

The Effect of Self-Efficacy on Economic Problem-Solving Student: Metacognitive Mediation

Diyah Samrotul Fitri¹, Albrian Fiky Prakoso^{1*}, Arina Salsabilla Haq²

^{1*} Universitas Negeri Surabaya, Surabaya, Indonesia

²Louis-Leitz-Schule, Feuersee Stuttgart, Germany



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ABSTRACT

Objective: This study aims to determine the effect of self-efficacy directly and indirectly (through metacognition) on students' economic problem-solving. The sample in this study were X-grade students of Surabaya State High School 17 as many as 143 students. **Method:** Measurement of metacognitive ability includes metacognitive knowledge and metacognitive regulation. Measurement of students' economic problem-solving skills using economic material tests. Self-efficacy measurement includes magnitude, strength, and generality. Data collection using questionnaires and test questions. The data analysis technique used in this study was SEM-PLS analysis with the Warp-PLS approach. **Results:** The results of this study indicate that the effect of self-efficacy has a very significant effect on students' metacognitive abilities of 0.624 with $p < 0.001$. and the results of the analysis of the effect of metacognition on economic problem solving amounted to 0.336 and the indirect effect is from self-efficacy through metacognitive mediation and then to economic problem solving which is 0.209. then the total effect of the effect of self-efficacy on economic problem solving directly or indirectly was $x 100\% = 15.6\%$. **Novelty:** The use of variable Economic problem solving is a novelty found in the search process using the Vosviewer application.

INTRODUCTION

The use of economics in daily activities, understanding strategies, and utilizing problem-solving strategies are emphasized in the curriculum, especially in Indonesia (Arie, 2017). Apart from students' problem-solving skills in the learning curriculum, the ability of students in Indonesia in this regard can be said to be low from other countries, this is evidenced by the results of the PISA (Program for International Student Assessment) which an examination system organized by the OECD (Organization for Economic Cooperation and Development) in Paris, France, and takes place every three years starting in 2000 until 2018. In PISA in 2015, Indonesian students' learning achievement ranked 60 out of 72 countries (Hartini, 2018; Nugrahanto, 2019) and in 2018 the learning achievement of Indonesian students decreased and reached a score that was still below other countries, out of 79 countries Indonesia ranked 74 (Tohir, 2019). This means that in Indonesia the quality of education is still below other countries so improvements are needed in the education system in Indonesia.

The questions used by PISA are essay questions based on examples from daily activities, where students are asked to answer the theory they know in class. in the questions used during PISA students are asked to be able to reason, make evaluations, and be creative when solving them (Gumus, 2019). From this description, it can be concluded that the problem-solving skills of students in Indonesia are below compared to other countries.

Problem-solving ability plays an important role in achieving academic success, so researchers feel interested in making research in various disciplines, such as mathematics (García et al., 2016; Gumus, 2019; Siregar & Kairuddin, 2020; Smith et al., 2018; Tian, 2018), sains (Akben, 2020) and economics (Ningrum, 2017; Putri, 2018). The importance of problem-solving skills in learning mathematics has been widely proven, but research on problem-solving skills in learning economics has received less attention, especially in Indonesia, empirical studies on problem-solving skills in learning economics are still rarely researched.

Concentrating on the core discussion of the problem of economics, the problem of economics is caused by the imbalance between unlimited human needs and quite limited resources, which results in scarcity. In line with what is stated by Robbins¹, economics is the study of human behavior is the relationship between goals and scarce resources and has many alternative uses (Robbins, 1969 [1935]). The purpose of studying economics is the ability to make rational decisions during the decision-making process and to solve everyday economic problems.

The ability to solve economic problems is one of the main objectives of economics that is expected to be achieved by a learner. The ability to solve economic problems is an individual's ability to obtain solutions to economic problems. Learners are expected to understand the basic concepts of economics, be able to solve problems by combining theoretical abilities, calculations, graphics, tables, equations, and try to find solutions to economic problems that occur around them (Sihaloho et al., 2018). If someone has problem-solving skills, then it is likely that students can improve their learning achievement, the results of research that have been conducted by several researchers that the effect of problem-solving ability is quite instrumental to the achievement of learning achievement (Lee, 2017; Park, 2020; Utami, 2020).

