradict scientific facts during this process (Sekerci, 2015). Because physics is a predominantly conceptual discipline with many abstract ideas and formulas, students sometimes develop misconceptions about abstract content in physics learning (Urey, 2018). Therefore, the learning implemented by educators is closely related to the conceptual understanding gained by students.

Natural Science is a study that has a strong relationship to the activities or lives of living things (Lee et al., in Ahmad et al., 2024). Tiwe (2021) stated that Natural Sciences can foster students' hands-on learning experiences, critical thinking skills, objectivity, and a scientific approach to nature. Natural Sciences is also very beneficial for students because it helps them learn about various types of environments, both natural and artificial, and they can apply them in their daily lives and activities (Wedyawati & Lisa, 2019).

Robert E. Slavin (1983) stated that the learning model type Team Assisted Individualization has 8 (eight) components, namely: (a)Teams, namely a small group whose members have heterogeneous abilities, consisting of 4-6 students, (b)Placement Test, namely the initial test or the average daily score of students (c)Student Creative, namely emphasizing and creating the perception that the success of each student is determined by the success of his group, (d)Team Study, is a learning action that must be carried out by students in group (e)Team Score and Team recognition, namely giving scores on the results of group work and giving awards to successful groups and those that are less successful, (f)Teaching Group, namely providing brief material before group assignments, (g)Fact Test, namely giving small tests such as quizzes, (h)Whole Class Units, namely presenting the material again with problem-solving strategies.

Based on the facts found in the field from the experiences of students in the 2025/2026 academic year, particularly for basic physics courses, problems were found in student learning outcomes that were less than satisfactory. Student learning outcomes are considered successful if they achieve a percentage of ≥80% (Tiwe, 2021), and this completion is in the very good category (Kusumo, 2021). et al., 2022). These learning outcomes are due to the lack of variety in classroom learning methods during basic physics courses. In fact, in basic physics courses, many teaching methods can be implemented, but not all educators understand whether the method used is appropriate for the material being presented. Therefore, the methods used by educators, such as lectures and question-and-answer sessions, appear less meaningful in facilitating students to learn more seriously, and the expected results are less than optimal. This can be seen from the lack of understanding of the material received by students who are less active in the learning activities carried out.

The description of this problem is reinforced by Umaina & Safiuddin (2023), who stated that the use of lecture methods, demonstrations, and monotonous learning models are factors that cause low student learning outcomes. Furthermore, the classical and monotonous nature of planning and implementing basic physics lessons in the chapter on dynamic electricity is one of the causes of low student learning outcomes in basic physics courses (Aqli et al., 2022).

The same thing above was also reinforced by Sutini (in Wahono &Marasabessy,2024) that the obstacles to student development and learning outcomes are caused by the delivery of material only through lecture techniques and methods without the support of learning strategies or media, so that the learning carried out by educators feels boring and does not attract students' attention. The situation in learning activities that supports is certainly due to the provisions of learning methods or models that give students tasks to be more active in the stages of learning activities, both in group activities and in problem-solving activities (Asmiet al.., 2024). Therefore, the learning method or model used by educators is one of the important things that needs to be considered in implementing

learning so that learning objectives can be achieved and the expected results are maximized.

Due to the problems identified in this research, follow-up measures are needed to ensure that student learning outcomes do not decline. To address these issues, a learning model is needed. Team Assisted Individualization on the dynamic electricity material for 2nd-semester Electrical Engineering students.

Based on the explanation above, a study was conducted regarding the low learning outcomes of Electrical Engineering students in the dynamic electricity material. This study aims to improve the learning outcomes of Engineering students by using a learning model. Team Assisted Individualization on Electrical material.

2. RESEARCH METHODS

The method used in this study was Classroom Action Research, which was implemented over two cycles. Classroom action research is a research activity carried out by educators in their classrooms using self-reflection, aimed at improving their teaching performance and improving student learning outcomes as expected. To ensure smooth implementation, several steps are involved in each cycle, namely planning, implementing actions, observing, and reflecting (Wardani & Wihardit, 2023).

