Formatif: Jurnal Ilmiah Pendidikan MIPA, March 2025, 15 (1), 163-174
http://dx.doi.org/10.30998/formatif.v15i1.27231
p-ISSN: 2088-351X e-ISSN: 2502-5457
Accredited (S2) by Ministry of Research and Technology of Indonesia No. 148/M/KPT/2020
Available online at https://journal.lppmunindra.ac.id/index.php/Formatif/index

Implementation of the Each One Teach One and Student Debate Learning Model to Achieve Biology Learning Completeness and Critical Thinking at Senior High School

Muh. Sri Yusal[1,*)], Ryan Humardani Syam Pratomo[1)], Mohd Lokman Abdullah[2)], Sri Mukminati Nur[1)]
[1)] Universitas Patompo, Indonesia
[2)] Open University, Malaysia

Abstract

Learning models are activities carried out by teachers and students to achieve learning objectives effectively and efficiently. The study aims to examine the implementation of using the Each One Teach One and Student Debate learning models to achieve complete biology learning and critical thinking among senior high school students in Gowa Regency. The research is quantitative with a quasi-experimental research design; the 1st Experimental class was treated with the Each One Teach One model, and the second experimental class was treated through the Student Debate model. The research consists of the preparation stage, implementation of experiments, conclusions, and reporting results. At the end of each biology learning experiment, a post-test was conducted to determine the student's final ability. Each One Teach One and Student Debate learning model has a real effect on the learning outcomes of students in Science Class XI so that they reach the value of learning completeness. The results of hypothesis testing with a probability of 0.018 (<0.05) show that both learning models have a significant effect on learning completeness. The advantages of using this learning model are encouraging students to cooperate with their colleagues so as to create active learning, increasing analytical power, arousing learning motivation, establishing good communication, stimulating students to do their best individually and collectively, and arousing student creativity, and students' critical thinking skills achievement.

Keywords: Each One Teach One, Student Debate, Learning Completeness, Learning Models

(*) Corresponding Author: msriyusal.ugm@gmail.com

How to Cite: Yusal et al. (2025). Implementation of the each one teach one and student debate learning model to achieve biology learning completeness and critical thinking at senior high school. *Formatif: Jurnal Ilmiah Pendidikan MIPA, 15* (1), 163-174. http://dx.doi.org/10.30998/formatif.v15i1.27231

INTRODUCTION

The Problems that often arise during teaching and learning activities are classroom management, classroom teacher leadership from the beginning to the end of teaching and learning activities, and communication between teachers and students when providing learning materials and student assignments that only take place in one direction. This condition took place when giving students assignments in the form of case studies and required answers from students in the form of percentages in groups in front of the class. The results then showed that most students only read out the results of the discussion that had been written down, and only a few students thought critically to develop and add explanations to the results of the discussion they had (Wulandari et al., 2019).

Critical thinking is the root of cognitive skills that include judgement, analysis, evaluation, inference, description, and self-regulation. Critical thinking describes the skill in mastering and reporting the meaning or intent obtained from various experiences,

situations, problems, events, decisions, agreements, beliefs, provisions, and mechanisms or criteria. Critical thinking means being able to recognise the right intentions and inferences between statements, problems, concepts in beliefs, decisions, alibis, and experiences. (Budiastuti et al., 2023; Khairuddin et al., 2023; Tuasikal et al., 2021).

The basic skill that must be possessed and developed in the implementation of the new curriculum is the critical thinking ability of students (Undang-Undang Republik Indonesia Nomor 20 Tahun 2003). Critical thinking is defined as a skill or passion in drawing and evaluating conclusions based on existing truths. In addition, critical thinking is defined as an activity that involves formulating problems and evaluating them based on facts. The definition of learning outcomes is a pattern that comes from actions, values in students, understanding attitudes, and also abilities that have been obtained. In general, student learning outcomes are used as a benchmark of student success in carrying out learning activities (Sholicha & Wulandari, 2020).

In general, the teaching and learning process in education involves four main components: students, teachers, learning environment and subject matter. These fourcomponents greatly influence students in achieving learning objectives; in this case, each learner has a different level of ability when viewed from the ability to capture lessons, the knowledge possessed in each learning material, learning motivation, learning interests, learning skills, learning goals and others (Malik et al., 2022; Yusal et al., 2022; Yusal & Jilung, 2022).Therefore, every educator or teacher is required to be able to provide optimal guidance so thateach student can develop their knowledge according to the field of study that has been taught (Darmayani et al., 2021a, 2021b; Yusal, 2020).

In simple terms, the term learning means "an effort to provide learning to a person or group through various efforts and various models, methods and approaches towards achieving planned goals" (Kamil et al., 2022; Rudisaberi et al., 2022). Learning can also be interpreted as educators an activity or teachers programmatically in instructional design to make students learn actively, which emphasises the learning resources provision (Hasan, 2019; Yusal & Carding, 2020).

The learning model is the teacher's activity in thinking and striving for consistency between aspects of the components that form the learning system using certain tactics (Simeru et al., 2023). Ningsih et al., (2023) It also reported that the learning model is defined as a series of learning activities that teachers and students must carry out to achieve learning objectiveseffectively and efficiently. Based on some of the above references, it can be concluded that the learning model is an action consisting of activities series in the learning process through the use of methods and the various resources utilisation or strengths in learning so that learning objectives can be achieved effectively and efficiently.

