Journal of Mathematics Science and Computer Education
https://ppjp.ulm.ac.id/journals/index.php/jmsc-edu/index
e-ISSN: 2807-9167 p-ISSN: 2807-9329
Vol 5 No 1 2025
DOI: https://doi.org/10.20527/jmscedu.v5i1.14793

Learning Transformation with the RWRS Model on Metacognitive Skills and Learning Outcomes of Students

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Article Info

Article history:
Received: February 14, 2025
Accepted: May 18, 2025
Published: May 31, 2025

Keywords:
Learning outcomes
Learning transformation
Metacognitive skills
RWRS model

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Abstract

This study is based on high school students' low metacognitive skills and learning outcomes. The solution to this problem is to apply the RWRS learning model. The RWRS learning model has stages that can empower students' metacognitive skills through the Reading, Writing, Reflecting, and Sharing stages. This study aimed to determine the effect of the RWRS learning model on metacognitive skills and student learning outcomes. The type of research is a quasi-experimental pre-test and post-test study group design. The sample consisted of an experimental class and a control class. Data analysis with ANCOVA. The instruments used were a pre-test, a post-test, and the MAI questionnaire. The ANCOVA test of metacognitive skills showed a significance value of 0.000 <0.05, which means that the RWRS model affects metacognitive skills. The results of the ANCOVA test on student learning outcomes showed a significance of 0.702> 0.05, which means that the RWRS model does not affect student learning outcomes. The conclusion is that the RWRS learning model has an effect on students' metacognitive skills but does not have an effect on students' learning outcomes.

To cite this article: Nadia, S., Siswati, B. H., Fiarani, H. S., & Bernal, R. A. D. (2025). Learning transformation with the rwrs model on metacognitive skills and learning outcomes of students. *Journal of Mathematics, Science, and Computer Eductaion*, 5(1), 23-32.

INTRODUCTION

Education is a process aimed at developing human skills to reach a certain quality, individually and socially. One of the key factors in achieving educational goals is the classroom learning process (Amah et al., 2023; Kalin et al., 2017; Madani, 2019). Learning objectives are fulfilled when the quality of teaching improves. The application of learning models must align with the content and intended learning outcomes (Ekowati et al., 2023; Khalil & Elkhider, 2016). Metacognitive skills are necessary for managing students' knowledge so they can set learning goals and strategies appropriately (Bae & Kwon, 2021; (Risti et al., 2022).

Student learning outcomes represent academic achievements gained through assignments, tests, and active participation in the learning process, expressed in scores. Optimal learning outcomes enable students to compete in various societal activities (Dakhi et al., 2020). Learning outcomes serve as indicators of the success or failure of the learning process and guide teachers and educators in decision-making. Based on these outcomes,

teachers can assess and evaluate the models, methods, and media used in teaching (Apriyuliza et al., 2023).

Metacognition originates from the word "metacognition," where "meta" means beyond and "cognition" means what is known or thought. Metacognitive skills involve regulating active learning behaviors such as planning, monitoring, organizing, and controlling cognitive procedures. Students who can select proper steps, plan, and monitor their learning progress are engaging in meaningful learning and are better able to handle problems in the learning process (Swastika et al., 2022).

Metacognitive skills are related to student activities, task complexity, and problem-solving processes. Students with good metacognitive skills can solve problems effectively because they know their thinking processes (Susanti et al., 2020). These skills help students manage their learning strategies (Marantika et al., 2021; Siswati et al., 2023). Optimally developed metacognitive skills enhance the effectiveness of the learning process and students' understanding (Hutabarat et al., 2019; Siswati et al., 2021).

Reading and writing often focus on mastering cognitive concepts through objective written tests in teaching and learning. On the other hand, metacognitive skills are less developed, causing students to memorize rather than understand the material (Annisa et al., 2023). Due to a lack of metacognitive skills, students are seen as unable to assess, monitor, or solve their problems. As a result, they may appear passive in class and perform poorly in assessments (Siswati et al., 2020).

This issue can be addressed by implementing a learning model that motivates students during lessons (Risti et al., 2022). The RWRS model is a way to improve metacognitive skills and learning outcomes. Through the RWRS stages (Reading, Writing, Reflecting, and Sharing), students can enhance their metacognitive skills and academic performance, as these stages are designed to empower thinking skills (Siswati et al., 2020).

