Jurnal Pendidikan Ilmu Pengetahuan Sosial Indonesia
Volume 10 Nomor 3 bulan September Page 388 - 397
p-ISSN: 2477-6254 e-ISSN: 2477-8427

Enhancing Students' Learning Motivation through the Jigsaw Learning Model Supported by Virtual Museum Integration

Fina Fauziyah[1*], Hayyun Lathifaty Yasri[2]

[1)] *Universitas Islam Negeri Maulana Malik Ibrahim Malang*
E-mail: finafzh0602@gmail.com

[2)] *Universitas Islam Negeri Maulana Malik Ibrahim Malang*
E-mail: hayyunlathifah@pips.uin-malang.ac.id

Abstract. This study aims to examine the effect of the Jigsaw learning model supported by virtual museum resources on students' learning motivation at MTs Mambaul Ulum. A quantitative experimental approach was employed, utilizing a pretest–posttest non-equivalent control group design. The design involved two Grade 8 classes: Class 8C served as the control group with 26 students, while Class 8D served as the experimental group with 20 students. Participants were selected using purposive sampling. Both groups underwent a pre-test prior to the intervention and a post-test following the intervention. The control group received conventional instruction, whereas the experimental group was taught using the Jigsaw model integrated with virtual museum support. A questionnaire was used to measure students' learning motivation, and the data were analyzed using an Independent Samples T-Test. The analysis revealed that the pre-test significance value (sig. 2-tailed) between the experimental and control groups was 0.383 > 0.05, indicating no significant difference prior to the intervention. However, the post-test significance value was 0.015 < 0.05, indicating a statistically significant difference between the two groups after the intervention, thereby rejecting the null hypothesis (H_0) and accepting the alternative hypothesis (H_1). The findings of this study have implications for teacher policy in designing learning that is appropriate to the characteristics of the teaching material. For students, these findings have implications for increased participation and activeness in cooperative learning.

Keywords**:** Jigsaw Model, Virtual Museum, Learning Motivation

Introduction

One aspect of attitude that is crucial to the student learning process is motivation. Motivation plays an important role in providing energy, directing, and maintaining positive student behavior to always be actively involved in the learning process and influencing student learning development (Law et al., 2019; Tasiwan et al., 2014). Students with high learning motivation tend to have a positive attitude in learning, such as focusing on following the learning process, being actively involved in class activities, often asking questions to the teacher, and always having time to study(Maison et al., 2018). The problem of student learning motivation has been widely researched and studied before. However, it remains a persistent issue across schools of various levels. In Tamam & Qomaria (2023)'s research, high school students' learning motivation remains low due to ineffective learning strategies. Learning processes have not been optimally tailored to meet student needs. Similarly, low motivation is observed at the junior high school level, attributing it to teacher-centered learning dominated by lectures (Pratiwi & Wuryandani, 2020). Likewise, at the elementary level, student

motivation remains low due to passive learning approached which lack interactive media support (Putu Suari, 2018).

The context of this study is learning motivation in social studies subjects. Social science can develop basic knowledge and skills that are useful for students in everyday life. Unfortunately, the social studies learning process still receives less attention from both teachers and students. The problem in social studies learning that is often encountered is the weak learning process. Learning is still centered on teachers; teachers are less encouraged to develop thinking skills, and learning is only directed at children's ability to memorize information (Permatasari et al., 2019). Sari & Tarigan (2017) argue that the lack of variation in the learning model used by teachers causes students to become passive during learning. Consequently, the classroom atmosphere is not conducive to learning, and students may struggle to comprehend the material presented by teachers. Monika et al. (2018) similarly observe that social studies teaching predominantly relies on conventional learning methods, such as lectures. In addition, Azizah et al (2018) also stated that the content in social studies learning is extensive and dense, utilizing rote learning methods that hinder students' understanding and retention of material in long-term memory. This significantly impacts the social studies learning process and the educational outcomes achieved by students