Polya in Lee (2017 : 13) *How to Solve It* suggests that to get the best results when solving the problem, there are several stages to solve a problem, namely (1) Knowing the problem, (2) Planning, (3) Implementing the plan, (4) Evaluating. These stages will organize a structured mindset (Elsa Siahaan, 2018). In solving problems a person is required to use their metacognition (by making a solution plan, monitoring and evaluating the feasibility of implementing the plan that has been prepared), self-efficacy, and trust (Gumus, 2019).

Based on the results of the description above, in the planning step, students who have confidence in their abilities will find it easier to implement solutions. and in the evaluation step, students will check the correctness of the solution for suitability. It can be concluded that if students have high metacognitive abilities and self-efficacy, they will be able to solve problems.

Lioe in suryaningtyas (2020) suggests that metacognition is one of the important elements in students' problem-solving to monitor their thinking process. In accordance with Flavell's opinion (1979), metacognitive abilities refer to students' awareness of their

thinking abilities and the regulation of the thinking process to solve a problem that is being faced (Chen & Hapgood, 2021).

When solving a problem, students need awareness to use strategies and self-efficacy in every action to achieve the right solution (Somawati, 2018). Students' intelligence in using strategies and self-efficacy to achieve appropriate problem-solving is inseparable from metacognitive abilities (Sugandi et al., 2020).

Research shows that someone with high self-efficacy uses more metacognition than someone with low self-efficacy (Hayat et al., 2020). Individuals who have low self-efficacy and when faced with a difficult task will choose to avoid it, whereas those who believe they are capable of doing will tend to take part in the activity (Sihaloho et al., 2018).

Based on the description above, it shows that high metacognition can mediate student self-efficacy, so it will affect students' ability to find solutions to solve their learning problems (D Akamatsu, 2019). With high metacognitive abilities, students will be better able to make plans, create strategies and be able to evaluate the strategies they have applied to overcome the problems they face (Pramono, 2017).

Students who have not received training in learning strategies will have difficulty solving problems when doing assignments. Metacognitive skills can help students to connect economic science concepts by combining theoretical skills, graphical calculations, and tables in solving an economic problem (Sihaloho et al., 2018). Metacognitive skills are needed in learning so that students can know the material that has and has not been mastered, so that students can organize themselves in learning (Anisah et al., 2018).

Self-efficacy and metacognitive ability are thought to have an influence on problem solving (Gumus, 2019). Bandura social cognitive theory shows that self-efficacy can affect the way a person thinks, feels, motivates himself, and behaves. The self-efficacy theory shows that a high sense of efficiency in completing academic tasks will make them believe that they can complete tasks according to needs and situations, and can survive in the face of obstacles and challenges.

Problem solving ability is basically a cognitive process that is consciously monitored, develops strategies and can evaluate these strategies to solve a problem. Self-efficacy can directly or indirectly affect problem-solving performance by influencing analytical strategies, suggesting that metacognition plays a mediating role in the relationship between self-efficacy and performance. Students tend to have the ability to make an appropriate plan and evaluate a strategy in dealing with problems if they have a high level of self-efficacy.

Based on the background description above, it can be concluded that high metacognitive skills and self-efficacy can encourage students to find solutions to economic problems, by equipping students to be confident in their ability to apply good strategic processes to be able to monitor their learning and thinking processes (Suryaningtyas, 2020). Metacognitive skills can help students understand problems and organize the problem-solving process well (Diah & Nunik, 2018). Students if they have high metacognitive skills and self-efficacy will be more responsive when receiving

information and answering questions and have a high awareness to realize when there are mistakes during the problem-solving process (Fuldiaratman et al., 2021).

The role of self-efficacy and metacognitive ability on academic achievement plays an important role in several domains such as science (Suryaningtyas & Setyaningrum, 2020) and mathematics (Diah & Nunik, 2018; Pramono, 2017; Tian, 2018). The importance of self-efficacy and metacognitive abilities on learning outcomes has been widely proven, but research on self-efficacy and metacognition on problem-solving has received less attention, especially in Indonesia, empirical studies on self-efficacy and metacognitive abilities on problem-solving are still rarely researched. So in this study, we chose to investigate self-efficacy metacognitive ability as a mediating variable of economic problem solving performance. The purpose of this study was to determine the effect of Self-efficacy on Economic Problem-Solving student: Metacognitive mediation.

