Implementation of the Jigsaw Method as an Innovative Approach in Group-Based Learning

**Pirda Aziza[1], Valbona Loshi Softa[2], Sufiyanu Haliru[3],
Vera Mandailina[1], Syaharuddin[1], Abdillah[1]**
[1]Mathematic Education, Muhammadiyah University of Mataram, Indonesia
[2]Department of Education Science Courses and Foreign Language, Wisdom University College, Albania
[3]Department of Science Education, Kebbi State University o Science Technology, Aleiro
pirdaziza34@gmail.com[1], valbonasofta@gmail.com[2], abuhaliru@gmail.com[3],
vrmandailina@gmail.com[1], syaharuddin.ntb@gmail.com[1], abdillahahmad24041983@gmail.com[1]

Abstract: This study systematically evaluates the implementation of the Jigsaw method as an innovative approach in group-based learning. The research adopts the Systematic Literature Review (SLR) methodology, aiming to identify, assess, and interpret all available research evidence with the goal of providing answers to specific research questions. Data sources were obtained through a journal search conducted using Google's international journal database, Google Scholar. The findings of the research indicate that the Jigsaw method significantly enhances student engagement, fosters social skills development, and deepens conceptual understanding. The Jigsaw process encourages collaboration and active student participation, creating an enjoyable learning environment with advantages such as mastery of content, knowledge exchange, and positive learning outcomes. However, suboptimal implementation may hinder the effectiveness of the learning process. In comparison to other methods, Jigsaw proves effective across various contexts, including mathematics education, orthopedics, and archaeology. This study affirms the crucial role of the Jigsaw method as an effective and engaging tool for group-based learning, providing practical guidance for the development of innovative and effective learning strategies. In conclusion, the Jigsaw method remains relevant and impactful, strengthening its position as a valuable approach in the context of modern education.

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A. INTRODUCTION

Education has undergone rapid development, making the implementation of teaching methods crucial in achieving effective and inclusive educational goals. One innovative approach that is gaining increasing attention is the Jigsaw method (Kusuma, 2018). This method offers a collaborative approach where learners actively participate in building knowledge through group cooperation. By dividing the learning material into sections presented by each group member, the Jigsaw method provides opportunities for students to gain a deep understanding of concepts while developing social skills such as cooperation and empathy. In this context, the research aims to explore how the implementation of the Jigsaw method can enhance the effectiveness of group-based learning and identify factors influencing the success and challenges in applying this innovative approach. Research on the Jigsaw

method indicates its potential to create a more inclusive and effective learning environment in modern education (Mari & Gumel, 2015). The Jigsaw method promotes collaboration among students and encourages active engagement in the learning process.

Group-based learning is an effective approach in contemporary education that emphasizes social interaction and enhances students' understanding of the learned (Arave & Stonebraker, 2023). In the learning process, students should be directly involved in the instructional activities to enable them to develop knowledge, critical thinking skills, and competencies (Mukminah et al., 2020) . This approach emphasizes active participation and collaboration among learners, facilitating the exchange of knowledge and experiences among them. By leveraging the diversity within groups, this approach promotes the development of social skills, problem-solving abilities, and critical thinking – crucial aspects in preparing students to face real-world challenges (Malan, 2021).

The focus of this research lies in innovative approaches to group-based learning, with the implementation of the Jigsaw method as a strategy considered relevant and effective (Mikraj, 2023). The Jigsaw method embraces the concept of cooperative learning, wherein students collaborate in small groups to master the learning material and subsequently share their knowledge with other group members. This study aims to explore the positive impact of the Jigsaw method on student interactions, the development of social skills, and a profound understanding of the learning material. Through a deeper understanding of these aspects, it is anticipated that the research will unveil the potential for developing more effective and adaptive models of group-based learning within the educational context (Journal et al., 2024).

The implementation of the Jigsaw method has been extensively researched in various contexts and has demonstrated significant positive implications. Studies have found that this method enhances student motivation, understanding of learning materials, and engagement in the learning process (Isnaeni ,2023), (Rieneke et al., 2022). Furthermore, the use of the Jigsaw method also impacts teachers' teaching practices by enriching classroom discourse (Cochon et al., 2023) and improving effectiveness in delivering instructional content. In terms of academic performance, empirical evidence indicates that the Jigsaw method is effective in enhancing students' knowledge and communication skills (Unsi & Muniroh, 2022). Research also highlights the potential of this method in fostering prosocial behavior and strengthening social relationships among students, especially in the context of heterogeneous school environments (Nalls & Wickerd, 2023). Overall, the Jigsaw method is viewed as an innovative approach that can be adopted to enhance academic outcomes and reinforce social interactions within the classroom.