The Each One Teach One model is an alternative way to transfer the most factual informationbetween students in the teaching and learning process. This method gives students the confidence to share information relevant to the learning topic with their peers so that all learners gain knowledge together. The learning process is more interesting because all students areactive in sharing the information they get. Some of the advantages of the *Each One Teach One* model*:* 1) helps students cooperate with others; 2) helps students manage information well; 3)students share information; 4) reduces the teacher's habit of lecturing or dictating; 5)improves student learning outcomes (Alirman, 2018; Rafulta & Nofrianto, 2017; Ramli, 2022).

The *Student Debate* is one of the learning models that was most important in improving students' academic abilities because it has a series of teaching materials that can be a package of pros and cons. This learning model can involve materials that allow students to help and support each other as they learn and work together

to complete tasks (Hamdani et al., 2022; Zandagi et al., 2018). In addition, social skills needed in collaboration efforts can be obtained as important in the process of completing group tasks; students can obtain these skills after implementing the *Student Debate*. Likewise, student participation can be increased during the demonstration of the learning model; the role can be in the form of note-takers, conclusion makers, material organisers or facilitators. The role of the teacher during learning takes place is to monitor the learning process and the running of the debate class (Hasan, 2019; Marini et al., 2023).

This debate model can also be used when the results of the speaker need to be honed and scrutinised, and the conclusions obtained do not answer the problems of the topic being discussed. Another advantage gained in this model is an increase in student analysis when solving a problem or looking for possible ways out of the problem at hand. In addition, it canhone students' thinking or speaking skills, considering that several different opinions need to be listened to and found a way out so that they can reach a satisfactory conclusion or decision (Putra, 2021; Suharti et al., 2024).

Al Giffari & Wiyanarti (2021) also suggested that the debate model can be one of the valuable learning methods that can encourage students' thinking and contemplation when they are able to defend opinions that go against their beliefs. Overall, the *Student Debate* learning model is a learning technique that is able to actively involve allelements in the class, not just the debaters, so that the teaching and learning process is effective and controlled (Tambunan & Mahmudi, 2024).

Learning completeness is the final assessment of the process and recognition that has been done repeatedly and stored for a long period. Learning completeness plays a role in shaping individual personalities, and people always want to achieve better results so that they will change their way of thinking and produce the desired work behaviour. Changes in behaviour and mental development towards a student, such as from not knowing to know, from not understanding to understanding, is one proof of learning (Malik et al., 2022; Yusal et al., 2022; Yusal & Jilung, 2022). This study is different from several previous studies that only used one learning model. This time, we focus on two learning models, examining critical thinking skills and the achievement of student learning completeness at school.

Based on some of the background explanations, this study aims to examine the implementation of using the *Each One Teach One* and *Student Debate* learning models to achieve biology learning completeness and critical thinking of senior high school students in Gowa Regency. This research is expected to arouse student motivation to achieve learning completeness. In addition, this research can help students improve their critical thinking skills so that there is effective communication between teachers and students. This can facilitate the teaching and learning process in senior high schools so that the quality of learning can improve as expected.

METHODS

This research is quantitative with a quasi-experimental research design. The first experimental class was treated using the Each One Teach One model, and the second experimental class used the *Student Debate* model. The research implementation procedure consists of several stages, namely preparation, conducting experiments, making experimental conclusions, and reporting experimental results. The research was conducted in the XI IPA Class of senior high school students in Gowa Regency in July-September 2023, while the sample consisted of students of classes XIa and XIb, each

of which numbered 32 people. At the end of each learning experiment, a post-test was conducted to determine the final ability of students. The research variables consisted of two types: 1) The independent variable (x), i.e., Each One Teach One learning model with the *Student Debate* learning model, and 2) The dependent variable (y_1), i.e., Biology learning outcomes.; (y_2), i.e., Critical Thinking Skills.

The data collection methods used during the study were tests, observations, and interviews. The test instrument was used to measure learning outcomes and learning completeness about the extent of students' understanding or knowledge of biology learning materials after participating in *Each One Teach One* and *Student Debate* learning. The objective test used is a combination of multiple-choice tests with essay tests. Direct observation instruments and interviews are the instruments applied type to provide a more in-depth picture of the interaction and critical thinking skills of students applied in real situations. In addition, the instruments were used to gain qualitative insight into the effect of *Each One Teach One* and *Student Debate* learning on critical thinking development and student learning outcomes. The indicators used in the instrument are the ability to compose coherent and logical arguments, the ability to answer questions, defend opinions, interact in discussions, and the ability to think reflectively and conclude.

The sampling technique was *purposive sampling*, which is data collection thathas known procedures and research objectives so that the data used is more accurate and reliable. (Samsi & Yusal, 2022; Yusal, 2021; Yusal et al., 2019b, 2019a, 2019c; Yusal & Hasyim, 2022). The research data analysis technique consists of several statistical tests, including a homogeneity test, normality test, descriptive test and inferential test (t-test). The homogeneity test is a statistical test procedure used to show two or more groups of data samples taken frompopulations that have the same variance.

