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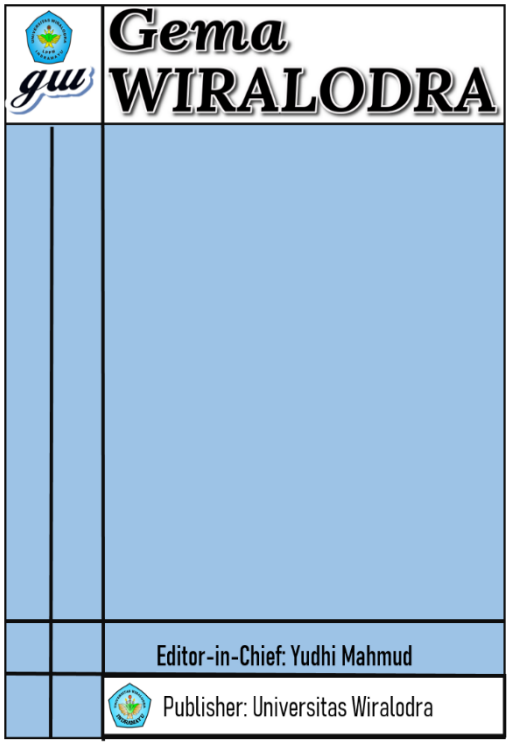

The Influence of Contextual Teaching and Learning (CTL) and Self-Confidence on Junior High School Students' Mathematics Learning Achievement

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The Influence of Contextual Teaching and Learning (CTL) and Self-Confidence on Junior High School Students' Mathematics Learning Achievement

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Abstract
This study aims to examine the influence of Contextual Teaching and Learning (CTL) and self-confidence on the mathematics learning achievement of junior high school students. Mathematics is often considered a difficult subject, and this perception is influenced by both instructional methods and students' psychological attributes, such as self-confidence. A quantitative approach with a 2×2 factorial design was employed. The sample consisted of 80 eighth-grade students selected through purposive sampling from several junior high schools. Students were categorized based on teaching method (CTL vs. conventional) and levels of self-confidence (high vs. low). Data were analyzed using a two-way ANOVA. The results showed that both CTL and self-confidence had a significant effect on mathematics achievement ($F = 8.92$, $p < 0.05$ and $F = 11.21$, $p < 0.05$, respectively). Furthermore, there was a significant interaction between teaching method and self-confidence ($F = 6.98$, $p < 0.05$). These findings suggest that the implementation of CTL is more effective for students with high self-confidence and that students' psychological readiness plays an important role in academic success. This research implies that mathematics learning should not only focus on instructional strategy but also on developing students' self-confidence. Integrating CTL with efforts to enhance student confidence can significantly improve mathematics learning outcomes in junior high schools.
Keywords: CTL, Self-Confidence, Learning Achievement, Mathematics.

1. Introduction

Education plays a fundamental role in creating a superior generation capable of facing the global challenges of the 21st century. In the current era of the Industrial Revolution 4.0 and Society 5.0, educational challenges are increasingly complex, demanding not only students' cognitive abilities, but also critical thinking, creativity, collaboration, and self-confidence. One subject that contributes significantly to the development of these competencies is mathematics. However, the reality on the ground shows that learning mathematics often presents a challenge for students, primarily due to teaching methods that are still dominated by conventional approaches and minimal attention to student psychological factors, such as self-confidence (Sanjaya, 2010; Sudrajat, 2019).

Mathematics, as a basic science, plays a crucial role in developing logical, systematic, and analytical thinking. The Ministry of Education and Culture (Kemendikbud) emphasizes the importance of mastering numeracy literacy as a key focus of the Independent Learning Program. However, student learning outcomes in mathematics in Indonesia remain relatively low. Based on the 2018 Programme for International Student Assessment (PISA) survey, Indonesia ranked 73rd out of 79 countries in mathematics literacy (OECD, 2019). This indicates that mathematics learning in Indonesia is still unable to optimize students' potential.

One factor contributing to low mathematics learning outcomes is a less contextual and teacher-centered learning approach. The conventional learning model, still dominant in the classroom, results in students being less actively involved in the learning process and

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experiencing difficulty connecting the material to everyday life (Slameto, 2013). Teachers primarily act as the sole source of information, while students play a passive role as recipients of the material. This approach is inconsistent with modern learning principles that place students as active subjects in constructing knowledge (Vygotsky, 1978).

To address this issue, the Contextual Teaching and Learning (CTL) approach is offered as an alternative solution. CTL emphasizes the connection between subject matter and students' real-life contexts so they can develop meaningful understanding (Johnson, 2007). In CTL learning, students are not only required to memorize concepts but also to understand and apply them through direct experience, group discussions, reflection, and problem-solving. This approach aligns with constructivism theory, which states that knowledge is built through experience and social interaction (Piaget, 1972; Bruner, 1966).

