International Journal of Trends in Mathematics Education Research
Vol. 6, No. 2 (2023), pp. 96~101
ISSN 2621-8488 (online)
DOI: https://doi.org/10.33122/ijtmer.v6i2.220

SAINTIS publishing

Research Article

# The effect of reciprocal learning and self-efficacy on students learning outcomes at the University of Muhammadiyah Jember

**Qurrota A'yun[1]*, Luluk Handayani[1], Dimas Anditha Cahyo Sujiwo[2], Inayatul Maula[3], Restu Aulia Rahma[3]**
[1] Lecturer, Department of Informatics Engineering, University of Muhammadiyah Jember, Jawa Timur, Indonesia, 68121
[2] Lecturer, Department of Mathematics Education, University of PGRI Argopuro Jember, Jawa Timur, Indonesia, 68121
[3] Student, Department of Informatics Engineering, University of Muhammadiyah Jember, Jawa Timur, Indonesia, 68121
*Corresponding Author: cahyodimas10@gmail.com | Phone Number: +6285258850610

*Received: 20 April 2023* *Revised: 22 May 2023* *Accepted: 20 June 2023* *Available online: 30 June 2023*

## ABSTRACT

Every learning activity must involve students so that they can experience what they are learning. In order to achieve the best learning results, students must be actively involved in learning activities. Reciprocal learning is an independent learning activity in learning subject matter as well as an active and creative role as an educator in conveying all information to his friends. The existence of student confidence in active and independent learning will have a positive effect on student learning outcomes. Instruments used in the form of questionnaires and tests. The questionnaire is in the form of a number of written questions used to obtain information from the respondent, while the test is in the form of a list of questions or items. The analysis in this study uses multiple linear regression tests. The results of the study show that: (1) there is a significant influence between the use of reciprocal learning and the learning outcomes of IT students at the Muhammadiyah University of Jember; (2) there is a significant influence between self-efficacy and the learning outcomes of IT students at the Muhammadiyah University of Jember; and (3) there is an effect of the use of reciprocal learning and self-efficacy simultaneously or together on the learning outcomes of IT students at the Muhammadiyah University of Jember.

**Keywords:** Reciprocal Learning; Self Efficacy; Learning Outcomes;

## 1. INTRODUCTION

Education encourages the development of various aspects of life in the learning process, which directly affect human life. Human life depends on education because it helps raise the standard of human resources (HR). To create a learning process that meets expectations, various facilities are needed, as well as the support of competent educators (Munna & Kalam, 2021; Ordu, 2021; Ristiani, 2021). However, in practice, the learning process does not always run smoothly; a number of problems arise that must be addressed to ensure that the conditions in the learning process are created in such a way as to achieve the desired goals and produce the best results.

According to (Saputra, 2015), in determining learning outcomes, the learning process is equally important. So that the knowledge gained can be internalized by students and become the basis for independent and continuous learning, teachers and students collaborate to share and process information during the learning process. Learning is an active process where student learning activities interact with teacher teaching activities. Student learning activities thus play an important role in the process of practicing learning. The learning model used needs to be considered because it has an impact on student success. Therefore, teachers must be able to create a productive learning environment that encourages student participation in educational activities. Students will have a positive impression of learning if a pleasant learning environment is created, which allows the best learning outcomes to be achieved.

Learning is the process by which experience modifies or reinforces behavior. Using this perspective, learning is an activity and process rather than having goals or outcomes. The process of acquiring new knowledge, abilities, and attitudes is known as learning. (Nugroho & Warmi, 2022) Learning is a process of psychological change, especially changes in behavior as a result of interaction with the environment to meet needs. Learning includes more than just remembering; it also includes experiencing. Every learning activity must engage students so that they can experience what they are learning. Therefore, to achieve the best learning outcomes, students must be actively involved in learning activities.

Students can be actively involved in the learning process by using student-centered learning strategies, as seen in the description above. One of the most enjoyable academic activities for students is learning together. One of the appropriate learning models is the reciprocal teaching-learning model (Sandopa et al., 2022). Reciprocal learning is a learning method that can help students understand what they are learning. The reciprocal learning model employs four learning strategies: summarizing the materials, creating questions and attempting to respond to them, educating friends about what they have learned, and anticipating the next question in a problem that the teacher has presented. (Erwanto et al., 2018). With the use of reciprocal learning, it is hoped that it will help students acquire skills and understand subject matter in the learning

process so that they can carry out activities such as summarizing, clarifying, predicting, and responding to what they have read from their lessons.