RESULTS & DISCUSSION

Results

Table 1 shows that the application of the *Each One Teach One* learning model to students of XIa IPA Class at Senior high school students in Gowa Regency had reached the value of learning completeness in accordance with the predetermined success indicators. This research consists of two stages. The first experimental class applies the *Each One Teach One* learning model, while the second stage applies the *Student Debate* learning model. The learning outcome data has reached an average value of 75.65 with the requirements of the Minimum Completeness Criteria (KKM) value of 75. Learning outcomes in the 1st experiment class have met the criteria for learning outcomes because the learning model makes all students active in obtaining learning information and passing it on to other students. This is in accordance with Alirman (2018) who states that the *Each One Teach One* learning model can create good communication among students, increase student motivation to bring out bright ideas, and increase students' sense of responsibility during the learning process.

Table 1. The 1st Experimental Class Learning Outcome Data (*Each One Teach One* Learning Model)

No.	Learning Outcomes	Post-Test Score
1.	Total number of students' scores	2124
2.	Average Value	75.65

The research data also shows that 22 students are in the high and medium categories or have high completeness scores, with an average post-test score range of 68.76%. In addition, there are only 10 students who get low or incomplete scores and do not meet the criteria for completeness of learning outcomes in the first experimental class, with an average range of 31.24%.

Table 2. The 2nd Experimental Class Learning Outcome Data (*Student Debate* Learning Model)

No.	Learning Outcomes	Post-Test Score
1	Total Overall Score	2570
2	Average Value	80. 31

Table 2 also shows that the *post-test* results of the 2nd experiment class have passed the standard of minimum learning completeness criteria because students prepare learning tools beforethe discussion begins so that learning objectives can be achieved completely. In addition, thelearning model can increase understanding and thinking power, organise learning time, and expand the knowledge of students in the classroom (Girsang et al., 2024; Habibah et al., 2022; Haryanto & Kencanawati, 2023; Nurjannah et al., 2024). The average value of *post-test* results in the second experimental class was 80.31, and the range met the KKM value. Twenty-four learners obtained learning outcomes that were in the high category with an average value of 75% learningcompleteness. In addition, eight students obtained learning outcomes that were inthe low category, with an average value of 25% learning completeness.

Table 3. The Comparison of The1st and 2nd Experiment Class Post-Test Results Students at XI IPA Class Senior high school students in Gowa Regency

Category	Score	The 1st Experiment Class (*Post-Test* Score Result)		The 2nd Experiment Class (*Post-Test* Score Result)	
		Frequency	Percent (%)	Frequency	Percent (%)
Not completed	0-74	10	31.24%	8	25%
Completed	75-100	22	68.76%	24	75%
Total		32	100%	32	100%

Table 4 and Figure 2 below showed the Each One Teach One and Student Debate learning models are able to stimulate students' critical thinking skills in participating in classroom learning; this can be seen in the ability of students to interact during discussions as much as 81-88%, the ability to answer every question as much as 75-81%, the ability to defend opinions as much as 56-68%, the ability of students to compile coherent and logical arguments as much as 50-62%, and the ability to think reflectively and conclude as much as 50%. This condition shows that both types of learning models applied in the teaching and learning process in senior high schools can increase students‘ motivation and passion for learning, increase students’ focus on learning, improve communication between fellow students, and improve students' critical thinking skills in dealing with problems that arise in the teaching and learning process. Thus, the quality of learning desired by teachers and students can be achieved (Ilmaliyev et al., 2022; Koswara et al., 2021; Purwanto & Sunawan, 2022).

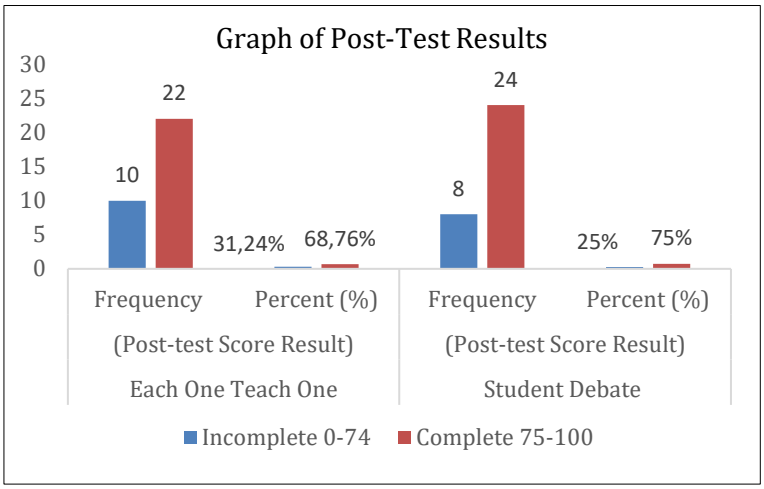

Figure 1. The Graph of the 1st and 2nd experiment class post-test results

Table 4. The analysis results of critical thinking skills in the 1st and second experimental classes