This research was conducted at Muhammadiyah University of Tegal, with a sample size of 12 students. The material used was dynamic electricity, and the variables studied were student learning outcomes in the dynamic electricity material. Before conducting the research, several preparations were made, including creating a learning implementation plan, preparing observation sheets to be used, providing learning media, and preparing assessment questionnaires to measure student success in participating in the learning process, so that they can be used as a benchmark for reflection and can improve subsequent research.

The data in this study were generated from assessment instruments in the form of observations and written tests, then used with descriptive statistical data analysis techniques to determine the average score. Observation is an observation of an object that uses the senses to collect data, while a test is a set of questions or student worksheets designed to assess student knowledge and can determine the level of student achievement after learning (Salim & Haidir, 2019). This study is said to be successful if students achieve overall learning completion with predetermined indicators, namely≥80% (Tiwe, 2021). The completion of these students' results is certainly in the very good category (Mulyaniet al., 2022).

To calculate the learning success achieved by students, you can use the following formula:

$$Average\ value = \frac{Total\ student\ scores}{Number\ of\ students} \quad (1)$$

$$Individual\ completion\ = \frac{Total\ value}{Maximum\ value}\ x\ 100 \quad (2)$$

$$Percentage\ of\ completion\ = \frac{Number\ of\ students\ who\ completed}{Total\ number\ of\ students}\ x\ 100\% \quad (3)$$

(Source: Umaina & Safiuddin, 2023)

The learning outcomes that students have obtained as a whole can be interpreted and classified according to the criteria that have been determined using the table below:

Table 1. Student Learning Outcomes Criteria

No.	Percentage (%)	Category
1.	81 - 100	Very good
2.	61 – 80	Good
3.	41 – 60	Pretty good
4.	21 – 40	Not Good
5.	< 21	Very Bad

(Source: Mulyani*et al.*. in Kusumo*et al.*, 2022)

3. DISCUSSION

The research activities conducted refer to the learning objectives that were determined from the beginning, and of course, the implementation is carried out according to the research stages, starting from planning, action, observation, and reflection. These activities will certainly refer to the learning implementation plan that was prepared in advance. The implementation of this research was carried out in two cycles with second-semester students of the D3 Electrical Engineering study program, each cycle with a duration of two hours of lessons. The implementation of learning improvements in cycle I can be seen in the image below.

In the implementation of the first cycle of learning above, the principal and colleagues helped to observe the activities carried out by the educator. The activities in the picture are the educator delivering learning materials and showing learning media in the form of images that have been prepared on HVS paper about the life cycle of animals. Students pay attention to the material presented by the educator and examine the images shown. Students arrange the images and provide reasons for the images they have arranged. The educator then explains again about the images that have been arranged by the students and concludes the activities together. Next, students work on evaluation questions individually so that the educator knows the learning outcomes achieved by the students. The learning outcomes can be presented in the table below.

Table 2. Description of Student Learning Outcomes in Cycle I

No.	Information	Value Acquisition
1.	Total value	840
2.	Average value	70
3.	Highest student score	80
4.	Lowest student score	50
5.	Students achieve satisfactory grades	(67%)
6.	Students achieve grades below	(33%)

Based on the table above, the learning outcomes obtained by students in cycle I as a whole are 840, and the average value obtained is 70. Of the 12 students, of course, some get the highest and lowest scores; the highest score is 80, while the lowest is 50. The implementation of learning improvements in cycle I that achieved satisfactory scores was 8 students with a success percentage of 67% and included in the good category, while those who had not achieved it were 4 students at a

percentage of 33%. The results of the research on learning completeness that had been achieved by the students as a whole still did not reach the predetermined completeness because the percentage results obtained were included in the good category.

Activities in implementing learning improvements in cycle I showed that the learning outcomes achieved by students as a whole were:≤ 80%, so learning improvements are still needed in cycle II. The research activities conducted in cycle II are the same as those in cycle I, referring to the predetermined learning objectives and their implementation according to the research stages, which begin with planning, action, observation, and reflection. The implementation of the research will refer to the previously prepared learning implementation plan.