As one of the main components that organize the learning process, teachers play an important role in creating active, practical, interesting, and meaningful learning for students to achieve optimal learning objectives (Duchatelet & Donche, 2019; Ningrat et al., 2018. Previous studies have explored teachers' efforts to address issues of student learning motivation through various learning methods and media approaches. Recommended learning methods to overcome learning motivation problems include value clarification technique (VCT), contextual teaching and learning (CTL), make a match, problem-based learning, and survey, question, read, recite, review (SQ3R) (Ima et al., 2023; Jayanegara et al., 2024). Meanwhile, learning media such as Moodle e-learning, role-playing games (RPG), educational games, and classrooms have been identified as tools to mitigate learning motivation issues (Cachay-Gutierrez & Cabanillas-Carbonell, 2024; G. C. Kesuma, 2023; Sholichah et al., 2022; Zulherman et al., 2023).

One strategy that can be undertaken to overcome problems in learning is by providing innovation in the application of learning models and media, such as Jigsaw learning model assisted by the Virtual Museum. The Jigsaw learning model emphasizes heterogeneous group members s(Kamaruddin & Yusoff, 2019; Kumar et al., 2017). The Jigsaw model is designed to increase students' sense of responsibility for their learning and the learning of others (Anggraini, 2019; Kusuma, 2018). The Jigsaw method is an innovative and cooperative teaching method that involves active student participation, emphasizes peer cooperation, and ensures teamwork (Nurbianta & Dahlia, 2018; Sharma et al., 2019).The implementation of the Jigsaw learning model has been proven to increase student learning motivation, as previous research shows that its implementation contributes to higher learning motivation compared to conventional methods(Sulistiani et al., 2022). Lie in Sugestiningsih & Sudrajat (2018) said that students who are exposed to the Jigsaw learning model can collaborate effectively in teams, have opportunities to process information, enhance communication skills, and make learning more meaningful. Previous studies have demonstrated that the Jigsaw learning model can foster positive social relationships, increase students' self-confidence, and improve

their critical thinking skills(Costouros, 2020; Hijrihani & Wutsqa, 2015; Khalistyawati & Muhyadi, 2018).

One of the relevant learning resources applied in social studies education is virtual museum. A virtual museum is a new communication media that offers guided virtual tours led by museum staff. This virtual experience provides a unique learning opportunity and serves as an educational resource (Schweibenz, 2019). A virtual museum combines the concept of a physical museum with multimedia technology supported by the advancement in communication technology (Wulandari et al., 2021). The implementation of virtual museums allows students' potential to develop toward effective and optimal learning goals, giving them the opportunity to experience independent learning(A. T. Kesuma et al., 2020; Zeng et al., 2018). This is in line with previous research highlighting the advantages of digital learning resources, such as fostering independent learning, reducing dependence on teacher presence, and facilitating convenient access to knowledge mastery (Kang & Kim, 2021). Moreover, learning activities become more effective and efficient, thereby increasing students' interest in learning. The establishment of virtual museums facilitates easier access to historical information and knowledge for the Indonesian people, especially teachers and students, to dig deeper into information and knowledge related to the history of the Youth Pledge in Indonesia. Using the Virtual Museum requires only an internet connection and electronic devices such as laptops or smartphones, eliminating the need for transportation expenses (Rashid et al., 2021). The selection of the virtual museum as a learning medium in the implementation of the jigsaw learning model was based on previous research findings that demonstrated that virtual museums have a positive effect on increasing student learning motivation (Mitria Gistarida, 2025; Tasbihah & Suprijono, 2021). This rationale underpins the author's decision to employ the Virtual Museum at MTs Mambaul Ulum.