Critical thinking skills indicators	The 1st Experiment Class (Each One Teach One)		The 2nd Experiment Class (Student Debate)	
	Frequency	Percent (%)	Frequency	Percent (%)
Ability to construct coherent and logical arguments	16	50	20	62
Answering questions	24	75	26	81
Defending an opinion	18	56	22	68
Interaction during the discussion	26	81	28	88
Reflective thinking and summarising	16	50	16	50

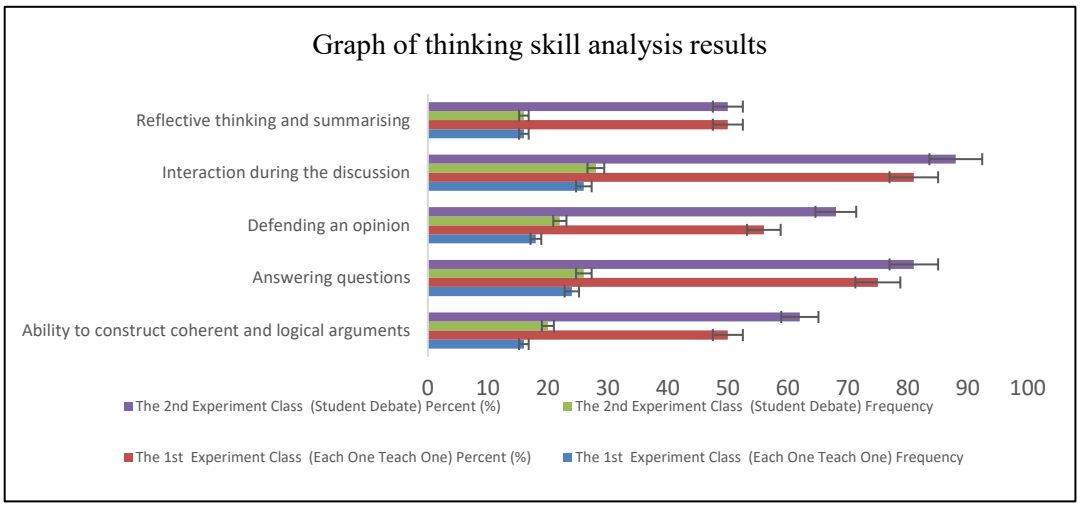

Figure 2.The analysis graph results of critical thinking skills in the 1st and the second experimental classes

The next stage after the *post-test* is the normality and homogeneity test, which is necessary before hypothesis testing. Table 5 shows that the results of the normality testof learning outcomes using the *Each One Teach One* and *Student Debate* learning models are normally distributed because the output results obtained asymp. Sig. (2-tailed) as much as 0.060 for experimental class I and 0.076 for experimental class II. The range of values also shows significantly >0.05, which is assumed that both types of data are normal. Table 6 also shows that thetwo learning models (*Each One Teach One* and *Student Debate*) studied and taught to Senior high school students in Gowa Regency IPA Class XI have been homogeneous because of the output value of asymp. Sig is 0.061, which is significantly> 0.05. It is assumed that both types of data of the two experimental classes are homogeneous and can be continued to conduct hypothesis testing. It is assumed that both types of data of the two experimental classes are homogeneous and can be continued to conduct hypothesis testing (Gultom et al., 2023).

After the data is considered normal and homogeneous, the hypothesis test (t-test) iscontinued to analyse how far the influence arises from the independent variable or explanatory variable on the dependent variable. Table 7 below shows that the *Each One Teach One* and *Student Debate* learning models have a real influence on the learning outcomes of XI Science Class at Senior high school students in Gowa Regency. This effect is confirmed by the 2-tailed probability (significance) value of 0.018 and smaller than 0.05. It also shows that H1: is accepted and Ho: is rejected, and it can be concluded that there is a significant effect of *Each One Teach One and Student Debate* learning models on student learning outcomes.

Discussion

The finding showed that the *Each One Teach One* learning model has helped students to work together and share information with others so that no one is selfish to master a learning topic; even the model can trigger student motivation to seek more learning information assigned by the class teacher. Overall, this learning experiment has increased students' activeness in following the learning process seriously. Another advantage of this learning model is that the classroom atmosphere becomes lively, the teacher becomes enthusiastic in sharing his knowledge, as well as the students are not lazy in gaining knowledge at school (Rafulta & Nofrianto, 2017; Simeru et al., 2023; Yusal, 2020).

In general, students of XIb IPA Class Senior high school students in Gowa Regency have met the minimum learning completeness criteria because their post-test scores are above the KKM standard (Table 2). The results of the study also show that the *Student Debate* learning model has improved students' thinking skills or public speaking skills. The learning model is also able to actively involve all elements in the class, not just the debaters so that the teaching and learning process is effective and controlled (Adrianto et al., 2021; Darmayani et al., 2021a, 2021b; Wijriati, 2018).

Overall, the two learning models applied to XI IPA Class Senior high school students in Gowa Regency have significantly affected the learning outcomes of students in the class, as can be seen in Table 3 and Figure 1 below. The table and figure also illustrate that both learning models in the experimental class significantly improved students' learning outcomes. However, the *StudentDebate* learning model was superior in improving learning outcomes and motivation compared tothe *Each One Teach One* model.

