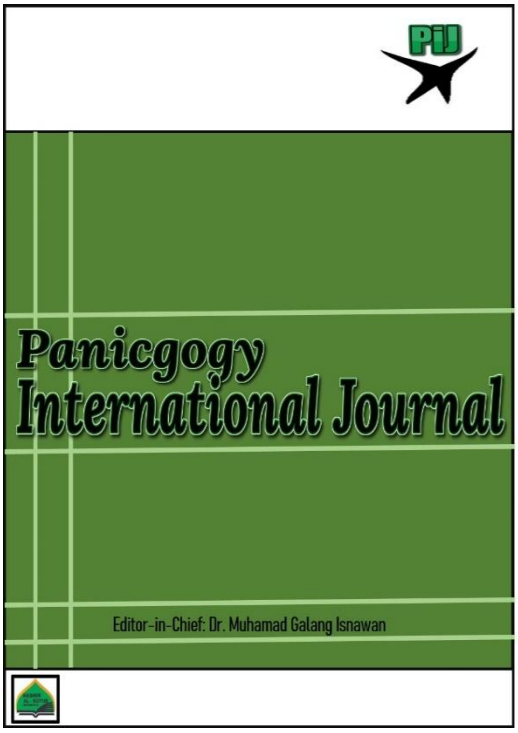
Panicgogy International Journal

Publication details, including instructions for authors and subscription information:
https://nakiscience.com/index.php/pij



Warung hierarki used civic educational learning for increase the participation of learning: experimental study

Dina Indriyani[a*], Ucu Rohimah[b]
[a*]Universitas Suryakancana, Cianjur, West Java, Indonesia, dinaindriyani08@gmail.com
[b]Universitas Suryakancana, Cianjur, West Java, Indonesia, ucurohimah17@gmail.com

To cite this article:
Indriyani, D & Rohimah, U. (2024). Warung hierarki used civic educational learning for increase the participation of learning: experimental study. *Panicgogy International Journal, 2*(2), 64-71.
To link to this article: nakiscience.com/index.php/pij

Panicgogy International Journal, 2(2), 64-71, 2024
https://nakiscience.com/index.php/pij

Original Article

Warung hierarki used civic educational learning for increase the participation of learning: experimental study

Dina Indriyani[a*], Ucu Rohimah[b]
[a*]Universitas Suryakancana, Cianjur, West Java, Indonesia, dinaindriyani08@gmail.com
[b]Universitas Suryakancana, Cianjur, West Java, Indonesia, ucurohimah17@gmail.com

*Correspondence: dinaindriyani08@gmail.com

Abstract
The aim of this study is to examine the impact of using the Warung Hierarchy learning model on students' learning participation in the Citizenship Education (PPKn) learning process. Student participation is considered a key factor influencing their learning outcomes, and it is crucial for teachers to encourage active involvement in learning activities, as good participation can lead to optimal results. The researcher focuses on using an innovative learning model to enhance student participation. The experimental method was used, with the researcher testing the effect of the Warung Hierarchy model on improving learning participation. The study was conducted with students from a vocational school as the sample to evaluate the effectiveness of this model during PPKn lessons. The results indicate that implementing the Warung Hierarchy learning model can increase students' participation, which suggests that this model is effective in encouraging students to engage more actively in the learning process, ultimately positively influencing their learning outcomes.
Keywords: warung hierarchy, learning methods, PPKn learning, learning participation

1. Introduction

The implementation of PPKn learning is a tool to foster the younger generation to be able to become good citizens or "a good citizen". The development of good citizens is carried out through delivering citizenship theory materials and direct implementation of the theory in community life in the form of real actions that lead to the application of learning outcomes in their entirety (Komalasari & Saripudin, 2018; Bringle & Clayton, 2012). However, in its implementation, PPKn learning often encounters the problem of lack of student participation in learning (Haque, 2023). Often the selection of PPKn learning methods in schools today is too rigid and is considered less interesting for students to learn, resulting in minimal student participation, especially in the learning process. This condition is thought to be caused by the selection of monotonous and conventional learning methods by teachers, so that it is less interesting for students' enthusiasm and participation in learning. The learning material, which is quite a lot and difficult, is also an obstacle for students to fully understand the learning. Students consider PPKn subjects as uninteresting and boring lessons because they are rote. Such conditions make the learning process only controlled by teachers (Syaparuddin et al., 2020,).