Based on preliminary research conducted by researchers at MTs Mambaul Ulum, there are several reasons for choosing the school as the object and place of research. First, the learning model implemented by the teacher is still in conventional learning such as lectures, questions and answers, and assignments. Second, MTs Mambaul Ulum has never used learning media using virtual museums, and the distance between the school and the museum is very far. To address this issue, implementing a jigsaw learning model assisted by a virtual museum is reommended. This research differs from previous studies by applying the Jigsaw learning model combined with Virtual Museum media at the secondary school level. Based on the background provided, the purpose of this study is to determine the influence of the Jigsaw learning model assisted by the Virtual Museum on student learning motivation at MTs Mambaul Ulum.

Method

This study uses quantitative approach and using experimental design. The instruments were analyzed through statistical procedures. The pretest-posttest non-equivalent control group design was employed by administering tests before and after the learning intervention in both the experimental and control groups. Class 8 became the population in this study with a total of 100 students divided into 4 population classes, with class 8C as the control class with a total of 26 students and class 8D as the experimental class with a total of 20 students. The selection of research subjects was determined using purposive sampling, targeting students with low enthusiasm

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during social studies classes. The assignment of experimental and control classes was done randomly through a drawing process using the random picker application.
A questionnaire was used as a research tool to measure students' learning motivation. The questionnaire items were based on several indicators of motivation proposed by Schunk et al. (2012), including task choice, effort, and persistence. Initially, Schunk et al. (2012) proposed four indicators: task choice, effort, persistence, and achievement. However, the researchers excluded the achievement indicator because it pertains to learning outcomes and is not the focus of this study. The research instruments that have been prepared need to be tested for validity and reliability. A statement/item is considered valid if the significance value is more than 0.2, as shown in the Corrected Item-Total Correlation column. An instrument is declared reliable if the significance value (α) ranges from 0.6 - 0.8 (Natanael & Sufren, 2013).
The validity test results indicated 11 out of 30 instrument items which were less than 0.2 considered as invalid. These 11 items were excluded from testing. The reliability test results state that the Conbrach Alpha's value is 0.772. This value is between the value range of 0.6 - 0.8 indicating that the instrument is reliable and suitable for further testing. The data obtained were then analyzed in two stages; the classic assumption test and hypothesis testing. The classic assumption test includes the normality test and homogeneity test. The hypothesis test was carried out using the Independent Sample t-test

Research Result

Data on learning motivation variables were obtained from the results of questionnaires administered before and after giving treatment to both the control and experimental classes. Data collection was carried out through a questionnaire consisting of 19 statements adapted from the learning motivation indicators by (Schunk et al., 2012). The following section presents the results of the pre-test and post-test in the control and experimental classes.

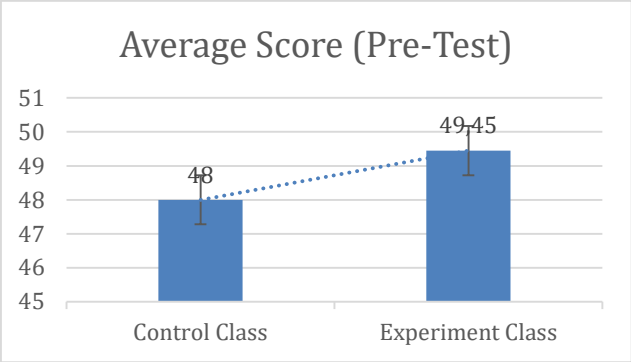

Figure 1. Average Pre-Test Score of Control and Experimental Classes

The diagram above provides an understanding that there is no significant difference between the mean pre-test score of the control class and the mean pre-test score of the experimental class. These results indicate that student learning motivation in both the control and experimental classes tends to be the same. This condition is due to the fact that the learning previously applied used the same method, the same media, and even the same teacher.