Group-based learning is a novel approach that involves the training and testing of data by specific groups, utilizing collectively created and employed classifiers within the group. Evaluation is also conducted at the group level, employing specially designed assessment steps tailored for the group learning context. This approach has been widely applied across various domains such as information retrieval, contributions to public goods and collaboration (Chang & Deguchi, 2021) , fuzzy semi-supervised grouping (Jing et al., 2022), project-based learning, and remote laboratory experiments. In the context of information retrieval, the Adaboost. Group algorithm has been proposed as a method aimed at enhancing accuracy in

group-based decision-making during the training process. In project-based group learning, students engage in collaboration to complete assigned projects, promoting reciprocal assistance and cooperation among group members. In the context of remote laboratory experiments, a collaborative learning environment facilitates interaction and discussion among students within the group, enabling them to collectively discuss experimental results and deepen their understanding.

The Jigsaw method is an innovative approach that promotes collaborative learning through group cooperation (Akhiruddin et al., 2022). This method divides the learning material into several parts, presented by each group member, allowing students to understand concepts deeply while developing social skills such as collaboration and empathy (Karnidah, 2023). Group-based learning is a primary focus in contemporary education because it can facilitate social interaction and enhance students' understanding of the learned concepts (Thenu et al., 2023). This approach encourages active participation and collaboration among learners, fostering the development of social skills, problem-solving abilities, and critical thinking.

The aim of this research is to investigate the effectiveness and impact of implementing the Jigsaw method as an innovative approach in the context of group-based learning. The study will assess how the Jigsaw method can enhance social interaction among students, develop collaborative skills, and collectively reinforce the understanding of learning concepts. Additionally, the research aims to identify factors influencing the success of implementing the Jigsaw method, thereby contributing significantly to the development of more effective and innovative group-based learning strategies. With a focus on these aspects, the objective of this research is to provide in-depth insights into the potential of the Jigsaw method in enhancing the quality of collaborative learning in the educational environment. Potential of the Jigsaw method in enhancing the quality of collaborative learning in the educational environment.

B. METHOD

This research utilizes the systematic literature review (SLR) method. SLR is defined as a methodology or analytical tool that processes and gathers a set of studies for subsequent identification and analysis. This analysis can be conducted through critical review, mapping, and appreciation of various previous studies within the same topic. Therefore, SLR is highly efficient in summarizing various literature to assist researchers in addressing the research questions defined by the investigator (Athief et al., 2022). The use of SLR is deemed appropriate in this study as it is considered sufficiently structured in the systematicity of the research process and its analysis. With SLR, the synthesis of conclusions from various previous studies can be obtained much more easily. Therefore, empirical measurements, such as those performed in other studies, become irrelevant for use in this research. To conduct this research, the researcher underwent several stages.

The initial article search process was conducted on the Google Scholar portal, followed by exploration in reputable online databases such as Research Gate, SINTA, DOAJ, and Scopus, using the keywords "Implementation of the Jigsaw method as an innovative The initial article search process was conducted on the Google Scholar portal, followed by exploration in

reputable online databases such as Research Gate, SINTA, DOAJ, and Scopus, using the keywords "Implementation of the Jigsaw method as an innovative approach in group-based learning." Subsequently, a review of the protocol was performed by formulating research questions, classifying keywords according to the Population, Intervention, Comparison, Outcome, and Context (PICOC) strategy derived from the obtained articles. Inclusion and exclusion criteria were established by selecting articles that align with the research questions while disregarding the researcher's subjectivity in article selection. For the purpose of organizing the selected articles, Mendeley software was employed. The data extraction and synthesis processes involved thematic analysis and meta-analysis.

The benefits of conducting research using the Systematic Literature Review (SLR) method include the ability to identify, assess, evaluate, and interpret all available research with a specific focus on an intriguing phenomenon. The overarching stages of composing research with the SLR method consist of three main steps: the planning stage, conducting stage, and reporting stage. The planning stage involves identifying the systematic review needs, drafting a review protocol, and evaluating the review protocol. The conducting stage encompasses searching for primary review materials, selecting and screening materials for the review, extracting data from review materials, assessing the quality of review materials, and synthesizing data. The reporting stage consists of disseminating the main ideas (Rusdiana et al., 2022).

C. RESULTS AND DISCUSSION

1. Understanding the Implementation of the Jigsaw Method

The Jigsaw method is a cooperative teaching approach that has been researched in various learning situations, revealing positive impacts on both students and teachers. Studies indicate that the utilization of the Jigsaw method can transform the way teachers deliver content, shifting from an instructor-focused approach to one that prioritizes student engagement (Cochon et al., 2023). Furthermore, the application of the Jigsaw method has been proven to enhance students' ability to establish connections between mathematical concepts, argumentation skills, and comprehension of fiqh concepts (Ainiyah & Mustofa, 2022). Beyond academic achievements, the Jigsaw method holds the potential to improve social relationships among students and enhance their academic performance, making it an effective intervention for diverse student populations (Nalls & Wickerd, 2023). Consequently, overall, the Jigsaw method stands as a valuable instructional tool capable of enhancing teaching practices and student achievements across various fields of study and learning contexts.

