

The Use of Jigsaw Type Cooperative Learning Model on Algebraic Factorization Material in Class VIII-A Of SMP Negeri 1 Depapre, Jayapura

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Abstract

This study aims to describe the implementation of the Jigsaw cooperative learning model in teaching algebraic factorization to eighth-grade students at SMP Negeri 1 Depapre, Jayapura Regency. Using a descriptive qualitative approach, this research examines the improvement in students' understanding and skills through expert and home group-based learning. Data collection was conducted through written tests and observations, focusing on student activity and instructional implementation. The findings indicate that the Jigsaw model significantly enhances student learning outcomes, achieving average scores above the minimum competency standards, along with positive changes in aspects of cooperation, responsibility, and student attitudes. This model is recommended for broader application to improve the quality of mathematics instruction in junior high schools.

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1. INTRODUCTION

Mathematics learning at the junior high school level faces special challenges, especially in the material of algebraic factorization which is abstract and considered difficult by many students (Jayanti, Jazuli, and Ikman, 2013:14). This gap in understanding causes low motivation and student learning achievement (Indriana, 2011). This factor is exacerbated by the teaching approach which is still predominantly using the lecture method, where the teacher plays an active role while students tend to be passive (Rusman, 2013). Students who only listen and receive material without interaction often find it difficult to understand abstract mathematical concepts that require in-depth understanding. At SMP Negeri 1 Depapre, this phenomenon has an impact on low mathematics learning outcomes, especially in algebraic factorization material.

The Jigsaw cooperative learning approach was developed as an effective method that allows interaction between students in understanding the material more deeply (Wisudawati and Sulistyowati, 2019). In this model, students are divided into expert groups and home groups, where each student is responsible for understanding and teaching the material that has been learned to friends in their home group (Ratumanan, 2004). Several studies support the effectiveness of the Jigsaw method in improving mathematics learning outcomes and building collaborative skills. According to Slavin, RE (2011), a cooperative approach such as Jigsaw not only supports the understanding of mathematical concepts, but also fosters an attitude of cooperation, responsibility, and respect for differences.

However, a more recent study by (Nisa et al, 2021) showed that although Jigsaw has many advantages, its success depends on students' active involvement in group discussions. Applications in several contexts showed that less active students needed further guidance to be maximally engaged (Nisa et al., 2021). Meanwhile, a study by Sutopo and (Mardiah, 2020) highlighted the importance of structured teaching tools and intensive coaching by teachers during the learning process to increase the effectiveness of this model.

The formulation of the research problem is the low level of understanding of class VIII-A students of SMP Negeri 1 Depapre on the material of algebraic factorization, which has an impact on learning outcomes. The purpose of this study is to describe the application of the Jigsaw type cooperative learning model in improving students' understanding of the material. This study is expected to provide benefits in improving the quality of mathematics learning at the junior high school level, especially by providing empirical data on the effectiveness of Jigsaw.

2. RESEARCH METHOD

Types of research

This study uses a descriptive method with a qualitative approach to describe the implementation of the Jigsaw cooperative learning model and its impact on students' understanding of algebraic factorization material (Sugiyono, 2015). The qualitative approach was chosen to explore the interactions and dynamics in the study group, in accordance with the characteristics of descriptive analysis that focuses on natural phenomena without variable manipulation (Sugiyono, 2017).

Subjects and Location of Research

The research was conducted at SMP Negeri 1 Depapre, Jayapura Regency, with the research subjects being class VIII-A students consisting of 30 students. The selection of this location took into account that students in this school showed challenges in understanding algebraic material, so it is relevant for testing the Jigsaw model which is expected to improve students' understanding collaboratively.

Instrument

The instruments used in this study include written tests, student observation sheets, and teacher observation sheets. Written tests are used to measure students' cognitive understanding after implementing the learning model. Student and teacher observation sheets are used to record students' collaborative activities in groups, involvement during the learning process, and achievement of competencies according to learning indicators (Isrok'atun and Rosmala, 2018).

Data collection technique

Data collection was conducted using learning outcome tests and observation sheets. The learning outcome test aims to measure the improvement of students' cognitive skills in solving algebraic factorization problems. Meanwhile, observation sheets are used to record students' behavior and interactions in groups, so that they can evaluate the affective aspects and collaborative learning processes that emerge during learning.

Data analysis

Data analysis was conducted qualitatively descriptively, which includes data processing in stages: data reduction, data presentation, and drawing conclusions (Miles & Huberman, 2014). These steps allow for a deep understanding of the effectiveness of the Jigsaw model implementation, as well as how this model affects students' cognitive and affective learning outcomes.

3. RESEARCH RESULTS AND DISCUSSION

Based on the research results, the application of the Jigsaw type cooperative learning model on the algebraic factorization material in class VIII-A of SMP Negeri 1 Depapre showed a significant increase in students' cognitive and affective aspects. The average score of students after learning using the Jigsaw model was 76.08, exceeding the Minimum Completion Criteria (KKM) set at 60. Of the total 23 students present, 8 students achieved an A (100), while the rest achieved scores in the range of B to D. The results of the observation also showed an increase in students' attitudes of cooperation, responsibility, and self-confidence during the learning process, with 13 students obtaining a very good attitude score (A), and the rest were in the good to sufficient category.