Schools as educational institutions, teachers have a role as a medium for delivering knowledge, namely realizing the quality of competent human resources, this is the task and responsibility of teachers that must be carried out properly (Mulang, 2021).Teachers have the task and responsibility not only to teach but also to educate students to have good character/morals through character education in the form of instilling life values that are sourced from the points of Pancasila values as the nation's outlook on life (Islahiyah et al., 2023; Nuristia & Bangun, 2023).To maximize the duties and responsibilities of teachers, the ability to manage the class well and create a conducive and interactive learning atmosphere is needed so that optimal learning will be realized (Noviyanti & Setyaningtyas, 2017).

To optimize learning, student learning participation is very necessary because in an effective learning process there is a two-way interaction that occurs between teachers and

students. Learning participation is a form of positive student response by showing an enthusiastic attitude, willingness to learn and continuous curiosity and wanting to be directly involved in learning activities (Filgona et al., 2020). According Librianty & Syarif (2014), learning participation is a process in which students are actively involved involving physical and mental aspects by activating the five senses in a series of learning activities that include visual, auditory, oral, motoric, emotional, and body language activities, and obeying the structure of learning participation, as an effort to satisfy curiosity about a skill or subject matter, which will have an impact on improving the quality of students. The quality of learning possessed by students is formed through their involvement during the learning process (Tleuken et al., 2022).

PPKn learning with learning techniques that are considered indoctrinating using conventional methods such as lectures, tends to make students give passive responses in following the learning process, and hinders students in understanding learning (Suhartono, 2019). Responding to this, an appropriate approach or method is needed to encourage the quality of student learning so that students can give a positive response in developing learning participation (Barr, 2017). One way that can help students develop learning participation is to study together or form study groups because group learning can stimulate students to practice social interactions that have a positive impact on learning. Group learning in foreign language terms is better known as cooperative learning. In the form of group learning, each student will help each other in realizing learning objectives on a particular topic.

Lie (2002) stated that cooperative learning, known as mutual cooperation learning, is a learning system where students are given the opportunity to work together with other students in structured tasks. Jigsaw Cooperative Learning is one of the learning methods based on "Cooperative learning" in developing student learning participation, this method will involve a process of cooperation between students in studying the material content (Sulisto & Haryanti, 2022,). Interaction between students in learning using the jigsaw cooperative learning model will encourage students to be involved and actively participate in learning so that the implementation of learning can take place optimally.

This article will discuss the results of research conducted by researchers related to the jigsaw cooperative learning model in the form of "Warung Hierarchy". Researchers call it the Jigsaw Warung Hierarchy model. Warung Hierarchy is an innovation that researchers have made to the Jigsaw cooperative learning model. The focus of the discussion is on how to apply the Jigsaw Warung Hierarchy model in PPKn learning as an effort to increase student learning participation. The research aims to answer the following questions: (1) How does the application of the Jigsaw Warung Hierarchy model affect student participation in PPKn learning? (2) What are the challenges faced in implementing the Jigsaw Warung Hierarchy model in the classroom?

2. Methods

In this study, the researcher employed an experimental research method to investigate the impact of the Jigsaw learning method based on the Warung Hierarchy model in PPKn (Civics Education) lessons. The research involved two different classes: an experimental group that implemented the Jigsaw Warung Hierarchy model and a control group that followed the regular PPKn curriculum. The researcher compared student learning participation between the two groups to assess the effectiveness of the innovative learning model in promoting active student engagement. The study was conducted at a vocational high school, specifically at a well-known vocational school, using two trial classes—one as the control class and the other as the experimental class.