Reciprocal teaching is learning that is carried out so that learning objectives are achieved through an independent learning process. The reciprocal teaching model has four learning stages, namely: 1) summarizing, 2) questioning, 3) clarifying, and 4) predicting (Manala, 2019; Saswandi, 2018; Sundahry et al., 2018). With reciprocal learning, educators teach students important cognitive skills by creating learning experiences, modeling certain behaviors, and then helping students develop these skills on their own with encouragement. and support.

Students who are capable of learning independently have the disposition and capacity to engage in active learning activities that are motivated by the desire to advance a competency that they already possess. A student is said to have independent learning if he has his own will to learn, is able to solve problems in the learning process, has responsibility in the learning process, and has self-confidence in each learning process. Student independence in the learning process will produce maximum learning outcomes (Metekohy et al., 2022; Triningsih et al., 2021; Sele et al., 2023; Sukatin et al., 2023). The courage of students will be carried over to the learning process through their involvement in each of their learning activities.

Independence will come to students as a result of their participation in the learning process. With the use of reciprocal learning, students will feel safer. Students' self-efficacy will increase, giving them more assurance when engaging in academic activities. Students' high levels of self-efficacy will undoubtedly have an impact on their academic performance. The belief that one can coordinate skills and abilities to achieve goals in order to achieve favorable academic results is known as self-efficacy. The ability to handle and solve problems on your own can be very helpful. Confidence also affects how stressed and anxious a person feels, including during certain activities. Students who have a high level of self-efficacy will have a greater chance of succeeding in achieving their learning goals.

## 2. RESEARCH METHOD

The approach used is a quantitative one, and the type is correlational. The analysis of the research data focuses on hypothesis analysis, namely simple linear regression analysis and multiple linear regression. A simple analysis is used to measure whether there is an influence or not between 1) reciprocal learning variables and student learning outcomes and 2) self-efficacy variables and student learning outcomes. while the multiple linear regression analysis is used to measure the influence between the variable variables, namely reciprocal learning and self-efficacy, on the dependent variable, namely student learning outcomes. To facilitate the completion of the analysis and the accuracy of the data, researchers used SPSS 23. The research design uses a paradigm approach to the relationship between two independent variables, namely reciprocal learning and self-efficacy variables, which have a relationship with one dependent variable, namely the student learning outcome variable, which is called the dependent variable.

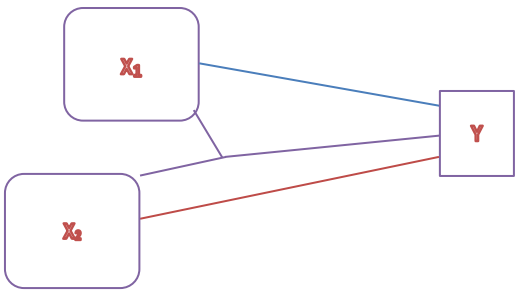


**Figure 1**. Research Model

Before conducting data analysis, researchers tested the instrument to determine its validity and reliability. The validity and reliability used in this study were tested using student response questionnaires using reciprocal learning, student self-efficacy questionnaires, and test questions. Questionnaires can be declared valid when measured or statistically the rcount value is greater than the r-table value and is positive, while reliability is used to determine the consistency of a question (Sujiwo & A'yun, 2020). The reliability test can be determined by Cronbach's alpha coefficient, namely the reliability coefficient, which can show how well the items in a group are positively correlated with one another. then carry out normality tests and classical assumption tests in the form of multicollinearity tests, heteroscedasticity tests, and autocorrelation tests.

**Table 1**. Interpretation of Reliability Value

| Intervals | Descriptions |
|---|---|
| $r \leq 0.20$ | Very low reliability |
| $0.20 < r \leq 0.40$ | Low reliability |
| $0.40 < r \leq 0.60$ | Moderate reliability |
| $0.60 < r \leq 0.80$ | High Reliability |
| $0.80 < r \leq 1.00$ | Very High Reliability |

# 3. RESULTS AND DISCUSSION

## 3.1. Results

The research sample is made up of IT students at the Muhammadiyah University of Jember, with a sample size of 29 students. This sample was used as research respondents as a response to reciprocal learning activities and student self-efficacy in learning activities, as well as data for obtaining learning outcomes through tests carried out after participating in learning activities. The number of student response questionnaires used to determine student responses to reciprocal learning and student self-efficacy questionnaires totaled 16 statements, while the tests used amounted to 5 questions. In carrying out the analysis, researchers used SPSS