This study confirms that the Jigsaw cooperative learning model is effective in improving students' learning outcomes and collaborative skills, especially in the material of algebraic factorization which is often considered abstract and challenging. In line with the research of (Rusman et al, 2013) which found that the Jigsaw model can improve students' positive attitudes and their understanding of the material, the results of this study strengthen that the Jigsaw method allows interactive and collaborative learning, where students are empowered to master the material with a sense of personal responsibility in the expert group and a sense of collaboration in the original group. According to (Isrok'atun and Rosmala, 2018), the social system and principle of responsibility in this model provide opportunities for students with diverse thinking abilities to support each other, which ultimately improves overall understanding of the material.

This study is consistent with the findings of (Slavin, 2011). Which showed that cooperative learning supports students in understanding abstract concepts through interactions with their peers, a process called "peer teaching." (Nisa et al, 2021) also emphasized the importance of active student involvement in maximizing the effectiveness of cooperative learning. In this study, student involvement in expert and home group discussions encouraged better understanding, especially for students who previously had difficulty learning independently. Thus, this study reinforces the importance of implementing the Jigsaw model in mathematics subjects, where active involvement and social interaction can play an important role in overcoming challenges in understanding algebraic factorization material.

The novelty of this study lies in the application of the Jigsaw model specifically to the material of algebraic factorization, a topic that is rarely studied in the context of cooperative learning in junior high schools. Many previous studies have focused more on the application of Jigsaw to social or science materials, so the contribution of this study to mathematics teaching, especially to abstract materials, shows that Jigsaw is able to overcome learning obstacles faced by students. In addition, the Jigsaw model in this study has also been proven effective in improving social skills, such as cooperation and responsibility, which support the achievement of overall learning objectives.

This study strengthens the finding that cooperative learning, especially the Jigsaw model, has great potential in changing students' perceptions of mathematics from a scary subject to a fun and meaningful learning experience. In the long term, this study opens up opportunities for the application of similar models to other mathematics topics that require intensive involvement and collaboration among students

4. CONCLUSION

Conclusion

The results of the study showed that the implementation of the Jigsaw cooperative learning model was effective in improving student learning outcomes, both in cognitive and affective aspects, in the material of algebraic factorization. The average student score

increased and was above the Minimum Completion Criteria (KKM) of 76.08. This increase was also seen in student attitudes, which showed higher cooperation, responsibility, and self-confidence in the learning process. These findings support that Jigsaw-based learning can create a conducive collaborative atmosphere and help students understand abstract mathematical material better.

5. SUGGESTION

As a recommendation, the implementation of the Jigsaw model needs to be integrated into mathematics learning at the junior high school level more widely, especially in materials that tend to challenge students' understanding. For schools, this model can be adapted as a learning method that actively involves students, thereby improving their social skills and academic understanding. For teachers, the implementation of the Jigsaw model in various other mathematics topics can be considered so that the benefits of this cooperative method can be felt more optimally in the teaching and learning process.

6. BIBLIOGRAPHY

- Andrian, Y., & Rusman, R. (2019). Implementation of 21st century learning in the 2013 curriculum. *Journal of Educational Science Research*, 12(1), 14-23.
- Huberman, A. (2014). *Qualitative data analysis a methods sourcebook*.
- Isrok'atun, AR, & Rosmala, A. (2018). *Mathematics learning models*. Jakarta: Bumi Aksara.
- Jayanti, Jazuli, and Ikman. (2013). Improving Students' Mathematics Learning Outcomes on the Main Material of Algebraic Factorization Using the Jigsaw Type Cooperative Learning Model for Class VIII2 Students of Smp Negeri 3 Mawasangka. *Journal of Educational Research*, 1(2).
- Mikroyannidis, A., Okada, A., Scott, P., Rusman, E., Specht, M., Stefanov, K., ... & Chaimala, F. (2013). weSPOT: A personal and social approach to inquiry-based learning. *Journal of Universal Computer Science*.
- Nisa, K., Nurhasanah, N., Kusuma, ASHM, Sutisna, DSD, & Sari, MP (2021). Development of character assessment instruments for elementary school (SD) students. *Scientific Journal of Educational Profession*, 6(1), 102-107.
- Nur, S., & Mardiah, M. (2020). The importance of teacher professionalism in education. *Al-Liqo: Journal of Islamic Education*, 5(02), 215-228.
- Pramitasari, A., Indriana, Y., & Ariati, J. (2011). The Relationship Between Perceptions of Contextual Learning Methods and Biology Learning Motivation of Grade XI IPA Students of SMAN 1 Pangkalan Kerinci, Riau. *Undip Psychology Journal*, 9(1).
- Ratumanan, TG (2004). *Learning and Teaching: Second Edition*. Ambon: UnesaRusman, E., Boon, J., Martínez-Monés, A., Rodríguez-Triana, M.J., & Retalis, S. (2013, September). Towards the use of new methods for formative e-Assessment of 21st century skills in schools. In 8th European Conference on Technology Enhanced Learning: Scaling up Learning for Sustained Impact.
- Slavin, R.E. (2011). Instruction based on cooperative learning. *Handbook of research on learning and instruction*, 358-374.
- Sugiyono. 2015. *Educational Research Methods Quantitative, Qualitative and R&D Approaches*. Bandung: Alfabeta.
- Sugiyono. (2017). *Quantitative, Qualitative and R&D Research Methods*. Bandung: Alfabeta.
- Wisudawati, AW, & Sulistyowati, E. (2019). *Science Learning Methodology (First)*. PT Bumi Aksara.