The implementation of learning in cycle II was the same as the previous cycle, in that the activities carried out by the researcher were observed by colleagues. The activities carried out in the picture were the educator delivering learning materials and showing learning media. Students paid attention to the material presented. Students were enthusiastic about providing reasons related to the students' understanding that they had compiled. The educator then re-explained the images that had been compiled by the students and concluded the activities together. Next, students worked on evaluation questions individually so that the educator knew the learning outcomes achieved by the students. The learning outcomes in cycle II can be presented in the table below:

Table 3. Description of Student Learning Outcomes in Cycle II

No.	Information	Value Acquisition
1.	Total value	1.050
2.	Average value	88
3.	Highest student score	100
4.	Lowest student score	60
5.	Students achieve satisfactory grades	(92%)
6.	Students achieve low grades	(8%)

Based on the table above, the learning outcomes obtained by D3 Electrical Engineering students in semester 2 in cycle II as a whole obtained a score of 1,050, and the average score obtained was 88. Of the 12 students, there were those who got the highest score and there were also those who got the lowest score. The highest score obtained was 100, while the lowest was 60. In the implementation of cycle II, there were 11 students who achieved satisfactory criteria with a success percentage of 92% and were included in the very good category, while there was 1 student who had not achieved it at a percentage of 8%. The success achieved by students in cycle II as a whole was≥ 80%then it is included in the very good category, so that the implementation of learning improvements only reaches cycle II.

The improvement in learning outcomes achieved by students from cycles I and II can be seen in the diagram below:

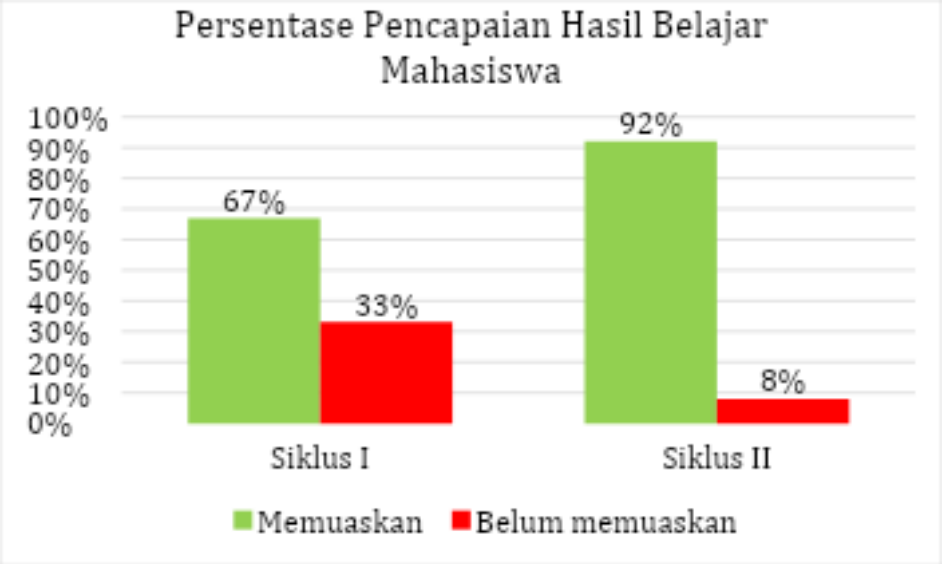

Figure 3. Diagram of student learning outcomes in cycles I and II

In the diagram of student learning outcomes in cycles I and II above, it can be seen that in cycle I, 8 students met the minimum achievement score with a percentage of 67% and 4 students did not meet it with a percentage of 33%, while in cycle II, 11 students met the good criteria with a percentage of 92% and 1 student did not meet it with a percentage of 8%. The achievements obtained from the completion of student learning outcomes in cycle I are included in the good category, while in cycle II, they are included in the very good category.