The participants in this research were 60 students from a vocational high school. These students were selected purposefully, with one class assigned to the experimental group, where the Jigsaw Warung Hierarchy model was applied, and the other class as the

control group, where traditional methods were used for teaching PPKn. The students in both classes were at similar academic levels and had comparable characteristics to ensure fairness in comparing the outcomes. The research was conducted over a period of four weeks, with the experimental group receiving the intervention through the Jigsaw Warung Hierarchy model.

Data collection was carried out using a combination of quantitative and qualitative methods. Pre-tests and post-tests were administered to both the experimental and control groups to measure changes in student participation levels. Direct observations of classroom interactions were also conducted to gather qualitative data on student engagement during lessons. In addition, feedback questionnaires were distributed to both students and teachers to assess their perceptions of the learning experience and to identify any challenges faced during the implementation of the Jigsaw Warung Hierarchy model. This comprehensive data collection approach allowed the researcher to gain insights into the impact of the learning method on student participation.

The collected data were analyzed using a two-sample t-test to determine the significance of the differences in learning participation between the experimental and control groups. The n-gain score was calculated to assess the extent of improvement in student participation in the experimental class compared to the control class. By comparing the pre-test and post-test results, the researcher was able to quantify the effect of the Jigsaw Warung Hierarchy model on student participation and evaluate the effectiveness of the method in fostering more active engagement in PPKn learning.

3. Result and Discussion

3.1Results

The statistical test used by researchers to see the level of difference in the average score values obtained by the experimental class and the control class. The following is a table of t-test results on control class and experimental class data.

Table 1. Data from the t-test results of the control class and experimental class

One-Sample Test

	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Kelas Eksperimen	104.670	34	0.000	55.514	54.44	56.59
Kelas Kontrol	47.849	28	0.000	53.241	50.96	55.52

Based on the results presented in Table 1, the posttest value of Sig. (2-tailed) for the experimental class was 0.000, which is lower than the significance level of 0.05. Similarly, the posttest value for the control class also yielded a Sig. value of 0.000, indicating a significant result. These findings suggest that the differences between the two groups were statistically significant, meaning that the observed effects were not due to random chance. Both the experimental and control groups showed a significant change in their posttest results, pointing toward the influence of the respective methods used in the study.

Given that the Sig. (2-tailed) value for both the experimental and control classes is below the threshold of 0.05, this allows for the rejection of the null hypothesis (H0) and the acceptance of the alternative hypothesis (Ha). The null hypothesis, which proposed that there is no significant difference between the two groups, is thus rejected. The acceptance of Ha, which suggests a significant difference, implies that the application of the Jigsaw Hierarchical Warung method in the experimental class had a substantial impact on students' participation and learning outcomes.

Original Article

The results demonstrate a clear distinction in the posttest scores between the experimental and control groups, reinforcing the effectiveness of the Jigsaw Hierarchical Warung method in enhancing student learning participation. The experimental group, which employed the innovative method, showed a marked improvement in learning outcomes, while the control group, using traditional methods, did not exhibit the same level of progress. These findings support the conclusion that the Jigsaw Hierarchical Warung method is more effective in promoting student engagement and participation compared to conventional teaching methods.

To see the level of significance of the posttest value, more details will be presented in the following Table 2

Table 2**.** N-Gain Score test results

	N	Min	Max	*Mean*	Std. D
	Statistik	Statistik	Statistik	Statistik	Statistik
N-Gain Score	35	.58	.65	.5851	.12566
N-Gain Persen	35	31.58	80.65	58.5166	12.56663

Based on the data analysis conducted with the assistance of IBM SPSS 24.0 software, the N-Gain Score test yielded a Mean value of 0.58, which falls within the range of 0.5 to 0.7. This indicates that the effectiveness of the Jigsaw method, Warung Hierarchy model, is classified as moderate. A moderate effectiveness means that the method has a noticeable impact on improving the level of student learning participation but may require further refinement to achieve a higher level of impact. The N-Gain Score offers a clear measure of how much improvement has been observed in student participation as a result of using the method.