The results of direct observation and facts obtained during the research show that the *Student Debate* model has advantages over other learning models in the process of improving learning outcomes and motivation for several reasons:

1) The student *Debate* model can create healthy competition and cooperation so that students get a number of motivations when doing activities; 2) this learning model is able to stimulate students to do the best things for them individually and collectively; 3) In addition, it can develop and arouse the creativity and attractiveness of students; and 4) achievement of students' critical thinking skills (Djunadi, 2015; Pranata & Noperma, 2023; Zandagi et al., 2018).

The same thing by Hasan, (2019) who argues that *student debate can encourage students to think critically, work as a team*, and foster creativity individually and in groups. Likewise, Marini et al. (2023) said that the debate learning model has a great influence on students and, at the same time, is able to build the 6 Cs, namely cooperation, creativity, critical thinking, communication, and character.

The Each One Teach One, and Student Debate learning models (Table 4 and Figure 2) are also able to influence students‘ critical thinking skills at school; in this case, the learning model is able to generate students’ critical thinking skills in facing and solving biology learning problems in high schools in Gowa Regency. This is according to Ghazali et al. (2024) & Wahjusaputri et al. (2021) which suggests that problem-based learning can improve critical thinking skills because the model trains students to form groups to talk about their own opinions systematically, thus enabling students to get used to making assumptions and reasons, being able to evaluate real evidence, and being able to manage language order to support and refute other people's opinions. Several factors can influence critical thinking skills, namely the ability to interact with others, self-confidence or motivation, habits, wisdom development, consistency or determination, and emotions or feelings (Sutaphan & Yuenyong, 2023; Widiyanto et al., 2024).

The results of the hypothesis test are in line with the *post-test* analysis results on the *Each One Teach One* learning model with an average value of learning completeness of 68.76. Likewise, the *Student Debate* learning model has reached an average learning completeness value of 80.31. Rafulta & Nofrianto (2017) reported that the *Each One Teach One* learning model can encourage students to cooperate and exchange ideas with their colleagues so that active learning occurs in the classroom. Similarly, Wijriati, (2018) reported that *Student Debate* learning can increase the analytical power of students, be able to reveal the facts of each problem, and arouse enthusiasm or motivation to learn.

Therefore, it is recommended that the teaching team in schools apply learning models that are able to improve the critical thinking skills of each student in their class because this makes it easier for students to accept the learning that the teacher has given. This condition will make students feel comfortable in the teaching and learning process activities; they are not only required to come to record what has been given by the teacher, but they can also explore every scientific problem related to the given subject. This also makes the classroom atmosphere more lively and passionate in welcoming the teacher's arrival, so that overall, it will improve the quality of the teaching and learning process at school and will automatically give the highest priority to students and schools.

CONCLUSION

The Each One Teach One and *Student Debate* learning models significantly affect the learning outcomes of Senior high school students in Gowa Regency Science Class XI students. Both learning models also support students in achieving learning completeness in their classes. The advantages of using these two learning models are that they can encourage students to cooperate and exchange ideas with their colleagues so that

active learning occurs in the classroom, increase the analytical power of students able to arouse enthusiasm or motivation to learn, create good communication among students; able to stimulate students to do the best things for them individually and collectively; arouse the creativity of students; and achievement of students' critical thinking skills. These two learning models can stimulate students' critical thinking skills because they can increase the ability to interact with others, increase self-confidence, the ability to compose logical arguments and defend opinions, and, most importantly, the ability to think reflectively and draw conclusions. This study limitation is not considered representative of all schools in South Sulawesi. Therefore, it is hoped that further research will examine several districts that are considered to have a high or low level of education so that the results of the study can contribute nationally to improving the quality of education in Indonesia in general and specifically improve the quality and quality of learning in each of the targeted schools.

REFERENCES

Adrianto Hebert, Ulinniam, Purwanti Eny Wahyuning, Yusal Muh. Sri, Widyastuti Dyah Ayu, Sutrisno Eko, Tamaela Kevin A., Dailami Muhammad, Purbowati Rini, Angga La Ode, Hasibuan Anggi Khairina Hanum, Hariri Muhammad Rifqi, Nendissa Dessyre M., Nendissa Sandrina Juliana, Noviantari Ariyani, & Chrisnawati Lili. (2021). *Bioteknologi*. In *Widina Bhakti Persada Bandung.*

Budiastuti, E., Sugiyem, & Puad, F. N. A. (2023). Developing self-assessment instruments to measure students' performance characters in making dresses using a high-order thinking skills approach. *Cakrawala Pendidikan*, *42*(1), 27–37. https://doi.org/10.21831/cp.v42i1.50172

Al Giffari, F., Wiyanarti, E., & Ma'mur, T. (2021). Student Debate Club dalam Pembelajaran Sejarah. *FACTUM: Jurnal Sejarah Dan Pendidikan Sejarah*, *9*(2), 203–210. https://doi.org/10.17509/factum.v9i2.27813