RESEARCH METHOD

The type of research used is explanatory quantitative research using a survey design, a method used to obtain data from a particular place by circulating questionnaires on variable X (metacognitive) there are 7 instrument grids namely declarative knowledge, procedural knowledge, conditional knowledge, strategies, planning, monitoring and evaluation. Variable Y1 (self-efficacy) has 3 instrument grids, namely magnitude, strength, and generality. Variable Y2 conducts an economic problem-solving test by conducting a problem test consisting of four economic essay questions. This study aims to explain the relationship between variables.

The data collection technique for the Economic Problem-Solving task consists of four essay questions which are used to measure or obtain data on students' problem-solving skills. The economic problem-solving tasks used in this study are about priority scale and opportunity cost. The questions were prepared, then consulted with a supervisor. Are these questions said to be appropriate, good, and sufficient to describe economic ability. Scoring guidelines for problem-solving tasks are assessed on a scale ranging from 0 to 25 for each question. The sample criteria that researchers use are class X students of Surabaya State High School 17 by examining four classes. The number of samples in this study was 143 students who were taken as a whole from four classes. In measuring the level of self-efficacy and metacognitive ability of students, data collection was carried out by distributing questionnaires while economic problem-solving data used the distribution of questionnaires.

While the quantitative approach is the approach used in this study, research instruments are used for techniques in data collection, in testing the hypothesis of this study using statistical data analysis techniques. The data source used is primary data obtained directly from the object of research, namely questionnaires distributed to students. while secondary data is a literature study and documentary studies from related schools. Literature studies, taken through literature studies are theoretical supporting materials for conducting research. Meanwhile, documentary studies are a search for data about variables in the form of documents that exist in an intended object,

such as notes, reports, archives and so on that relate to the problem under study. The type of data used in the study uses ordinal data which is obtained by classifying ranks and relationships, based on rankings.

For data analysis techniques, there are several stages, namely validity testing and reliability testing with SPSS. For data processing using SEM-PLS with 3 stages, namely model specification to describe the relationship between latent variables based on theory, Outer model to describe the relationship between latent variables and their measurements, and Inner model to describe the relationship between latent variables.

RESULTS AND DISCUSSION

Results

Convergent Validity Test

Based on the WarpPLS software-assisted convergent validity test, it is known that there are 3 indicators of self efficacy (X), 7 metacognitive indicators (Y1), and 4 indicators of economic problem solving (Y2) as a whole can be said to be valid and in accordance with the desired criteria, namely factor loading > 0.30.

Reliability Test

The value of Composite reability coefficients and Cronbach's alpha which can describe the reliability of the variables, namely:

Table 1. Composite reability coefficients and Cronbach’s alpha values

Var.	Composite reability coefficients	Description	Cronbach’s alpha	Description
X	0.892		0.817	
Y1	0.897	Fulfilled	0.864	Fulfilled
Y2	0.816		0.699	

Source: Data processed by researchers, 2023

Based on the output results above, it can be seen that all coefficients are above or greater than 0.7 so that they meet the criteria for Composite reability coefficients and Cronbach's alpha.

Goodness of Fit Test

The results are shown in the table below:

Table 2. Model Fit Test Results

Model fit and indicator quality	Fit Criteria	Analysis Result	Description
APC	P<0,05	0.382 (P<0.001)	Qualified model fit
ARS	P<0,05	0.306 (P<0.001)	Qualified model fit

AARS	P<0,05	0.298 (P<0.001)	Qualified model fit
AVIF	acceptable if ≤ 5, ideally ≤ 3.3	1.548	Ideal
AFVIF	acceptable if ≤ 5, ideally ≤ 3.3	1.473	Ideal
GoF	small ≥ 0.1, medium ≥ 0.25, large ≥ 0.36	0.431	Large
SPR	acceptable if ≥ 0.7, ideally = 1	1.000	Ideal
RSCR	acceptable if ≥ 0.9, ideally = 1	1.000	Ideal
SSR	acceptable if ≥ 0.7	1.000	Accepted
NLBCDR	acceptable if ≥ 0.7	1.000	Accepted

Source: Data processed by researchers, 2023

Hypothesis Test

Hypothesis testing in this study uses the help of SEM-PLS which can be seen in Figure 1 as follows:

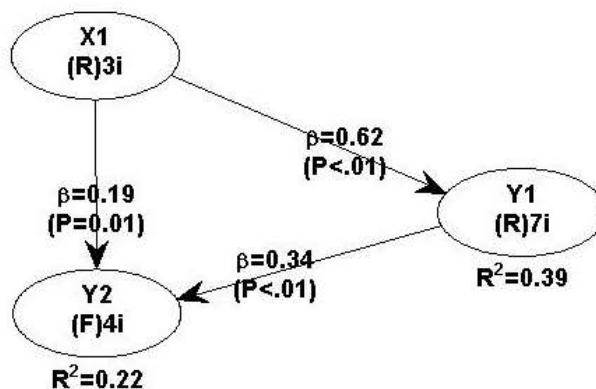


Figure 1. Hypothesis Test Results

To see how much direct and indirect influence and total influence can be seen in table 2 as follows:

Table 3. Direct Effect

Relationship between Variables		Path coefficient	p-value
X	Y1	0.624	<0.001
X	Y2	0.187	0.011
Y1	Y2	0.336	<0.001

Based on table 3, it shows that the effect of (X) on (Y1) has a path coefficient of 0.624 with a p-value <0.001. and for (Y1) on (Y2) has a path coefficient of 0.336 with a p-value <0.001.

Table 4. Indirect Effect

Variable Eksogen	Variable Mediating	Variable Endogen	Indirect Effect	P Value
X	Y1	Y2	0.209	<0.001

From the results of the indirect effect hypothesis test above, it is known that the path coefficient of the indirect effect of X on Y2 through Y1 is 0.209 with $p < 0.001$, said to be very significant, so Y1 is a mediating variable.

Table 5. Total Effect

Total effects			
	X	Y1	Y2
Y1	0.624		
Y2	0.396	0.336	

In this study, the details of the total effect are $\times 100\% = 15,6\%$. Based on the results of these calculations, thus the contribution value between the self-efficacy variable (X) to economic problem solving (Y2) both directly and indirectly (through metacognitive ability) is 15.6%.

Discussion

The effect of self-efficacy on metacognition directly

The results of the analysis on SEM-PLS using the Warppls 0.7 program show the output results with the effect of self-efficacy (X) on metacognition (Y1) having a path coefficient of 0.624 and < 0.001 . because p has a value smaller than 0.01, it can be declared very significant, so that the hypothesis can be accepted.

The path coefficient has a positive sign (0.624), this illustrates that self-efficacy affects metacognition and the hypothesis is accepted. Based on the output results which have a path coefficient of 0.624, it can be seen that the increase in student self-efficacy will be followed by the higher the students' metacognitive abilities.

These results are in line with Bandura's theory which states that self-efficacy shows an assessment of one's ability to successfully perform a given task and metacognition includes a review of what is known and how to utilize it in the process itself while simultaneously carrying out its capabilities and can have an impact on performance (Bandura, 1977).

In line with research (Daisuke Akamatsu, 2019), that self-efficacy owned by students can significantly have a positive influence on metacognitive abilities. With the ability of self-efficacy, students can believe and be confident in the abilities they have when facing tasks and will be able to apply their metacognitive abilities, these students believe that they can make learning plans and choose learning strategies that are in accordance with their abilities (Ziegler & Opdenakker, 2018).

Metacognitive influence on economic problem-solving directly

The results of the analysis on SEM-PLS using the WarpPls 0.7 program show the output results with the effect of metacognition (Y1) on economic problem solving (Y2) having a path coefficient of 0.336 and < 0.001 . because p has a value smaller than 0.01 then this can

be said to be very significant, so the hypothesis is accepted. The path coefficient has a positive sign (0.336), meaning that the better the metacognition, the more economic problem-solving increases.

This illustrates that metacognition affects economic problem-solving and the hypothesis is accepted. Based on these results, it can be seen that if the level of metacognition of students is higher, the level of economic problem-solving ability of students will also increase. Some studies also state that metacognition has an important role in the formation of students' problem-solving skills (Atmatzidou et al., 2018; Gumus, 2019; Ka, 2017; Özcan, 2015; Schnotz & Mengelkamp, 2017; Yuliyani, 2017).

These results are in line with the results of research conducted by (Muna, 2017), If metacognition is a variable that can directly affect problem-solving performance with highly significant results. With metacognitive abilities, students with their abilities in doing tasks will make learning plans and can adjust learning strategies according to their abilities to solve problems.

The effect of self-efficacy on problem-solving both directly and indirectly (mediated by metacognition)

The results of the analysis on SEM-PLS using the WarpPLS 0.7 program show the output results that self-efficacy can have a direct effect on students' economic problem-solving with a value of 0.158 and the indirect effect is from self-efficacy through metacognitive mediation then to economic problem-solving which is 0.209. then the total effect of the influence of self-efficacy on economic problem-solving directly or indirectly is $\times 100\% = 15,6\%$. Thus the effect of self-efficacy variables on economic problem solving both directly and indirectly (through metacognitive mediation) is 15.6%.