Further analysis of the N-Gain Percent provided a Mean value of 58.5166, which places it within the range of 56-75%. This percentage range is interpreted as a fairly effective result, suggesting that the application of the Jigsaw Warung Hierarchy method led to a moderate improvement in student learning participation. The N-Gain Percent serves as another indicator to assess the degree of change in student outcomes, reinforcing the conclusion that the model had a positive effect on the students' engagement in the learning process.

From these findings, it can be inferred that the Jigsaw method, Warung Hierarchy model, had a positive impact on student participation in the PPKn learning process, though its effectiveness is categorized as moderate. While the results indicate a significant improvement in student learning participation, it is evident that there is still potential for further enhancement of the method to achieve even greater effectiveness. The moderate N-Gain Score suggests that the model is useful but may require adjustments or additional strategies to achieve optimal results.

In conclusion, the Jigsaw Warung Hierarchy model has proven to be moderately effective in fostering student learning participation in PPKn learning. Although the effectiveness is classified as moderate, the data analysis indicates a promising outcome in terms of improving student engagement. Future research could focus on refining the model to enhance its effectiveness further and explore ways to maximize its impact on student participation in other subjects or contexts.

3.2 Discussion

Psychologically, learning is a process in which a person interacts with their environment in order to cause a change in behavior as a whole (Djamaluddin & Wardana, 2019). As stated by (Hidayat, 2013). PPKn is "an educational or learning program that procedurally and programmedly seeks to humanize and cultivate and empower humans or students (themselves and their lives) to become good citizens as required by the constitutional or legal requirements of the state." Nation or State. 2 (Nurwardani et al.,

2016; Sutiyono, 2017) states that Civic Education is a curriculum that expands political democracy from various sources of knowledge.

Learning occurs when there is participation, both from the teacher as a teacher and from students as learners (Nauli, 2023). Student involvement in the learning process. Involving students in the learning process can help them gain valuable knowledge. By taking on roles, children will actively contribute to their own growth and learn how to engage socially with others as they strive towards independence. One way to encourage learning is through learning engagement. Learning activities can only be successful if students as learners actively experience the learning process themselves, so creating conditions that allow students to actively participate in the learning process is very necessary to achieve the intended learning objectives (Gunawan & Ritonga, 2019).

Method is a route or approach taken to complete a task (Maesaroh, 2013). Jigsaw cooperative learning uses a zigzag saw pattern to teach students how to complete a task by working together to achieve learning goals (Rusman, 2011). Elliot Aronson and his colleagues at the University of Texas created the Jigsaw method (known as Jigsaw I), a cooperative approach that was later modified by Slavin and his colleagues at John's University. Because this strategy requires students to work together in small groups to complete tasks or problems, they become more dependent on each other to achieve learning goals, which ultimately increases students' enthusiasm for learning (Sulisto & Haryanti, 2022). Both teachers and students have a role in implementing this method, although students participate more in the learning process. Thus, this approach allows students to achieve their learning goals to the best of their ability and motivates them to actively participate in the process of helping each other understand the subject matter.