Based on the findings in the description above, the discussion in this study is that there is an increase in the learning outcomes of D3 Electrical Engineering students using the learning model. *Team Assisted Individualization from* the first cycle to the second cycle. In the implementation of the first cycle, the student learning outcomes achieved completion with a percentage of 67% and were in the good category, because of the activities carried out by educators, some students were still less brave in expressing their opinions because they were used to learning by gaining knowledge through less diverse learning so that the results obtained in cycle I still did not meet the success criteria, but there was an improvement compared to before the use of the model. *Team Assisted Individualization*. Implementation in the second cycle of student learning outcomes achieved 92% completion and is included in the very good category, because educators when implementing learning use learning media and students have also dared to express their opinions so that the learning outcomes achieved by students in cycle II have met the predetermined success criteria, although there is one student who has not achieved success in learning due to illness. Use of learning models, *Team Assisted Individualization* this case, can have a positive impact on the learning process. This learning is achieved by presenting teaching materials using visual media, which then allows students to express their opinions. This learning activity allows students to understand the material presented by the educator. They also feel happy and enthusiastic when participating in lessons so that the expected learning outcomes can be achieved optimally. Achievement in learning outcomes is a development experienced by students related to aspects of knowledge, attitudes, and skills as a result of learning activities (Susanto, 2016).

The success of the learning outcomes mentioned above is reinforced by Laila (2021), who stated that in her research, the learning outcomes achieved by students increased in each cycle, namely from the first cycle at 57%, the second cycle at 73%, and the third cycle at 92%. This increase occurred because the material presented by the educator was easily understood by

students, and they were able to recall the material presented through the learning model. Furthermore, Wahono &Marasabessy(2024) have also proven that the model Team *Assisted Individualization can* increase student learning outcomes in cycle I with a percentage of 56.25% and when cycle II it becomes 81.25%. This increase is because students are more enthusiastic about participating in learning carried out with the model or method used.

Likewise with the results of Wahyudi's research et al. (2023), which shows that the model Team *Assisted Individualization can* have a good influence on student learning outcomes rather than using the lecture method, this can be seen from the results of the research, namely in the test *paired sample t-test* produces a 2-tailed sig of 0.00<0.05 while*uji independent sample t-test* with a result of 0.01<0,05. Model *Team Assisted Individualization* was able to increase student motivation from medium to high levels and also student learning outcomes from 70% to 100% (Mansur*et al..*, 2021). The success of learning is determined by the methods and media used; this can be seen in the improvement of student learning outcomes through learning models. Team Assisted Individualization from the first cycle 75% and the second cycle to 82% (Kusumawati et al., 2020).

Student learning activities can be improved by using the Model Team Assisted Individualization in the pre-cycle with a percentage of 54%, the first cycle 68%, and the second cycle 84% or from the less active, quite active, then very active categories (Munandar et al., 2024). Educator activity has increased in the average value starting from the first cycle of 3.4 in the sufficient category, the second cycle of 4.33 in the good category, and the third cycle with a value of 5 which is included in the very good category, in addition to educator activity, student activity also increased when learning activities were carried out, namely when the first cycle with a value of 3.33 in the sufficient category, then in the second cycle 4.33 in the good category, and in the third cycle to 4.83 which is included in the very good criteria, if educator activity and student activity have increased, student learning outcomes will certainly also increase from the first cycle with a percentage of 42.10% when the second cycle 73.68% and the third cycle to 89.47%, the increase that occurred in the activity and learning outcomes is certainly due to the learning activities carried out using the learning model *Team Assisted Individualization* (Karina *et al..*, 2023).

Students' interest in learning can also be increased through learning models. *Team Assisted Individualization* from a low classification of 20.2 to a high classification of 26.1 and 29.1, where the level from start to finish was 73.2% (Alsokari et *al.*, 2024). The difficulties experienced by students when understanding the subject matter in the Basic Physics course can be overcome with the Model Team Assisted Individualization (Dwitaami & Setyawan, 2023). Based on this, it can be concluded that the lack of interest and understanding of Basic Physics courses can be overcome with a learning model. Team Assisted Individualization.

Student learning success is influenced by the model or method used in learning activities. Team Assisted Individualization can provide convenience for Team Assisted Individualization in pursuing knowledge (Wahyudi et al., 2023). Learning model Team Assisted Individualization can also help in the role of the level of learning achievement in a good way to support it (Ahmad et *al.*, 2024). Learning outcomes achieved by students before using the model *Team Assisted Individualization*, before the action, namely 42% with a fairly good category. Then, classroom action research was conducted from the first cycle to the second cycle with the model *Team Assisted Individualization* learning outcomes achieved *Assisted There* are levels in each cycle. The results achieved from the first to the second cycle ranged from 25%. Although there were differences in the results, there was an increase in each cycle with the model. *Team Assisted Individualization*.