There are four stages in RWRS. The first, reading, can increase learning motivation (Annisa et al., 2023). Reading has the potential to enhance metacognitive skills and foster active and independent readers (Razkane et al., 2023). The second stage, writing, involves summarizing content in one's own words based on what has been read (Rosdiana & Mahajane, 2024). The RWRS model incorporates reading and writing as tools for developing metacognitive skills. Reading can measure the effectiveness of metacognitive skills, as it directly affects learning outcomes (Erlin, 2021).

The third stage, reflecting, aims to evaluate students' understanding of the material. Students can refine, develop, and enhance their skills during the learning process at this stage, leading to a deeper and more structured understanding (Chang, 2019). The fourth stage, sharing, involves students working in groups and interacting with peers, which benefits the learning process (Siswati et al., 2020). Sharing is important in increasing student engagement and contributes to developing their critical thinking skills (Kuswara et al., 2023). This stage allows students to express their learning outcomes critically (Siswati & Suratno, 2024). This study aims to determine the impact of the RWRS learning model on the metacognitive skills and learning outcomes of students at SMAN 3 Jember.

METHODS

This study applied a quantitative approach using a quasi-experimental method with a pre-test and post-test study design. The population consisted of all 11th-grade students at SMAN 3 Jember, from which two classes were selected as samples—one experimental class and one control class. The research data were obtained through observation to monitor and observe student responses during the learning process. Documentation was used to collect various data sources, including student test results (pre-test and post-test) and the

MAI (Metacognitive Awareness Inventory) questionnaire, covering planning, monitoring, evaluation, and revising stages.

The data collection technique began with analyzing the sample through prerequisite tests, namely the normality and homogeneity tests, to determine the experimental and control classes. A pre-test and questionnaire were administered to both classes to obtain baseline data on students' initial abilities. The experimental class underwent learning using the RWRS model (Reading, Writing, Reflecting, and Sharing), while the control class used a conventional model, each over two sessions in one week. Post-tests and questionnaires were then given to both classes to obtain the research data. The research instruments included pre-test and post-test questions and the MAI questionnaire. Data analysis was conducted using ANCOVA (Analysis of Covariance). The research design is shown in Table 1.

Table 1 Research design

Class	*Pre-test*	Treatment	*Post-test*
XI.1	O_1	✓	O_2
XI.2	O_1	X	O_2

Information:
O_1 : Pre-test results
O_2 : Post-test results
✓ : RWRS learning model treatment
X : Conventional model treatment

The research variable is shown in Table 2.

Table 2 Research variable

No	Variable Type	Variable	Indicator
1.	Independent Variable	Learning Model	Reading, Writing, Reflecting, and Sharing
2.	Dependent Variable	Metacognitive Skills	MAI Questionnaire (Metacognitive Awareness Inventory) dengan indicator Planning, Monitoring, Evaluation, Revising
		Learning Outcomes	Pre-test and post-test
3.	Control Variable	Grade XI Students Human Digestive System	Experimental and control classes

RESULTS AND DISCUSSION

Metacognitive Skills

The average metacognitive skills score results are shown in Table 3.

Table 3 Average metacognitive skills scores

Class	Students	Before	Category	After	Category	Difference
Experimental	36	62.8	Fair	81.7	Very high	18.9
Control	36	62.4	Fair	75.7	High	13.3

Based on the post-intervention MAI questionnaire results in Table 3, the experimental class scored 81.7, categorized as "very high," while the control class scored 75.7, categorized as "high." This indicates that the average MAI score in the experimental class outperformed the control class. The relationship map between the RWRS learning model and metacognitive skill stages is shown in Figure 1.

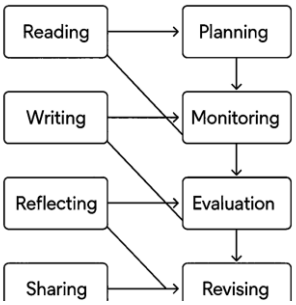

Figure 1 Relationship map of the RWRS learning model and stages of metacognitive skills

Prerequisite Tests

The results of the normality test of the metacognitive skills questionnaire are shown in Table 4.