According to Rusman (2012) & Sukarmini (2016), the following are the steps or syntax in practicing the Jigsaw cooperative learning model: 1) Students are divided into groups of four to five people; 2) Each team member receives a series of materials with various tasks; 3) individuals from various teams who have the same task create a new group called an expert group; 4) After discussing in the expert group, each member returns to their original group and informs the other members about the sub-chapter they have mastered; 5) The results of the discussion are presented by each expert team; 6) conversation; and 7) closing. In accordance with its characteristics, this method is intended to provide convenience in studying together a load of subject matter that is studied later, the material is delivered to other group members. Meanwhile Lubis & Harahap (2016) said that the Jigsaw style cooperative learning approach motivates students to participate and help each other in understanding the subject matter. Students who use cooperative learning strategies such as Jigsaw will be able to explain their ideas and abilities to other students about the material they are studying individually. Each group member has different material to learn from Jigsaw cooperative learning, and the goal is to understand part of each task given to each member (Yani, 2023).

The term “Warung Hierarchy” is a term used by researchers to name a development of a Jigsaw type Cooperative learning model that integrates the Jigsaw learning pattern into a place called a warung, in a real concept the term warung refers to a place where buying and selling transactions occur. In the Warung Hierarchy concept, the warung in question is a place for interaction between students. In this warung, there are sources of information and knowledge that are packaged in a “product” and are considered to represent important parts related to the content of the hierarchy of Legislation. It is called “Warung Hierarchy”, because in a narrow sense this warung only discusses the content of learning material on the hierarchy of legislation which in the term of the independent curriculum is “Products and Hierarchy of Legislation” unit 5 in phase E class 10.

The jigsaw method of the Warung Hierarchy model is a simple development of the cooperative learning model with the jigsaw type. This development is specifically designed to optimize the PPKn learning process in schools. The concept of "Shop" in this context refers to a place that is centered on sources of information and knowledge related to the

Products and Hierarchy of Legislation made from, by, and for students. "Warung Hierarchy" is a form of development of a learning model that integrates the Jigsaw model into PPKn learning with a study group that aims to carry out collaborative and interactive learning in developing active and responsible student learning participation. In the era of the independent curriculum, the sub-theme of the Hierarchy of Regulations is in unit 5, with the unit name "Products and Hierarchy of Legislation" in phase E (Grade X). In its implementation, PPKn learning with the Warung Hierarchy concept applies the Jigsaw learning method where each group consists of an expert group and an original group. Students with expert group members take on the role of "Shop Owners" who have the task of understanding the topic of the material and conveying what has been understood through expert group discussions to shop visitors, then students from the original group, namely as "Shop Visitors" will visit each shop to find information. The original group is required to record the results of the visit in the visit book provided by the researcher, this will be the material for conveying the information that has been obtained to each group.

In practice, the mapping of the Warung Hierarchy concept is different from the usual classroom learning concept, where the Warung Hierarchy concept has a zigzag learning mobilization strategy so that each group takes turns visiting other stalls every 5 minutes. Warung visitors in each group consist of group members 1-5. By involving interaction between students in each stall, it will encourage each student to be involved and actively participate in realizing the learning process optimally. After all groups have visited the five stalls, the researcher asked each group member (who occupies the position of a warung visitor) to return to their respective groups with the aim of conveying what has been obtained from each stall. In addition, the results obtained are conveyed by each group orally and in writing in front of the class alternately. After completion, the researcher and students draw conclusions about the learning that has been carried out together.

Based on the results of the field trials, it has been proven that the application of the Jigsaw method with the Warung Hierarchy model in PPKn learning effectively increases student learning participation. The data collected from the experimental class demonstrated significant improvements in student engagement during the learning process, suggesting that the innovative approach encouraged students to become more active and involved in their learning activities. This finding supports the notion that incorporating collaborative learning strategies, such as the Jigsaw Warung Hierarchy model, can positively influence students' participation and overall involvement in classroom activities.

4. Conclusion

The jigsaw method of the Warung Hierarchy model is an innovative approach to learning, particularly designed to enhance student participation in the context of PPKn (Pendidikan Pancasila dan Kewarganegaraan) education. The model was developed with a focus on the theme of "Products and Hierarchy of Legislation" within the subject, aiming to encourage students to engage actively in the learning process. The study conducted revealed that the implementation of this model significantly improved student learning participation, making it a promising method for increasing classroom involvement. The findings suggest that the model's collaborative nature, combined with the hierarchical structure of the learning tasks, effectively motivated students to engage in discussions and activities, thereby fostering deeper learning.