### *a. Validity and Reliability Test*

The instrument was tested first to determine its validity and reliability. The validity and reliability of the methods used in this study were tested using test questions and student response questionnaires:

#### 1. Reciprocal Learning

In testing the validity of using reciprocal learning with a total of 16 questionnaire items, the decision is made that the data will be valid if the value of $t_{count} > r_{table}$. The number of samples is 29; the r table value is 0.3673. There are two items that are invalid because the value of r-count in the r table is invalid, namely in items 7 and 12, where the value of r-count is 0.033 and 0.364, both of which are 0.3673 (invalid). That way, for the reciprocal learning questionnaire, 14 questions that have validity will be used. On reliability, the Cronbach's alpha value in this study was 0.966, which was more than 0.6, so it was said to be reliable. Based on the range of value interpretation intervals in the table, it is included in "very high reliability.

**Table 2**. Reciprocal learning reliability test

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | N of Items |
| .966 | 16 |

#### 2. Self-efficacy

The validity test on self-efficacy obtained is valid for all questions. With the results of using SPSS for the self-efficacy questionnaire, 16 questions will be used because all of the questionnaire questions are valid. In the reliability test, if the Cronbach's alpha value was 0.971 and greater than 0.6, it was said to be reliable. Based on the range of value interpretation intervals in the table, it is included in "very high reliability.

**Table 3**. Self-efficacy reliability test

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | N of Items |
| .971 | 16 |

#### 3. Test

In the test item test, it was found that all five test items were more than 0.3673 (valid). With the results of using SPSS assistance for the validity of the questions, all five questions will be used because all the test questions are valid. Based on Cronbach's alpha for this test item, it is 0.886 and more than 0.6 (reliable). Based on the range of interpretation intervals, this value indicates that it is in the very high reliability category.

**Table 4**. Reliability of test items

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | N of Items |
| .886 | 5 |

### *b. Conditional Test*

Before carrying out the analysis with regression, the analysis requirements were tested first. Test requirements analysis, including:

#### 1. Normality test

**Table 5**. Normality

One-Sample Kolmogorov-Smirnov Test

| | | Unstandardized Residual |
|---|---|---|
| N | | 29 |
| Normal Parameters[a,b] | Mean | .0000000 |
| | Std. Deviation | 14.53175676 |
| Most Extreme Differences | Absolute | .087 |
| | Positive | .080 |
| | Negative | -.087 |
| Test Statistic | | .087 |
| Asymp. Sig. (2-tailed) | | .200c,d |

a. Test distribution is Normal.
b. Calculated from data.

c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Based on the Kolmogorov-Smirnov test of normality with the help of SPSS for Windows, a sign value of 0.200 was obtained. Because the value of Sig. is > 0.05, the data is normally distributed.

### 2. Multicollinearity Test

**Table 6**. Multicollinearity

Coefficients[a]

| Models | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 120.529 | 44.899 | | 2.684 | .012 | | |
| | Reciprocal | -.021 | .210 | -.023 | -.100 | .921 | .712 | 1.405 |
| | Self | -.587 | .664 | -.201 | -.885 | .384 | .712 | 1.405 |

a. Dependent Variable: Results

The tolerance value is 0.712, and the VIF is 1.405. Based on decision-making, the tolerance value is 0.712 > 0.10 and the VIF value is 1.405  10.00. with these results indicating that the data of this study did not exhibit multicollinearity.

### 3. Heteroscedasticity Test

**Table 7**. Heteroscedasticity

Coefficients[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -8.721 | 25.779 | | -.338 | .738 |
| | Reciprocal | .012 | .121 | .023 | .101 | .920 |
| | Self | .258 | .381 | .155 | .677 | .504 |

a. Dependent Variable: RES_2

The use of reciprocal learning is 0.920, and self-efficacy is 0.504, all of which are more than 0.05. Therefore, in this research data, there is no heteroscedasticity.