Alirman, A. (2018). Penerapan Strategi Each One Teach One Untuk Meningkatkan Hasil Belajar Pendidikan Kewarganegaraan Siswa Kelas V Sekolah Dasar Negeri 028 Desa Kubang Jaya. *Jurnal Pajar (Pendidikan Dan Pengajaran)*, *2*(4), 516. https://doi.org/10.33578/pjr.v2i4.5692

Ayu Melati Ningsih, Ayu Pratamawati, Siti Sa'idah, Putu Satya Narayanti, Fahrian Firdaus Syafi'i, Ledy Nurlely Syamsi, Edi Jovita Ridhani Dorthea Maria Woga Nay Moh. Fadli Nur Utomo Bayu Aji. (2023). Desain sistem pembelajaran. In *Sada Kurnia Pustaka dan Penulis*. Sada Kurnia Pustaka. dan Penulis. http://staffnew.uny.ac.id/upload/132304795/penelitian/Desain+Pembelajaran-pekerti.pdf

Darmayani, S., Rudy Hidana, Fransina S Latumahina, Sandriana Juliana Nendissa, Masni Veronika Situmorang, Ronnawan Juniatmoko, Rosi Widarawati, MZ Novita, Ardli Swardana, Pelita Octorina, Gunaria Siagian, Anggi Khairina Hanum Hasibuan, Muh Sri Yusal, A.M. (2021a). Ekologi, Lingkungan Hidup dan Pembangunan. In *Widina Bhakti Persada Bandung*. www.penerbitwidina.com

Darmayani, S., Hidana, R., Sa'diya, A., Isrianto, P. L., Hidayati, Jumiarni, D., Hafsari, A. R., Latumahina, F. S., Setyowati, E., Solikah Ana Estikomah, Sri Kurniati, Sudirman Syam, S., Sufiyanto, M. I.., Yusal, M. S., Watuguly, T. W., & Gultom, V. D. N. (2021b). Bioteknologi Teori dan Aplikasi. In *Widina Bhakti Persada Bandung*.

Djunadi, D. I. (2015). Efektivitas Penerapan Metode Active Debate Dalam Pembelajaran Sosiologi. *DIMENSIA: Jurnal Kajian Sosiologi*, *4*(1), 61–76. https://doi.org/10.21831/dimensia.v4i1.3428

Girsang, L. B., Trianton, T., & Syahfitri, D. (2024). Pengaruh Metode Debat Terhadap Kemampuan Menyusun Argumentasi Pada Siswa SMK. *Jurnal Educatio*, *10*(3), 1015–1024.

Gultom, B., Sitepu, I., & Sinta Dameria Simanjuntak (2023) Pengaruh Model Pembelajaran Everyone Is a Teacher Here (Eth) Dengan Bantuan Ice Breaking Terhadap Literasi Numerasi Matematika Siswa Smp Negeri 31 Medan. *Jurnal Ilmiah Ekonomi Dan Manajemen*, *1*(3). https://ejurnal.kampusakademik.co.id/index.php/jiem/article/view/238%0Ahttps://ejurnal.kampusakademik.co.id/index.php/jiem/article/download/238/239.

Ghazali, N. H. C. M., Suppian, Z., Ahmad, H., Zaini, S. H., & Shuib, T. R. (2024). E-learning, assessment competency, and academic performance: A structural equation modelling approach. *Cakrawala Pendidikan*, *43*(2), 288–295. https://doi.org/10.21831/cp.v43i2.63622

Habibah, U., Pravitasari, D., & Rodin, I. (2022). Pengaruh Model Pembelajaran Active Debate terhadap Keterampilan Berbicara. *FingeR: Journal of Elementary School*, *1*(2), 99–107. https://jsr.unha.ac.id/index.php/FingeR

Haryanto, T., & Kencanawati, I. (2023). Improving Critical Thinking Skills of Prospective Biology Teacher Students through Ethnoscience-Based Biology Learning. *Tarbawi : Jurnal Ilmu Pendidikan*, *19*(1), 13–24. https://doi.org/10.32939/tarbawi.v19i1.2601

Hasan, N. (2019). Penerapan Model Pembelajaran Debat Aaktif untuk Meningkatkan Keaktifan dan Hasil Belajar PAI DIi SMK Kartika Grati Kabupaten Pasuruan. *Journal of Islamic Education (JIE)*, *IV*(2), 113–129.

Ilmaliyev, Z. B., Patihan, T., Tursunbekov, D. M., Kenzhaliyev, O. B., Sansyzbayeva, D. B., & Kassymova, G. K. (2022). Motivating factors of innovative research activities and barriers to R&D in Kazakhstan. *Cakrawala Pendidikan*, *41*(3), 619–629. https://doi.org/10.21831/cp.v41i3.47704

Kamil, Yunus, M., Yusal, M. S., & Elpisah. (2022). Pengaruh Kinerja Mengajar Guru Terhadap Prestasi Belajar Siswa di SD Negeri 34 Bontosoa. *Jurnal Education and Development*, *10*(2), 241–245.