This shows that students who have high self-efficacy can affect students problem-solving skills. In line with research (J. Lee et al., 2016; Li et al., 2020; Ryan Royston, 2017), that self-efficacy owned by students can significantly have a positive influence on students' problem-solving skills. With the ability of self-efficacy, students can believe and be confident in their abilities (Nur Fadilah & Arief Rafsanjani, 2021) When facing a task, students will be able to apply their metacognitive abilities. The student believes that he can make a learning plan and choose a learning strategy that is in accordance with his abilities. Metacognitive students in solving problems with confidence in their abilities that result in students will be more diligent in learning to achieve their learning goals so that they can improve their problem solving skills. The results of this study are in line with research (gumus, 2019) that metacognition is a variable that directly affects problem-solving performance with the most significant results.

While the existing literature also often emphasizes and highlights the effects of metacognition on learning achievement (D Akamatsu, 2019; Aminah, 2018; Stephanou & Mpiontini, 2017; Tian, 2018), However, the number of studies examining the overall mediating role of metacognition is very limited. Research by gumus (2019), showed that metacognition mediates the influence of self-efficacy, motivation, and math anxiety on math problem-solving. However, in Tian (2018), study, mediation analysis showed that self-efficacy fully mediated the effect of metacognition on math performance. This, this

result suggests that metacognition becomes more important when facing challenging tasks such as problem-solving (Fuldiaratman, 2021; Muna, 2018; Suryaningtyas, 2020; pramono, 2017; Diah, 2018). Metacognition, which is considered by some researchers to be a major factor in learning to self-regulate (Sihaloho et al., 2018; Stephanou & Mpiontini, 2017), is expected to serve as a mediator for non-cognitive constructs that influence learning performance and achievement.

CONCLUSION

Fundamental Finding : This study found that students' self-efficacy has a positive and very significant effect on students' metacognition. This means that the high self-efficacy of students when learning, will be followed by the high metacognition of students. Students' self-efficacy has a positive and significant influence on students' economic problem solving both directly and indirectly (through metacognitive mediation) students. **Implication :** These findings provide several implications, especially in improving students' ability to solve economic problems, teachers can do so by increasing students' self-efficacy because students' self-efficacy has a positive and significant effect on the ability to solve economic problems. In real conditions in the field, to get even better results, teachers can provide support or support in the student learning process (for example, giving appreciation for each student's ability to complete tasks, reflecting at the end of each lesson) this can increase students' self-efficacy. In line with research (J. Lee et al., 2016; Li et al., 2020; Ryan Royston, 2017), that the self-efficacy of students can significantly have a positive influence on students' problem solving ability. However, the results of this study show that metacognition has a higher influence than self-efficacy on economic problem solving. In line with Gumus research (Gumus, 2019) that metacognition is a variable that directly affects problem-solving performance with the most significant results. **Limitation :** Finally, the limitation of this study is that the questions used are only four economic questions, if more questions are included, it can produce a clearer measure of the assessment of students' economic problem-solving skills. With the limited time taken to carry out observations before the study, this is also a limitation in this study because if observations are carried out in more depth this will help researchers to determine the appropriate number of questions by examining the extent to which these questions are challenging for students. **Future Research :** Based on the results of the research that has been conducted, the researcher suggests that to improve metacognitive abilities, teachers can do so by increasing student self-efficacy because student self-efficacy has a positive and very significant effect on metacognition. With the ability of self-efficacy, students will be confident in their abilities when completing tasks and will be able to apply their metacognitive abilities. The student believes that he can make learning plans and choose learning strategies that are in accordance with the abilities that exist in him.

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***Albrian Fiky Prakoso**

Economics Education, Faculty of Economics and Business,
Surabaya State University,
Address: Surabaya, East Java, Indonesia
Email: *albrianprakoso@unesa.ac.id

Diyah Samrotul Fitri

Economics Education, Faculty of Economics and Business,
Surabaya State University,
Address: Surabaya, East Java, Indonesia
Email: diyah.19046@mhs.unesa.ac.id

Arina Salsabilla Haq

Louis-Leitz-Schule
Weiner Str. 51, 700469, Stuttgart, Deutschland Germany
Email: arina.haq@gmx.de