In addition to the learning approach, students' internal factors, particularly self-confidence, also significantly influence learning outcomes. Self-confidence is a person's positive attitude toward their ability to complete tasks or face learning challenges (Bandura, 1997). Students with high self-confidence are more confident in expressing their opinions, are less afraid of making mistakes, and tend to be more persistent and persistent in solving math problems (Lauster, 1997; Angelis, 2005). On the other hand, students who have low self-confidence will tend to avoid challenges, fear failure, and show negative attitudes towards mathematics lessons, which have a direct impact on their academic achievement. Previous research has shown that the CTL approach can improve student motivation and learning outcomes because it provides meaningful and enjoyable learning (Suyatno, 2012; Jauhar, 2011). Furthermore, the interactive and collaborative learning environment in CTL has been shown to increase student self-confidence through active engagement in group discussions and presentations. Thus, the CTL approach is relevant not only in the context of cognitive development, but also in the affective and socio-emotional development of students. However, there is still little research explicitly examining the interaction between the CTL learning approach and student self-confidence in mathematics achievement, particularly in the context of junior high school education and in areas with limited access to educational innovations, such as SMP YPPGI Bomou. Therefore, this study is crucial in providing empirical evidence regarding the effectiveness of the CTL approach and the importance of considering self-confidence in mathematics learning.

2. Method

This study employed a quantitative approach with a quasi-experimental design, specifically a 2x2 factorial design. This approach was chosen because it is able to describe the causal relationships between independent and dependent variables and the interactions between them (Fraenkel, Wallen, & Hyun, 2012). The 2x2 factorial design allowed researchers to test two independent variables: the learning model (Contextual Teaching and Learning/CTL and conventional) and student self-confidence levels (high and low), on mathematics learning achievement as the dependent variable.

The population in this study was all seventh-grade students at SMP YPPGI Bomou in the 2024/2025 academic year. The population consisted of 60 students spread across two parallel classes. The sampling technique used was random sampling. One class (30 students) served as the experimental group, receiving CTL instruction, and the other class (30 students) served as the control group, taught using conventional learning methods. Furthermore, based on self-confidence scores measured by a questionnaire, each group was divided into two subgroups: students with high and low self-confidence. The research instrument is a Self-Confidence Questionnaire. This instrument is used to measure students' level of confidence in mathematics learning. The questionnaire consists of 20 statements with a 5-point Likert scale, ranging from

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"Strongly Disagree (1)" to "Strongly Agree (5)". This instrument is compiled based on self-confidence indicators developed from Lauster's theory (1997), and has been tested for validity and reliability. The second instrument is the Learning Achievement Test. This test is used to measure students' mastery of mathematics material after learning treatment. The form of the questions is a multiple choice of 20 items with 4 answer options. The questions are compiled based on learning indicators and have been tested for content validity by material experts. The collected data were analyzed using a two-way analysis of variance (Two-Way ANOVA). This technique is used to determine: The main effect of the learning model on learning achievement, the main effect of the level of self-confidence on learning achievement and the interaction between the learning model and self-confidence on student learning achievement. Before conducting ANOVA, the prerequisite analysis tests were first carried out, namely: Normality test using the Kolmogorov-Smirnov method, Variance homogeneity test using the Levene test. If the ANOVA results show significant differences, it is continued with further testing (post hoc) using the Tukey HSD method to find out which groups are significantly different.

3. Results and Discussion

This study involved two treatment groups: an experimental group taught using Contextual Teaching and Learning (CTL) and a control group taught using conventional learning methods. Each group consisted of 30 students. After the lesson, students were given a mathematics achievement test. The average learning outcomes for each group are shown in Table 1:

Table 1.

Average Learning Achievement Based on Learning Model and Self-Confidence

Learning model	Confidence	Number of students	Average
CTL	Tinggi	15	83.47
CTL	Rendah	15	77.93
Konvensional	Tinggi	15	75.20
Konvensional	Rendah	15	69.47

The table 1 shows that students with high self-confidence scored higher than those with low self-confidence. CTL learning resulted in higher average scores than conventional learning, for both students with high and low self-confidence. To determine the significance of the influence between learning models, self-confidence, and their interaction on learning achievement, a two-way ANOVA test was used. The results of the analysis are shown in Table 2.

Table 2.