4. CONCLUSION

Based on the presentation of the findings above, it can be concluded that the learning

model Team *Assisted Individualization* improves *Assisted Individualization for Electrical* Engineering students at Muhammadiyah University of Tegal taking the Basic Physics course. This improvement can be observed since cycle I, with a percentage of 67%, which is included in the good category, or as many as 8 students who successfully achieved the mastery set by the school. Activities in cycle II obtained a score with a success percentage of 92% and is included in the very good category, or as many as 11 students who successfully achieved learning mastery.

The achievements obtained from the students' learning outcomes during cycle I≤ 80%are so it is in the good category, whereas when cycle II, it is included in the very good category because of the results obtained≥ 80%. This learning model makes students feel happy and enthusiastic when participating in the learning activities carried out.

In connection with the conclusions outlined above, there is a suggestion in this research that the learning model Team Assisted Individualization Educators can use this model to address classroom challenges, particularly those affecting student learning outcomes that are less than optimal. Furthermore, this learning model can also be used as a reference in developing learning strategies to be implemented in the classroom to avoid boredom.

5. REFERENCE

Ahmad, M. F., Rosfiani, O., & Rachman, S. (2024). peningkatan hasil belajar ilmu pengetahuan alam materi posisi dan bayangan matahari siswa kelas II melalui model pembelajaran kooperatif tipe *picture and picture* di SDN Tanjung Barat 09 Tahun pelajaran 2017-2018. *Madako Elementary School*, *3*(1), 27-41.

Alsokari, T., Rahmatika, N., Herawati, D., Kardinal, K., & Yumna, Y. (2024). Classroom Action Research: Implementasi Model Picture and Picture in Social Learning in Elementary Schools. *International Journal of Elementary School*, *1*(1), 1-7.

Aqli, F., Agil, M., & Nurhikmah, N. (2023). Penerapan Model Pembelajaran *Picture and Picture* Dalam Upaya Meningkatkan Hasil Belajar IPA Pada MI Darussu'ada Kecamatan Tatah Makmur Kabupaten Banjar. *Jurnal Sultan Idris Pendidikan Profesi Guru*, *1*(1), 74-85.

Asmi, N., Nursalam, N., & Madani, M. (2024). The Influence of The Picture and Picture Learning Model Oriented towards Character Education on the Motivation and Learning Outcomes of Social Sciences for Fifth Grade Students. *Edumaspul: Jurnal Pendidikan*, *8*(1), 389-396.

Dwitaami, A., & Setyawan, A. (2023). Upaya meningkatkan hasil belajar siswa kelas IV muatan IPA pada materi daur hidup hewan dengan menggunakan model pembelajaran kooperatife tipe *picture and picture* di SDN Gampengrejo Kediri. *Educenter: Jurnal Ilmiah Pendidikan*, *2*(1), 59-66.

Karina, S., Sulaiman, S., & Mislinawati, M. (2023). The Use of the Picture and Picture Learning Model in Improving Student Learning Outcomes in Theme 1 Sub-theme 1 in Class II SD Negeri 1 Jeumpet Aceh Besar. *Elementary Education Research*, *8*(4).

Kirbulut, Z. D., & Geban, O. (2014). Using three-tier diagnostic test to assess students' misconceptions of states of matter. *Eurasia Journal of Mathematics, Science and Technology Education*, *10*(5), 509-521.

Kusumawati, R., Mulyati, D., & Al Ghozali, M. I. (2020). Penggunaan Model Pembelajaran *Picture and Picture* Untuk Meningkatkan Hasil Belajar Kompetensi Dasar IPA Siswa Kelas IV SD Negeri 1 Lurah. *Action Research Journal Indonesia (ARJI)*, *2*(4), 220-226.