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Volume 10 Nomor 3 bulan September Page 388 - 397
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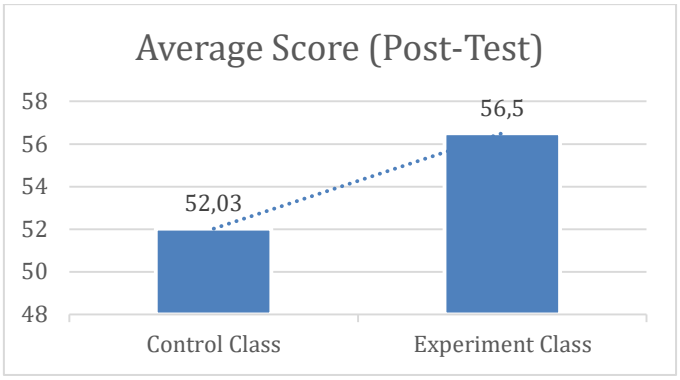

Figure 2. Average Post-Test Score of Control and Experimental Classes

The diagram above shows a significant difference between the average post-test score of the control class and the average post-test score of the experimental class. These results indicate that student learning motivation differs between the class that applied Jigsaw learning assisted by Virtual Museum and the class that applied conventional learning. The experimental class tends to have higher motivation compared to the control class. Thus, Jigsaw learning assisted by Virtual Museums plays a role in increasing student learning motivation.
The questionnaire data obtained was tested for classical assumptions in the form of a normality test and homogeneity test, followed by hypothesis testing using the Independent Sample T Test.

Table 1. Normality test results

Kolmogorov-Smirnov			
Class	**df**	**sig.**	**Description**
Pre-test (control class)	26	0,200	Normal
Post-test (control class)	26	0,126	Normal
Pre-test (experiment class)	20	0,153	Normal
Post-test (experiment class)	20	0,200	Normal

The table above shows that all data are normally distributed because the significance value is> 0.05. The data can be continued for data homogeneity testing.

Table 2. Homogenity test results

Data	**Sig**	**Probability**	**Description**
Pre-test	0,316	0,05	Homogenous
Post-test	0,253	0,05	Homogenous

The table above shows that all data are declared homogeneous because the significance value is> 0.05. The data can be continued for hypothesis testing.

Table 3. Independent Sample T-Test Results

Test	**t**	**df**	**sig. (2-tailed)**

Pre-test	0,881	44	0,383
Post-test	2,539	44	0,015

The T-test was conducted to determine the influence of the Jigsaw learning model assisted by the Virtual Museum. The provisions used in decision-making are based on the probability number: if the significance value is more than 0.05, then there is no difference in student learning motivation. If the significance value is less than 0.05, then there is a difference in student learning motivation(Kadir, 2015). Hypothesis test decision-making is based on:

- If the significance value (2-tailed) <0.05 then H0 is rejected and H1 is accepted
- If the significance value (2-tailed) > 0.05 then H0 is accepted and H1 is rejected

The table above describes the t-test value or the value of the difference test between the pre-test value of the control-experimental class and the post-test value of the control-experimental class. The significance value of the pre-test is 0.383. This value is more than 0.5 which indicates that there is no difference in the pre-test scores of the control and experimental classes. Meanwhile, the significance value of the post-test is 0.015 which is less than 0.05. This value indicates that there is a difference in learning motivation between the experimental class and the control class after treatment or H0 is rejected and H1 is accepted. It shows that the treatment carried out by researchers in the form of Jigsaw learning assisted by Virtual Museum has a significant effect on student learning motivation.

This study investigated the influenceof the Jigsaw learning model assisted by the Virtual Museum on the learning motivation of grade 8 MTs Mambaul Ulum students. The t-test results of the pre-test values of the control and experimental classes concluded that there was no significant difference in the pretest scores between the two groups. Pre-test results indicated no significant difference in initial learning motivation between the two groups. The average score for the control class was 48, while the experimental class scored an average of 49.45 which shows a difference of only 1.45 points. However, post-test results showed a significant difference in learning motivation between the groups. The control class averaged a score of 52.3, while the experimental class averaged 56.5 which shows a difference of 4.2points.