Table 4 Normality test results for metacognitive skills questionnaire

Class	Statistic	df	Sig.
Before Experiment	0.943	36	0.062
After Experiment	0.949	36	0.099
Before Control	0.964	36	0.289
After Control	0.949	36	0.100

All significance values are greater than 0.05, indicating that the data are normally distributed. The results of the homogeneity test of the metacognitive skills questionnaire are shown in Table 5.

Table 5 Homogeneity test results for metacognitive skills questionnaire

		Levene Statistic	df1	df2	Sig.
Before	Based on Mean	1.183	1	70	0.281
After	Based on Mean	3.029	1	70	0.086

Table 5 shows that the data are homogeneous since the significance values are greater than 0.05. The next step is data analysis using ANCOVA to determine the influence of the variables. The results of ANCOVA on the metacognitive skills are shown in Table 6.

Table 6 ANCOVA results on metacognitive skills

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	751.606	2	375.803	9.854	0.000
Intercept	2663.118	1	2663.118	69.832	0.000
Pre-test	85.481	1	85.481	2.241	0.139
Class	649.253	1	649.253	17.025	0.000
Error	2631.380	69	38.136		
Total	450053.000	72			
Corrected Total	3382.986	71			

a. R Squared = 0.224 (Adjusted R Squared = 0.202)

Table 6 shows that the significance value of 0.000 < 0.05 indicates a significant difference between the two classes, suggesting that the RWRS learning model affects students' metacognitive skills. This finding aligns with research by Siswati et al. (2020), which stated that the RWRS model includes stages proven to empower students' metacognitive skills. In the RWRS learning stages, students are trained to plan, monitor, evaluate, and revise, corresponding to the stages in metacognitive skills. According to

Schraw and Dennison (1994) in Fuldiaratman (2021), metacognitive skills involve planning, monitoring, evaluating, and revising during learning activities.

According to Bae and Kwon (2019) and (Siswati et al., 2020), every individual must possess metacognitive skills because they are essential. Metacognitive skills play a role in the learning process and provide benefits in everyday life by helping individuals plan, monitor, and evaluate their thinking processes and decision-making. The RWRS learning model is carried out in four stages. The first stage is Reading. In their research, Annisa et al. (2023) stated that students can gain new knowledge through reading activities. Reading is related to the planning phase of metacognitive skills, allowing students to apply these skills through the reading process.

The second stage is Writing. At this stage, students write a summary of what they have read. Yundiani et al. (2023) stated that in writing activities, students can plan, organize (monitor), and evaluate their work. These activities help develop their metacognitive skills. The third stage is Reflecting. During this stage, students carry out evaluation and revision, which helps refine, develop, and enhance their metacognitive skills in the learning process (Chang, 2019).

The fourth stage is Sharing. The key aspect of the sharing activity is the social interaction between the presenter and the audience to enhance initiative among students (Irzawati, 2023). In their study, Kuswara et al. (2023) stated that during the sharing activity, students can revise their work through discussions, which fosters enthusiasm during the teaching and learning process and empowers metacognitive skills through critical thinking. This shows that the stages of the Reading, Writing, Reflecting, and Sharing (RWRS) learning model align with those involved in metacognitive skills.

Learning Outcomes

The average learning outcomes are shown in Table 7.

Table 7 Average learning outcomes

Class	Pre-test	Post-test	Difference
Experiment	52.08	84.30	32.22
Control	54.30	84.16	29.86

The results for the experimental class show an average pre-test score of 52.08 and a post-test score of 84.30, with a difference of 32.22. The control class had an average pre-test score of 54.30 and a post-test score of 84.16, with a difference of 29.86. Based on the average post-test scores, the experimental class achieved slightly higher results than the control class.

Assumption Testing

The results of the student learning outcomes normality test are shown in Table 8.

Table 8 Normality test of students' learning outcomes

Class	Statistic	df	Sig.
Pre-Experiment	0.943	36	0.399
Post-Experiment	0.949	36	0.058
Pre-Control	0.964	36	0.076
Post-Control	0.949	36	0.060

Table 8 shows that the experimental class had a pre-test significance value of 0.399 and a post-test value of 0.058. The control class had a pre-test value of 0.076 and a post-test value of 0.060. All significance values are > 0.05, indicating that the data are normally distributed.