Kusumo, F. A., Subali, B., & Sunarto, S. (2022). The analysis of student's digital literacy with Microsoft e-learning media. *Journal of Primary Education*, *11*(2), 165-177.

Laila, I. N. (2021). Metode Picture And Picture Sebagai Upaya Peningkatan Pemahaman Konsep Merawat Hewan di Kelas II SDN Kepanjenkidul Kota Blitar. *IJoIS: Indonesian Journal of Islamic Studies*, *2*(2), 305-320.

Mansur, S., Raida, S. A., & Putra, S. H. J. (2021). Pembelajaran *Picture and Picture* Untuk Meningkatkan Motivasi Dan Hasil Belajar Siswa Pada Materi Invertebrata. *Journal of Biology Education*, *4*(1), 72-79.

Munandar, A., Afifah, J., & Fitri, D. (2024). Cooperative Learning Types of Pictures and Pictures in Increasing Student Learning Activity. In *Proceeding International Conference on Religion, Science and Education* (Vol. 3, pp. 515-521).

Octavia, Shilphy A. (2020). *Model-Model Pembelajaran*. Yogyakarta: Deepublish.

Önol, M., & Kocakülah, M. S. (2021). Anlam oluşturma yaklaşımına dayalı öğretimin ortaokul 7. Sınıf öğrencilerinin enerji dönüşümü kavramına ilişkin kavramsal değişimlerine etkisi. *Eğitimde Kuram ve Uygulama*, *17*(1), 20-38.

Pratiwi, N., & Aslam. (2021). Pengaruh Model Pembelajaran *Picture and Picture* terhadap Kemampuan Berpikir Kreatif Siswa di Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, 3 (6), 3697 – 3703.

Salim., & Haidir (2019). *Penelitian Pendidikan: Metode, Pendekatan, dan Jenis*. Jakarta : Kencana.

Sekerci, H. (2015). The Effects of the Constructivist Learning Approach on Student's Academic Achievement: A Meta-Analysis Study. *Turkish Online Journal of Educational Technology-TOJET*, *14*(4), 143-156.

Slavin, R. E. (1996). Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary educational psychology*, *21*(1), 43-69.

Susanto, Ahmad. (2016). *Teori Belajar dan Pembelajaran di SD*. Jakarta: Kencana.

Tiwe, P. (2021). Peningkatan Hasil Belajar Ipa Melalui *Cooperative Learning Tipe Picture and Picture* Pada Siswa Kelas II Sekolah Dasar Inpres Watujara. *Jurnal Literasi: Pendidikan Dan Humaniora*, *6*(1), 22-28.

Umaina, W. O. U., & Safiuddin, S. (2023). Meningkatkan Hasil Belajar melalui Model *Picture and Picture* di Kelas V SD Negeri 1 Molona. *Penuh Asa: Jurnal Mahasiswa Pendidikan Guru Sekolah Dasar*, *1*(2), 293-300.

Urey, H. C. (1947). The thermodynamic properties of isotopic substances. *Journal of the Chemical Society (Resumed)*, 562-581.

Vilmala, B. K., Karniawati, I., Suhandi, A., Permanasari, A., & Khumalo, M. (2022). A literature review of education for sustainable development (ESD) in science learning: What, why, and how. *Journal of Natural Science and Integration*, *5*(1), 35.

Wahono, B., & Marasabessy, R. (2024). Penerapan model pembelajaran *picture and picture* untuk meningkatkan hasil belajar siswa pada mata pelajaran IPA. *Asian Journal Collaboration of Social Environmental and Education*, *1*(2), 59-65.

Wahyudi, A., Pahan, B. P., & Sulistyowati, R. (2023). Peningkatan Hasil Belajar Siswa Melalui Kooperatif *Picture and Picture*: Suatu Studi di SDN 5 Menteng. *Harati: Jurnal Pendidikan Kristen*, *3*(2), 109-123.

Wardani, IG.A.K., & Wihardit, K. (2023). *Penelitian Tindakan Kelas*. Tangerang Selatan: Universitas Terbuka.

Wedyawati, N., & Lisa, Y. (2019). *Pembelajaran IPA di Sekolah Dasar*. Yogyakarta: Deepublish.