Summary of Two-Way ANOVA Results on Learning Achievement

Source	Type III Sum Of Squares	df	Mean Squares	F	Sig
Corctes Model	9052.162	3	3017.367	26.938	000
Intercept	795377.275	1	795377.275	7626.011	000
Pembelajaran	1538.355	1	4536.355	14.753	000
Kepercayaan diri	2543.580	1	2543.580	24.3984	000
Pembelajaean *Kepercayaan diri	2111.689	1	2111.689	20.252	000
Error	15432.049	148	104.271		
Total n	1042600.000	152			
Corected Total	24484.211	151			
a. R Squared = 370 (adjusted R squared = 357)					

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The statistical analysis using a two-way ANOVA for the first hypothesis test yielded a calculated F-value of 14.753 with a significance level of 0.000. Because the significance level is less than 0.05, H1 is accepted and H0 is rejected, indicating a difference in learning achievement between students taught using CTL and conventional learning in Mathematics. Using the two-way ANOVA formula in SPSS version 13 to test the second hypothesis, the calculated F-value was 24.394 with a significance level of 0.000. Because the significance level is less than 0.000, H1 is accepted and H0 is rejected, indicating a difference in learning achievement between students with high and low self-confidence in Mathematics. Using the two-way ANOVA statistical technique for the third hypothesis test, the calculated F-value was 20.252 with a significance level of 0.000. Because the significance level is smaller than 0.05, H1 is accepted and H0 is rejected, so there is an interaction between the use of Contextual Teaching and Learning (CTL), conventional learning and self-confidence towards the mathematics learning achievement of Class VII students of SMP YPPGI Bomou.

The use of the CTL approach makes learning more meaningful and realistic. This means that students are required to grasp the connection between learning experiences at school and real life. This is crucial because by being able to correlate the material they encounter with real life, not only does the material become firmly embedded in their memory, making it more difficult to forget. Meanwhile, the conventional approach has fundamental weaknesses: learning relies on memorization, the value of information is dependent on the teacher, students are inactive, and they are treated merely as information (Jauhar, 2011). This study demonstrated that, based on statistical analysis using a Two-Way ANOVA, the first hypothesis was tested with the results: H1 was accepted and H0 was rejected. This indicates a difference in student achievement in Mathematics between students taught using CTL and conventional learning. The analysis also revealed that students taught using CTL achieved higher average scores than those taught using conventional learning. This indicates that the use of CTL learning yields better results. It can be concluded that the use of CTL learning and conventional learning impacts student achievement. Differences in learning achievement between students with high self-confidence and those with low self-confidence in mathematics Self-confidence can foster positive emotions. A person with self-confidence is more likely to have a positive attitude and be able to control themselves when facing pressure. Self-confidence can facilitate concentration. Therefore, the teacher and students are not active, and students are only required as recipients of information (Jauhar, 2011). This study proved that, based on statistical analysis using a two-way ANOVA, the first hypothesis was tested with the results: H1 was accepted and Ho was rejected. This indicates that there is a difference in learning achievement between students taught using CTL learning and conventional learning. This indicates that the use of CTL learning produces better results compared to conventional learning. From the results of this study, it can be concluded that the use of CTL learning and conventional learning has an effect on student learning achievement.

Self-confidence can foster positive emotions. A person with self-confidence is more likely to have a positive attitude and be able to control themselves when facing pressure. It can facilitate concentration. Therefore, as a teacher, students are not actively involved, and students are treated merely as recipients of information (Jauhar, 2011). This study, based on statistical analysis using a two-way ANOVA, proved that H1 was accepted and H0 was rejected. This suggests that there is a difference in student achievement between students taught using CTL and conventional learning in mathematics. The analysis also revealed that students taught using CTL achieved higher average scores than those taught using conventional learning. This indicates that CTL learning produces better results than conventional learning. From this study, it can be concluded that both CTL and conventional learning influence student achievement.

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Self-confidence can foster positive emotions. A person with self-confidence tends to be calmer and more self-controlled when facing pressure. Self-confidence facilitates concentration. Therefore, someone with self-confidence finds it easier to focus on the task at hand (Weinberg & Gould, 2003). A good level of self-confidence facilitates decision-making and paves the way for making friends, building relationships, and helping us maintain success in learning or work. This indirectly impacts students' academic achievement. Active students tend to have better grades and academic achievement, although their IQs sometimes fall below those of students with high IQs who are inactive in class (Ngalim Purwanto, 1987). This study demonstrated that, based on statistical analysis using the Two-Way ANOVA formula in SPSS Ver.25, the second hypothesis test yielded results that H1 was accepted and H0 was rejected. This suggests that there is a difference in the learning achievement of students with high and low self-confidence in mathematics. The analysis also showed that students taught using CTL demonstrated higher self-confidence than those taught conventionally. Therefore, it can be concluded that using CTL can increase students' self-confidence in learning.

4. Conclusion

Based on the research results and data analysis, the following conclusions can be drawn: There is a difference in mathematics learning achievement between students taught using the Contextual Teaching and Learning (CTL) model and those taught using conventional learning. Students taught using CTL have higher average learning achievement. There is a difference in mathematics learning achievement between students with high self-confidence and those with low self-confidence. Students with high self-confidence demonstrate better learning achievement. There is an interaction between the learning model (CTL and conventional) and self-confidence levels on mathematics learning achievement. This means that the influence of the learning model on learning achievement depends on the student's level of self-confidence.

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