2. The Jigsaw Method in the Context of Group-Based Learning

The Jigsaw method is a collaborative learning strategy that encourages students to develop self-directed learning skills and collaborate with their peers. This approach emphasizes a deep understanding of the material, along with active participation in discussions and problem-solving . The process involves dividing students into small groups, where each group member becomes an "expert" in a particular subject area and shares knowledge with their peers . Research indicates that this method can enhance students'

learning achievement, increase student engagement, and promote interaction among students (Tps & Prestasi, 2021). The application of the Jigsaw method can be implemented in various educational contexts, including 21st-century learning environments, with the goal of creating a collaborative and enjoyable atmosphere (Sukmawati et al., 2023). While the Jigsaw method has its advantages and disadvantages, careful consideration is required in the learning process. Overall, this method has proven to be an effective approach to group-based learning that encourages collaboration and active student engagement.

3. Advantages and Disadvantages of the Jigsaw Method

The Jigsaw method possesses several advantages. This approach fosters cooperative learning and encourages active student participation in the classroom, contributing to the development of self-directed learning skills. The method also creates an enjoyable learning environment and nurtures collaboration among students, enhancing their learning experiences. Furthermore, the Jigsaw method enables students to master a subject area and share their knowledge with group peers, fostering a deeper understanding and engagement in discussions and problem-solving activities. Additionally, research has indicated that the Jigsaw method can improve learning outcomes, as evidenced in a study on mathematics education (Hidayati, 2022). However, there are potential drawbacks that need consideration. Poorly implemented, the Jigsaw method may slow down the learning process (Darusman & Omar, 2020). Therefore, it is crucial for teachers to carefully plan and execute the Jigsaw method to ensure its effectiveness in the classroom.

4. Comparison of the Jigsaw Method with Other Learning Methods

Student-centered cooperative learning approaches promote active engagement and constructive interaction among students. This approach has been compared to traditional lecture methods and has proven to have a positive impact on student knowledge, performance, and satisfaction (Sanaie et al., 2019). In the fields of orthopedics, archaeology, and everyday life, the Jigsaw method has been applied to automate the assembly of 3D objects experiencing physical damage. This approach utilizes global and local hierarchical geometry features to match and align fracture surfaces, yielding superior performance compared to more advanced methods (Cerón et al., 2022) . In the context of medical education, the puzzle method has proven effective in enhancing self-directed learning, peer interaction, and academic performance among first-year MBBS students (Rahe et al., 2023). Overall, the puzzle method is considered an effective and engaging learning approach that fosters collaboration, self-directed learning, and peer-assisted learning.

The Jigsaw method has a significantly positive impact on teaching practices and student learning outcomes across various learning contexts. Research indicates that the implementation of the Jigsaw method can shift the classroom dynamics from a teacher-centered approach to one that emphasizes students, enhancing their understanding of concepts and skills across different subjects. Furthermore, the Jigsaw method has been proven to improve social relationships among students and positively influence their academic performance. Its usage is also found to enhance active student participation, speaking abilities, as well as fostering both independent and cooperative learning (Rahayu et al., 2023).

However, despite providing valuable insights into the benefits of the Jigsaw method, there are several gaps that need attention for further research. Firstly, most studies still primarily focus on overall student learning outcomes, without considering individual differences among students or contextual factors that may influence the implementation of this method. Secondly, further research is needed to identify the best strategies for implementing the Jigsaw method in various learning contexts and to gain a deeper understanding of the mechanisms involved in cooperative learning using this method.

From the analysis results, several gaps requiring further research in the context of implementing the Jigsaw method have been identified. Firstly, in-depth research is needed to understand the influence of contextual variables such as students' backgrounds, learning environments, and teachers' instructional approaches on the effectiveness of the Jigsaw method. Secondly, further research can explore the adaptation of the Jigsaw method according to the individual needs of students, including those with special needs or different learning styles. Lastly, future research should also focus on the application of technology by exploring how the integration of technology, such as online learning platforms or mobile applications, can enhance the implementation of the Jigsaw method and support collaboration and project-based learning.

D. **CONCLUSIONS AND SUGGESTIONS**

Based on the cited research findings, the Jigsaw method has proven to have a significantly positive impact in the context of teaching and learning. This method promotes student-centered cooperative learning, transforming classroom dynamics into a more participatory and interactive environment. Research indicates that the use of the Jigsaw method can enhance students' understanding of concepts, skills, and performance across various fields of study, ranging from mathematics to English. Additionally, the Jigsaw method strengthens social relationships among students, fostering collaboration, and reducing dropout rates. By encouraging active participation, problem-solving, and independent learning, the Jigsaw method creates an enjoyable and supportive learning environment, enhancing students' overall learning experience.

However, there are still some aspects that need further investigation to deepen the understanding of the potential and implementation of the Jigsaw method. In-depth research is required to comprehend the influence of contextual variables, personalized learning, and the integration of technology in the application of this method. Thus, the Jigsaw method is a valuable instructional tool that can enhance teaching practices and student learning outcomes across various fields of study and learning contexts. Further development in this research can provide deeper and more beneficial insights for educational practitioners in designing effective and inclusive learning strategies.

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