Koswara, D., Dallyono, R., Suherman, A., & Hyangsewu, P. (2021). The Analytical Scoring Assessment Usage To Examine Sundanese Students' Performance in Writing Descriptive Texts. *Cakrawala Pendidikan*, *40*(3), 573–583. https://doi.org/10.21831/cp.v40i3.40948

Khairuddin, Masrun, Baktiar, S., & Syahruddin. (2023). Analysis of the impact of game-based physical education learning on physical fitness of junior high school students. *Cakrawala Pendidikan*, *42*(1), 241–253. https://doi.org/10.21831/cp.v42i1.54605

Netti Marini, Berlian Romanus Turnip, D. P. (2023). Penerapan Model Pembelajaran Problem Based Learning Dipadu Metode Debat Terhadap Kemampuan Berargumentasi. *Journal on Education*, *6*(1), 3168–3176. https://doi.org/10.25134/quagga.v11i1.1633

Nurjannah, Husnul Khatimah, Sumarni, S. (2024). Pengaruh Model Active Debate Dalam Pembelajaran Sejarah Terhadap Motivasi Belajar Mahasiswa. *NUSRA: Jurnal Penelitian Dan Ilmu Pendidikan*, *5*(2), 1–23.

Pranata, O. D., & Noperma, N. (2023). Critical Thinking Skills in Rotational Dynamics : Learning Physics With and Without Free-body Diagrams. *Tarbawi : Jurnal Ilmu Pendidikan*, *19*(2), 153–164. https://doi.org/https://doi.org/10.32939/tarbawi.v19i2.4215.

Purwanto, E., & Sunawan. (2022). Focused classroom meeting model of teaching for enhancing students' achievement motivation. *Cakrawala Pendidikan*, *41*(3), 719–730. https://doi.org/10.21831/cp.v41i3.49238

Putra, S. H. J. (2021). Effect of Science, Environment, Technology, and Society (SETS) Learning Model on Students' Motivation and Learning Outcomes in Biology. *Tarbawi : Jurnal Ilmu Pendidikan*, *17*(2), 145–153. https://doi.org/10.32939/tarbawi.v17i2.1063

Rafulta, E., & Nofrianto, A. (2017). Perbedaan Teknik Carousel Dengan Teknik Each One Teach One Dalam Pembelajaran Matematika. *Jurnal Tatsqif*, *15*(1), 38–50. https://doi.org/10.20414/j-tatsqif.v15i1.1315

Ramli. (2022). Penerapan Strategi Pembelajaran Aktif Each One Teach One Dengan Media Puzzle Magnet Untuk Meningkatkan Hasil Belajar Matematika Di Kelas Viii-B Di Smp Negeri 1 Mangaran Semester Genap Tahun Pelajaran 2018/2019. *JURNAL IKA: Ikatan Alumni PGSD UNARS*, *12*(2), 73–84

Reni Wulandari, Sarkadi, dan K. (2019). Pengaruh Model Pembelajaran Integratif dan Kemampuan Berpikir Kritis Terhadap Hasil Belajar Sejarah Siswa SMA. *Jurnal Penelitian Ilmu Pendidikan*, *12*(2), 139–146.

Roni Hamdani, A., Dahlan, T., Indriani, R., & Ansor Karimah, A. (2022). Analisis Pengaruh Penggunaan Model Problem Based Learning Terhadap Motivasi Belajar Peserta Didik Di Sekolah Dasar. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *7*(02), 751–763. https://doi.org/10.36989/didaktik.v7i02.252

Rudisaberi, M. Yahya, M. Sri. Yusal. (2022). *Pengaruh Proses Pembelajaran IPS dan Iklim Keluarga*. *10*(3), 336–341.

Samsi, A. N., & Yusal, M. S. (2022). Identifikasi Tumbuhan Mangrove Dan Pemanfaatannya Di Pulau Aru Provinsi Maluku. *Jurnal Inovasi Pendidikan Dan Sains*, *3*(2), 47–50. https://doi.org/10.51673/jips.v3i2.1012

Simeru, A., Natusion, T., Takdir, M., Sri, S., Susanti, W., Karsiwan, W., Suyani, K., Mulya, R., Friadi, J., & Nelmira, W. (2023). Model–Model Pembelajaran. In D. Sutomo (Ed.), *Lakeisha* (Vol. 1, Issue 1). Lakeisha. http://scioteca.caf.com/bitstream/handle/123456789/1091/RED2017-Eng-8ene.pdf?sequence=12&isAllowed=y%0Ahttp://dx.doi.org/10.1016/j.regsciurbeco.2008.06.005%0Ahttps://www.researchgate.net/publication/305320484_Sistem_Pembetungan_Terpusat_Strategi_Melestari

Suharti, P., Anggraini, C. C., & Wiwi Wikanta (2024). Implementation of IBSC Learning Model with Podcast Media Blended Learning Media System to Train Critical Thinking and Communication. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *14*(148), 85–94. https://journal.lppmunindra.ac.id/index.php/Formatif/article/view/15638.

Sutaphan, S., & Yuenyong, C. (2023). Enhancing grade eight students' creative thinking in the water STEM education learning unit. *Cakrawala Pendidikan*, *42*(1), 120–135. https://doi.org/10.21831/cp.v42i1.36621

Sholicha, D. N., & Wulandari, S. S. (2020). Pengaruh Model Pembelajaran Problem Based Learning terhadap Kemampuan Berpikir Kreatif Siswa Kelas X SMA 5 Palu. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, *8*(1), 96–107. https://journal.unesa.ac.id/index.php/jpap.