### 4. Autocorrelation Test

**Table 8**. Autocorrelation

Model Summary[b]

| Models | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| 1 | .214a | .046 | ,356 | 13,56353 | 1,671 |

a. Predictors: (Constant), Self, Reciprocal

b. Dependent Variable: Results

Durbin Watson value of dW = 1.671 Durbin-Watson table with 29 sample values and 2 independent variable values for dl = 1.2699 and dU value = 1.5631. So in looking for the value (4 - d) = 4 - 1.671, we get 2.329. The Durbin Watson (dW) value is 1.671 and is between dU = 1.5631 and (4 - d) = 4 - 1.902 = 2.329, based on the decision that there is no autocorrelation. Good data if the data used does not exhibit autocorrelation.

## *c. Hypothesis testing*

The hypotheses in this study consist of a hypothesis with a simple correlation test and a hypothesis with multiple linear regression tests.

### 1. Simple Linear Correlation Test

To establish how closely related the two variables are to one another and in which direction, simple correlation analysis, also known as bivariate correlation, is used. The straightforward correlation coefficient demonstrates how strongly the two variables are related.

### Simple Correlation Test between Reciprocal Learning and Learning Outcomes

Correlations

| | | Reciprocal | Results |
|---|---|---|---|
| Reciprocal | Pearson Correlation | 1 | .631 |
| | Sig. (2-tailed) | | .000 |
| | N | 29 | 29 |
| Results | Pearson Correlation | .631 | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 29 | 29 |

A simple correlation (r) obtained a correlation between the use of reciprocal learning and learning outcomes (r) that is equal to 0.000. Based on decision-making, if the sig value is less than 0.05, then the two variables have a relationship (correlation). If the degree of the relationship is obtained by a value of 0.631, then based on the interpretation of the data, it shows that the relationship obtained is 0.631 in the interval 0.60–0.799 with the criteria of a strong correlation relationship. While the direction of the relationship is positive because the value of r is positive, it means that the higher the use of reciprocal learning, the more it improves learning outcomes.

### Simple Correlation Test between Self-Efficacy and Learning Outcomes

Correlations

| | | Results | Self |
|---|---|---|---|
| Results | Pearson Correlation | 1 | .213 |
| | Sig. (2-tailed) | | .001 |
| | N | 29 | 29 |
| Self | Pearson Correlation | .213 | 1 |
| | Sig. (2-tailed) | .001 | |
| | N | 29 | 29 |

Based on the results of simple correlation analysis (r), it is found that the correlation between the use of self-efficacy and learning outcomes (r) is 0.001. Based on decision-making, if the sig value is less than 0.05, then the two variables have a relationship (correlation). As for the degree of the relationship, the value is 0.213, and based on the interpretation of the data, it shows that the relationship obtained is 0.213 in the interval 0.20–0.399 with the criterion of a low correlation relationship.

### 2. Multiple linear regression test

This multiple linear regression analysis is used to determine the effect of using reciprocal learning and self-efficacy on the learning outcomes of IT students at Muhammadiyah University of Jember.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .512a | .027 | -.148 | 12.08032 | .027 | .624 | 2 | 26 | .000 |

a. Predictors: (Constant), Self, Reciprocal

Based on the model summary table, it shows that the sign F change value is 0.000. Based on the decision that if the sign F change value is less than 0.05, then there is a relationship, and vice versa, if the sign F change is more than 0.05, then there is no relationship between the independent variable and the dependent variable. Because the F change value is 0.000 and less than 0.05, there is a relationship between the independent variables, namely reciprocal learning and self-efficacy, and the dependent variable, namely student learning outcomes. The R value is known to be 0.512, so we can draw conclusions based on this value based on the guidelines for degree of relationship. By adjusting for the degree of guidance, the R value, which is 0.512, lies in the Pearson correlation value area of 0.41–0.60. Thus, the degree of relationship between reciprocal learning variables and self-efficacy on student learning outcomes is in the moderate category.

## 4. CONCLUSION

Based on the results of data analysis from research that has been carried out on IT students at the Muhammadiyah University of Jember, using a significance level of 5%, it can be concluded that the following matters: 1). There is a significant influence of reciprocal learning on the learning outcomes of IT students at the Muhammadiyah University of Jember. This is indicated by a sign value of 0.000 and less than 0.05; the reciprocal learning variable and learning outcomes are correlated. 2) There is a significant influence of self-efficacy on the learning outcomes of IT students at the Muhammadiyah University of Jember. This is because the sign value is 0.001 and less than 0.05, and the self-efficacy variable with learning outcomes is correlated. 3). There is an effect of using reciprocal learning and self-efficacy simultaneously or together with the learning outcomes of IT students at Muhammadiyah University of Jember. This is indicated by the F change value of 0.000 less than 0.05, which means that there is a relationship between reciprocal learning and self-efficacy on student learning outcomes.