However, this study has several limitations that need to be addressed in future research. First, the research was conducted in a single subject area (PPKn) and in one specific context, which may limit the generalizability of the results to other subjects or educational settings. Additionally, the study only focused on short-term effects, and it would be beneficial to investigate the long-term impact of the jigsaw method of the Warung Hierarchy model on student learning outcomes. Future research could explore how this model can be adapted to different content areas and age groups to better understand its broader applicability and effectiveness.

The implications of this study for educators are significant. By adopting the Jigsaw Warung Hierarchy model, PPKn teachers have an alternative method to enhance student engagement and foster a more dynamic and interactive classroom environment. This can lead to improved student participation, critical thinking, and collaboration skills, all of which contribute to more effective learning. The study encourages teachers to explore innovative teaching strategies that promote active learning and student-centered approaches.

Based on the findings, it is recommended that teachers incorporate the jigsaw method of the Warung Hierarchy model into their teaching practices to increase student participation. Further research should explore its implementation in other subjects and educational contexts, as well as its long-term effects on student learning. Moreover, it would be valuable to investigate the factors that contribute to the success of this model, such as teacher facilitation, student motivation, and classroom dynamics, to provide more comprehensive insights into its effectiveness.

5. References

Barr, M. L. (2017). Encouraging college student active engagement in learning: Student response methods and anonymity. *Journal of Computer Assisted Learning*, *33*(6), 621-632. https://doi.org/10.1111/jcal.12205

Bringle, R. G., & Clayton, P. H. (2012). Civic education through service learning: What, how, and why? In *Higher education and civic engagement: Comparative perspectives* (pp. 101-124). Palgrave Macmillan US.

Djamaluddin, A., & Wardana. (2019). *Belajar dan pembelajaran.* Jakarta: CV Kaaffah Learning Center.

Filgona, J., Sakiyo, J., Gwany, D. M., & Okoronka, A. U. (2020). Motivation in learning. *Asian Journal of Education and Social Studies*, *10*(4), 16-37. https://doi.org/10.9734/ajess/2020/v10i430273

Gunawan, & Ritonga. (2019). *Media pembelajaran berbasis industri 4.0.* Jakarta: PT Raja Grafindo Persada.

Haque, M. R. (2023). The use of problem-based learning to enhance student participation. *Edulingua: Jurnal Linguistik Terapan dan Pendidikan Bahasa Inggris*, *10*(2), 41-52. https://doi.org/10.34001/edulingua.v10i2.5037

Hidayat, F. T. (2013). *Kajian pengembangan nilai-nilai kewarganegaraan dalam kegiatan berorganisasi di SMA Muhammadiyah 1 Purwokerto* (Doctoral dissertation, Universitas Muhammadiyah Purwokerto).

Islahiyah, I., Mariatun, I. L., & Sholeh, Y. (2023). Teacher efforts to instill character values in learning. *Edunesia: Jurnal Ilmiah Pendidikan*, *4*(3), 1488-1500. https://doi.org/10.51276/edu.v4i3.558

Komalasari, K., & Saripudin, D. (2018). The influence of living values education-based civic education textbook on students' character formation. *International Journal of Instruction, 11*(1), 395-410. https://doi.org/10.51276/edu.v4i3.558

Librianty, H. D., & Syarif, M. (2014). Bercakap-cakap pada pembelajaran bahasa Inggris. *Jurnal Pendidikan Anak Usia Dini*, *8*(5), 1-8.

Lie, A. (2002). *Kooperatif learning* (1st ed.). Jakarta: CV Grasindo.

Lubis, N. A., & Harahap, H. (2016). Pembelajaran kooperatif tipe jigsaw. *Jurnal As-Salam, 1*(1), 96–102.