The results of the Homogeneity test of students' learning outcomes are shown in Table 9.

Table 9 Homogeneity test of students' learning outcomes

		Levene Statistic	df1	df2	Sig.
Pre-test	Based on Mean	1.131	1	70	0.718
Post-test	Based on Mean	0.518	1	70	0.474

Table 9 shows that a pre-test significance value of 0.718 and a post-test value of 0.474. These values are > 0.05, indicating homogeneity. Subsequently, ANCOVA was used to analyze whether there was an effect from the two variables. The results of the ANCOVA test on student learning outcomes are shown in Table 10.

Table 10 ANCOVA test of students' learning outcomes

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1704.843	2	852.421	10.179	0.000
Intercept	26272.353	1	26272.353	313.733	0.000
Pre-test	1704.496	1	1704.496	20.354	0.000
Class	12.336	1	1704.496	0.147	0.702
Error	5778.143	69	83.741		
Total	518375.000	72			
Corrected Total	7482.986	71			

a. R Squared = 0,228 (Adjusted R Squared = 0,205)

Table 10 shows that a significance value of 0.702 (> 0.05), which means the RWRS learning model did not significantly affect students' cognitive learning outcomes. This finding contrasts with Siswati et al. (2020), who found that the RWRS model can influence students' cognitive learning outcomes. However, several factors may explain why the RWRS model did not significantly impact students' learning styles and the duration of the RWRS model implementation during the study.

The RWRS learning model consists of four stages. The first stage is Reading, which helps students understand texts to gain information and knowledge (Zetty, 2021). According to Azizah and Darmawan (2024), reading ability contributes to learning outcomes, and students with a strong reading interest tend to achieve higher academic performance. However, this current study does not align with their findings, as high reading interest did not directly correlate with improved learning outcomes. A contributing factor may be the differences in students' learning styles, which play an essential role in the learning process (Aprilia et al., 2022).

The second stage is Writing. Writing summaries can help students better understand the information read (Ramadi & Nurhalisa, 2022). According to Arofa et al. (2023), effective summary or note-taking skills indicate improved learning outcomes. However, this study contradicts those findings, as frequent reading and summarizing by students did not directly improve learning outcomes—likely due to other influencing factors in the learning process. The third stage is Reflecting. In line with Maulani et al. (2023), reflection helps students recognize their mistakes or misunderstandings, which can impact learning outcomes.

The fourth stage is Sharing. According to Awaluddin (2023), during sharing activities, students are encouraged to exchange information with peers through discussions and presentations, promoting classroom engagement. Idos and Sulaiman (2022) also noted that discussions do not solely influence learning outcomes, but by other factors such as students' preparation and the lack of specific motivational support (Kholik, 2022).

The RWRS model emphasizes learning stages focused on the direct understanding of the material. However, the degree to which each student absorbs material varies, depending on their learning styles (Aprilia et al., 2022). Consistent with Andiansah (2024), some

students think quickly and grasp material easily, while others with slower cognitive processing need more time or repetition to understand teacher explanations.

Another factor that may explain the lack of significant results is the short duration of RWRS implementation in the study school. According to Nugraha et al. (2023), the effectiveness of a learning model depends not only on its stages and methods but also on the amount of time students are given to adapt to the new model.

CONCLUSION

a) The RWRS learning model affects students' metacognitive skills, as indicated by a significance value of 0.000 (sig < 0.05). b) The RWRS learning model does not affect students' cognitive learning outcomes, as indicated by a significance value of 0.702 (sig > 0.05).

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization, SN and BHS; methodology, BHS and HSF; formal analysis, SN and HSF; investigation, SN, HSF, and RADB; resources, BHS; data curation, SN and HSF; writing—preparation of the original draft, SN and RADB; writing—review and editing, BHS; supervision, BHS; project administration, BHS.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to the Department of Education and the participating schools for their invaluable support and facilitation during the implementation of this research. Their cooperation and assistance greatly contributed to the successful completion of this study.

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