## CONFLICT OF INTEREST

There are no conflicts of interest declared by the authors.

## REFERENCES

Erwanto, Maryatmi, S. A., & Budiyanto, A. (2018). The Effects of Reciprocal Teaching Learning Strategy and Self efficacy on Learning Outcomes of Early Childhood (AUD) Mathematical Logic. *Jurnal Pendidikan Matematika* (Vol. 9, Issue 1).

Manala, P. (2019). The Effect of Reciprocal Teaching Technique on Students' Ability in Reading Comprehension at English Department of FKIP UHN Pematangsiantar. *JETAFL (Journal of English Teaching as a Foreign Language)*, *V*(1), 26–36.

Metekohy, L. M., Daliman, M., Metekohy, B., & Ming, D. (2022). The impact of teaching and learning quality process to school and university education for sustainable future. *JPPI (Jurnal Penelitian Pendidikan Indonesia)*, *8*(1), 143. https://doi.org/10.29210/020221203

Munna, A. S., & Kalam, A. (2021). Teaching and learning process to enhance teaching effectiveness: a literature review. In *International Journal of Humanities and Innovation (IJHI)* (Vol. 4, Issue 1).

Nugroho, R., & Warmi, A. (2022). Pengaruh Motivasi Belajar Terhadap Hasil Belajar Matematika Siswa Di Smpn 2 Tirtamulya. EduMatSains: Jurnal Pendidikan, Matematika dan Sains. 6(2). http://ejournal.uki.ac.id/index.php/edumatsains

Ordu, B.-A. U. (2021). *The Role of Teaching and Learning Aids/Methods in a Changing World*. 210–216.

Ristiani, I. (2021). *Development of Context-Based Meaningful Learning in The Era of Pandemic Covid19*. http://www.alfurqon.or.id/

Sandopa, A., Doyan, A., & Ardhuha, J. (2022). The effect of reciprocal teaching-learning model on the mastery of physics concepts and creativity of senior high school. *Journal of Physics: Conference Series*, *2165*(1). https://doi.org/10.1088/1742-6596/2165/1/012011

Saputra, K. Y. (2015). *Pengaruh Proses Pembelajaran Dan Motivasi Belajar Terhadap Hasil Belajar Ips Siswa Smp Maulana Pegayaman* (Vol. 5).

Saswandi, T. (2018). Utilizing Reciprocal Teaching Strategy to Improve Students' Reading Comprehension. *Jurnal Penelitian Dan Kajian Ilmiah MENARA Ilmu*, *VII*, 119–124.

Sele, Y., Sila, V. U. R., Oetpah, F., & Kabnani, Y. (2023). Students' Learning Independence from Different Specialization Classes: A Comparative Study. *Jurnal Pembelajaran dan Biologi Nukleus*, *9*(1), 57–65. https://doi.org/10.36987/jpbn.v9i1.3925

Sujiwo, D. A. C., & A'yun, Q. (2020). Pengaruh Pemanfaatan E-learning Terhadap Motivasi Belajar Mahasiswa. *JUSTINDO (Jurnal Sistem & Teknologi Informasi Indonesia)*, *5*(2), 53–59.

Sukatin, S., Mahdeyeni, M., Ginanjar, A., Fatonah, N., Meiliani, E., & Pahmi, P. (2023). Blended Learning Model to Improve Learning Independence in Students of Elementary School Teacher Education. *AL-ISHLAH: Jurnal Pendidikan*, *15*(1), 433–442. https://doi.org/10.35445/alishlah.v15i1.2394

Sundahry, S., Fitria, Y., & Rakimahwati, R. (2018). *The Effect Reciprocal Teaching Strategy of Critical Thinking Skills in Learning Tematic Class V*. 816–822. https://doi.org/10.29210/20181118

Triningsih, R., Dwp, I. A., & Pawenang, S. (2021). Learning Achievement Is Reviewed from Independence, Learning Facilities, Parental Attention and Peer Environment Students of SMK Negeri 1 Sragen. *Business and Accounting Research (IJEBAR) Peer Reviewed-International Journal*, *5*(4), 243–555. https://jurnal.stie-aas.ac.id/index.php/IJEBAR