Maesaroh, S. (2013). Peranan metode pembelajaran terhadap minat dan prestasi belajar pendidikan agama Islam. *Jurnal Kependidikan*, *1*(1), 150–168.

Mulang, H. (2021). The effect of competences, work motivation, and learning environment on human resource performance. *Golden Ratio of Human Resource Management, 1*(2), 84-93. https://doi.org/10.52970/grhrm.v1i2.52

Nauli, I. (2023). Pengaruh implementasi model pembelajaran berbasis masalah terhadap partisipasi belajar pendidikan kewarganegaraan siswa kelas VII-I SMP Negeri 5.

Jurnal Tarombo, 4(1), 47–56. https://jurnal.ipts.ac.id/index.php/tarombo/article/view/4926

Noviyanti, A. K., & Setyaningtyas, E. W. (2017). Partisipasi pembelajaran siswa dalam pembelajaran dengan classroom rules. *Journal of Education Research and Evaluation, 1*(2), 65. https://doi.org/10.23887/jere.v1i2.10071

Nuristia, W., & Bangun, N. D. B. (2023). Understanding the role and function of student development as an effort to implement character education values in the curriculum. *International Journal of Students Education*, 491-495. https://doi.org/10.62966/ijose.v1i2.508

Nurwardani, P., Saksama, H. Y., Winataputra, U. S., Budimansyah, D., Sapriya, Winarno, M., Mulyono, E., Jukti, S., Anwar, A. A., Evawany, Priyautama, F., & Festanto, A. (2016). *Buku ajar mata kuliah wajib umum pendidikan kewarganegaraan*. Pendidikan Kewarganegaraan di Perguruan Tinggi, 239–274.

Rusman. (2011). *Model-model pembelajaran: Mengembangkan profesionalisme guru.* Jakarta: PT Raja Grafindo Persada.

Suhartono, E. (2019). The importance of changes in civil learning patterns that are texting to contextual patterns. In *1st International Conference on Social Knowledge Sciences and Education (ICSKSE 2018)* (pp. 36-41). Atlantis Press.

Sukarmini, N. N., Suharsono, D. N., & Sudarma, D. I. K. (2016). Pengaruh model pembelajaran kooperatif tipe jigsaw dan motivasi berprestasi terhadap hasil belajar ekonomi kelas X di SMA Negeri 1 Manggis. *Jurnal Teknologi Pembelajaran Indonesia, 7*(2), 9-15. https://doi.org/10.23887/jtpi.v7i2.1888

Sulisto, A., & Haryanti, N. (2022). *Model pembelajaran kooperatif (Cooperative learning model).* Jakarta: Eureka Media Aksara.

Sutiyono. (2017). Pengembangan civic skills melalui seminar Socrates dalam pendidikan kewarganegaraan. *Jurnal Pancasila dan Kewarganegaraan, 2*(2), 59-67. https://doi.org/10.24269/v2.n2.2017.59-67

Syafaruddin, Meldianus, & Elihami, E. (2020). Strategi pembelajaran aktif dalam meningkatkan motivasi belajar PKN peserta didik. *Mahaguru: Jurnal Pendidikan Guru Sekolah Dasar, 1*(1), 30–41. https://doi.org/10.33487/mgr.v1i1.326

Tleuken, A., Turkyilmaz, A., Unger, K., Tokazhanov, G., El-Thalji, I., Mostafa, M. Y., & Karaca, F. (2022). Which qualities should build environment possess to ensure satisfaction of higher-education students with remote education during pandemics? *Building and Environment, 207*, 108567. https://doi.org/10.1016/j.buildenv.2021.108567

Yani, L., Sadrina, S., & Fathiah, F. (2023). Analisis kemampuan berpikir kritis siswa dalam penerapan metode jigsaw. *Jupiter (Jurnal Pendidikan Teknik Elektro, 8*(1), 58-66.