Tiro, M. A., Sukarna, S., & Aswi, A. (2010). *Statistika Deskriptif Peubah Banyak*. *January*, 332. https://www.researchgate.net/profile/Sukarna_Sukarna/publications.

Tuasikal, A. R. S., Hartoto, S., Prakoso, B. B., Kartiko, D. C., & Hariyanto, A. (2021). The Analysis of Teaching Skills and Learning Effectiveness of Internship Students. *Cakrawala Pendidikan*, *40*(3), 650–658. https://doi.org/10.21831/cp.v40i3.40466

Undang-Undang Republik Indonesia Nomor 20 tahun 2003 (Issue Sistem Pendidikan Nasional). (2003).

Wahjusaputri, S., Bunyamin, B., & Nastiti, T. I. (2021). Critical Success Factors in Implementing Teaching Factory-Based Competency for Vocational High School Students. *Cakrawala Pendidikan*, *40*(3), 584–592. https://doi.org/10.21831/cp.v40i3.28877

Wahyuni Malik, S., Azis, M., Yusal, S., & Yahya, M. (2022). Pengaruh Penggunaan Metode Pembelajaran Crozzword Puzzle Terhadap Hasil Belajar Ips Siswa Kelas V Sd Inpres Panaikang I/1 Kota Makassar. *Adi Widya: Jurnal Pendidikan Dasar*, *7*(I), 85–92. https://doi.org/10.25078/aw.v7ii.701.

Widiyanto, Setyawan, H., Suharjana, García-Jiménez, J. V., Pavlovic, R., Nowak, A. M., & Shahri, M. I. Bin. (2024). The differences in learning outcomes in students' archery skills according to physiological ability. *Cakrawala Pendidikan*, *43*(2), 305–313. https://doi.org/10.21831/cp.v43i2.63268

Wijriati, E. (2018). Penerapan Metode Pembelajaran Debat Untuk Meningkatkan Hasil Belajar PKN Pada Siswa Sekolah Menengah Pertama. *Suara Guru : Jurnal Ilmu Pendidikan Sosial, Sains, Dan Humaniora*, *4*(2), 437–449.

Yusal, M. S. (2020). Respirasi dan Eskresi Organisme Heterotrof.pdf. In *Biologi Umum*. Widina Bhakti Persada Bandung.

Yusal, M. S. (2021). Studi Potensi Eutrofikasi Di Pesisir Losari Makassar. *Enggano*, *2*(2), 348–357.

Yusal, M. S., Bahar, I., & Namul, B. (2022). The effect of picture and picture learning model on learning outcomes of junior high school Madani Makassar students. *BIOEDUPAT: Pattimura Journal of Biology and Learning*, *2*(1), 27–31. https://doi.org/10.30598/bioedupat.v2.i1.pp27-31

Yusal, M. S., & Carding, C. (2020). Peningkatan Hasil Belajar Siswa Melalui Metode Pembelajaran Problem Posing Di SMA Nasional Makassar. *BIOMA: Jurnal Biologi Dan Pembelajarannya*, *2*(2), 60–66. Yusal, M. S., & Hasyim, A. (2022). Kajian Kualitas Air Berdasarkan Keanekaragaman Meiofauna dan Parameter Fisika-Kimia di Pesisir Losari, Makassar. *Jurnal Ilmu Lingkungan*, *20*(1), 45–57. https://doi.org/10.14710/jil.20.1.45-57

Yusal, M. S., & Jilung, Y. (2022). Peningkatan Motivasi Belajar Melalui Model Pembelajaran The Power Of Two. *Jurnal Guru Membangun*, *41*(1), 17–25. http://dx.doi.org/10.26418/gm.v41i1.54468Halaman17

Yusal, M. S., Marfai, M. A., Hadisusanto, S., & Khakhim, N. (2019a). Abundance of Meiofauna and Physical-Chemical Parameters as Water Quality Indicator. *Ilmu Kelautan: Indonesian Journal of Marine Sciences*, *24*(2), 81–90.

Yusal, M. S., Marfai, M. A., Hadisusanto, S., & Khakhim, N. (2019b). Analisis Ekologis Meiofauna Sebagai Bioindikator Di Pesisir Pantai Losari, Makassar. *Bionature*, *19*(1). https://doi.org/10.35580/bionature.v19i1.7308

Yusal, M. S., Marfai, M. A., Hadisusanto, S., & Khakhim, N. (2019c). Water Quality Study Based on Meiofauna Abundance and Pollution Index in the Coastal Zone of Losari Beach, Makassar. *Jurnal Ilmu Lingkungan*, *17*(1), 172. https://doi.org/10.14710/jil.17.1.172-180

Zandagi, W., Bain, & Amin, S. (2018). Studi Komparasi Antara Metode Pembelajaran Debat dan Diskusi Dalam Meningkatkan Kemampuan Berpikir Kritis Siswa Pada Mata Pelajaran Sejarah Indonesia di SMAN 6 Semarang. *Historia Pedagogia*, *7*(1), 129–137.