Discussion

Based on the t-test results and the research hypothesis, it can be concluded that the students who received Jigsaw learning assisted by Virtual Museum significantly showed higher learning motivation compared to the students who received conventional learning. The t-test results affirm that the implementation of Jigsaw learning assisted by Virtual Museum positively influence student learning motivation. This is attributed to the collaborative learning environment facilitated by Jigsaw with Virtual Museum, enabling students to comprehend materials collaboratively and directly experience the museum's collections related to the Youth Pledge. These findings are aligned with Evrim Ural's research on jigsaw learning in public schools in Turkey, which similarly demonstrated higher motivation among students in the experimental group compared to those taught through traditional methods (Ural et al., 2017).

Jigsaw learning model conducted by instructing students to form a small group where each member receives different material. Thus, it enables mutual assistance among

group members to understand and master their respective materials. Therefore, through Jigsaw learning assisted by Virtual Museum, students engaged in discussion activities which fosters positive social relatioship. It is aligned with wht study of Costouros (2020). Furthermore, the use of Virtual Museum enhances students' interactions with museum staff, as noted by (Coquillon & Staples, 2015), fostering additional positive relationships among peers and teachers. Students with good abilities can help other friends who do not understand the material being studied (O'Leary et al., 2019). This is also what students of class 8D MTs Mambaul Ulum do. Students help each other in understanding the material to have optimal learning outcomes and establish positive relationships with fellow friends.

Students participating in Jigsaw learning assisted by Virtual Museum are engaged in discussion activities where they can express their opinions and present them in front of their peers. Thus, students were more confident and not being passive. This statement supports the results of research conducted by Hijrihani & Wutsqa (2015) that Jigsaw learning plays a role in fostering student confidence. Discussion activities can also hone critical thinking skills when students work together in tackling a problem. This statement is in line with the results of research conducted by (Khalistyawati & Muhyadi, 2018)which claim that Jigsaw learning has a significant effect on students' critical thinking skills. In line with these findings, Azmin (2016)conducted Jigsaw learning research which showed an increase in student understanding and performance which resulted in the realization of student learning outcomes.

The use of a Virtual Museum aids students in understanding social studies material by visualizing historical processes of the Youth Pledge, making learning enjoyable and motivating for students. Students can also learn that technology is not just for entertainment purposes but can also be used in optimizing learning. This statement is reinforced by the results of research conducted by Guo et al (2019) that Virtual Museum plays a role in improving student abilities in both cognitive and non-cognitive aspects. One non-cognitive aspect that improves due to the use of virtual museums in the Jigsaw learning model is student learning motivation. These findings certainly support those of previous researchers (Mitria Gistarida, 2025; Tasbihah & Suprijono, 2021). Ariesta et al (2024) also stated that the use of the Virtual Museum contributes to increasing student engagement in social studies and strengthens their nationalistic sentiments.

The implementation of Jigsaw learning assisted by Virtual Museum on social studies at MTs Mambaul Ulum has effectively increased student learning motivation. This learning model is very relevant to be applied to social studies learning because it engages students in unique and collaborative group activities. It is aligned with Davidson & Major(2014)perspective on the Jigsaw learning model's relevance in promoting independent understanding and motivation in learning.

Conclusion

Based on the research questions and findings, it can be concluded that implementing Jigsaw Model assisted by the Virtual Museum in learning social studies has an effect on the learning motivation of class VIII students at MTs Mambaul Ulum, as indicated by the results of the Independent Sample T-Test. All in all, there is a difference in the post-test results between the experimental and control classes. This finding is

reinforced by the results of the average posttest of learning motivation which shows a significant difference between the class receiving the Jigsaw learning model assisted by Virtual Museum and the class receiving conventional learning treatment. It indicates that the Jigsaw learning model with a Virtual Museum enhances students' learning motivation.

The findings of this study have implications for selecting social studies learning models and media that can enhance student learning motivation. For students, these findings imply increased student participation in learning, thereby enhancing their learning motivation, self-confidence, and discussion skills.

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