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The Implications of Applying Metacognitive Strategies on English Writing Skills of Students: A Perspective on Problem Solving and Students' Self-Efficacy

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ABSTRACT

This research aims to examine the implications of metacognitive strategies on problem-solving and students' self-efficacy in English writing skills. The study utilized a Quasi-Experimental research design involving a sample size of 100 participants. Tests were used to assess writing skills, and questionnaires were employed to gather data on the application of these strategies from the perspectives of problem-solving and self-efficacy. Subsequently, both the experimental and control groups received their respective treatments. The data was then analyzed using Analysis of Covariance (ANCOVA) with the assistance of SPSS 22. The research findings indicated that students who were exposed to the metacognitive strategy showed significant improvements in problem-solving and self-efficacy. This study contributes new insights into the importance of metacognitive strategies in the field of education.

Keywords: Metacognitive Strategies, Self-Efficacy, Problem Solving, Writing Skills.

INTRODUCTION

Teaching and learning domain, the teacher encourage techniques with the defined goal to overcome the learning problem, whether it has been provided by the learners themselves, educators, or instructors. The selection of these approaches depend on the issues and challenges that exist in the real of education. Therefore, not all chosen learning approaches will be able to address problems if there are still deficiencies in the abilities of the educators, the supporting facilities and infrastructure, the learning process, and other factors. Collaboration and support from all stakeholders are essential to achieve the educational objectives outlined in the vision and mission of the educational curriculum. Educational institutions often empower their educators to learn about the importance of professional, pedagogical, social, and personal competencies through seminars, workshops, and similar activities. This is done to enable educators to adapt to the developments in innovations and technology in the world of education. Such efforts are made to contribute to facilitating learners in discovering and acquiring knowledge, skills, and attitudes needed in the real world.

In English learning, the constructivist approach is essential for learners to acquire

knowledge and competencies through metacognition⁴ (Flavel in Alevin & Koedinger, 2002). Since English is a foreign language in Indonesia, it can be acquired through a set of strategies and applied in situations and conditions (Cirocki & Farrell, 2019; Floris, 2013) Metacognition is an aspect that is not fully known and understood by learners about "thinking of thinking." Metacognitive skills guide learners and teachers in facilitating language learning through problem-solving-based learning (PSBL) to acquire knowledge, skills, and attitudes. By incorporating metacognition into their learning process, learners can control and adapt themselves to specific situations¹⁶ (Erman in Permata, Suherman, & Rosha, 2012). When facing challenges in English language competency, every learner possesses their own metacognitive abilities and needs to prepare themselves to solve or overcome these challenges according to the context.

The strategies play a crucial role in acquiring knowledge or cognition and language skills, such as English (Teng & Zhang, 2018; Zhang, 2018)²² (Flavell, as cited in Zhang, 2018). In this context, Zhang²² (2018) conducted research on language learning using metacognitive strategies, such as the Structural Equation

Modeling approach⁸ (Flavell, 1979). Metacognition involves being aware of one's own thinking, knowing what is known and what is not known. In the context of learning, students are aware of how to learn, recognize their learning abilities and modalities, and understand the most effective learning strategies for effective learning.

In explaining the concept of metacognition, Flavell(Scanlon, 2010)⁸ (1979) defines it as a person's knowledge concerning cognitive processes and products or anything related to those processes and products. Metacognition is also seen to be the communication of information about cognition. by Meichenbaum(Scanlon, 2010) (in Susantini: 5). From these two definitions, metacognition can be understood as the knowledge that individuals generate from the processes (activities) they engage in.

Furthermore, according to Flavell¹⁶ in Permata, Suherman, & Rosha (2012), metacognition consists of metacognitive knowledge or metacognitive abilities and metacognitive experiences or regulation. Blankey & Spence (in Permata, Suherman, & Rosha, 2012) propose several strategies to develop metacognitive behaviors, which include 1) Identifying what we know and what we do not know; 2) Talking about our thoughts; 3) Keeping thought records; 4) Planning and self-regulating; 5) Asking about the thinking process; and 6) Self-evaluation. These strategies are aimed at enhancing metacognitive awareness and control, enabling learners to better understand their own cognitive processes and improve their learning and problem-solving skills. According to Sudiarta¹⁶ (in Permata, Suherman, & Rosha, 2012), "Metacognitive learning is a mathematics learning strategy that adopts the theory/perspective of metacognition, which can be observed in lesson plans, especially in learning objectives, learning scenarios, student worksheets, and the mathematical problems used." In other words, metacognitive learning in mathematics integrates metacognitive theory and perspectives into the planning of the learning process, such as setting learning objectives, designing learning scenarios, creating student worksheets, and selecting mathematical problems.

Schoenfeld¹⁶ (in Permata, Suherman, & Rosha, 2012) also states that "Metacognition is

related to students' thinking about their own thinking and their ability to use specific learning strategies accurately." This means that metacognition involves students thinking about their own thinking processes and their ability to utilize appropriate learning strategies effectively. Despite the fact that numerous research have looked at the effect of metacognitive methods on enhancing language abilities, notably in the context of the three metacognitive processes in reading comprehension, most of these studies utilize a quantitative research design that assesses the students' performance in applying metacognitive strategies³ (Al Mufidah, 2019).

In the context of learning using thematic approaches, it is essential to provide students with the necessary preparation and self-awareness of the success they can achieve in the future. Self-efficacy refers to an individual's confidence in their ability to achieve success in the future¹ specially writing outcome (Bandura, as cited in Abosede & Adesanya, 2017). Writing activities acquire the ability of self-regulation to create their experience and ideas. Building students' awareness and self-belief in achieving their dreams and success through learning is crucial. Thus, students' self-efficacy contributes significantly to their overall learning experience, as stated by Barling and Beattie¹ (as cited in Abosede & Adesanya, 2017). Self-efficacy is associated with performance related to various skills. Positive developments in self-efficacy led to improvements in education and training, linking this concept to different aspects⁶ (Cansoy & Türkoğlu, 2017). The ability to execute the plan and action for a particular purpose is also self-efficacy¹³ (Mukhid, as cited in Masitoha & Fitriyani, 2018). In an academic context, self-efficacy reflects how confident students are in performing particular tasks¹³ (Perez & Ye, as cited in Masitoha & Fitriyani, 2018). Self-efficacy plays a crucial role in academic motivation and learning motivation (especially students' ability to manage their learning activities) as well as resistance to learning¹³ (Zimmerman, as cited in Masitoha & Fitriyani, 2018).

Self-efficacy has three major dimensions: the perceived difficulty level of tasks that an individual believes they can achieve, strength, which refers to the belief in one's capability as strong or weak, and generality, which indicates the

extent to which these expectations are generalized across various situations¹³ (Lunenburg, as cited in Masitoha & Fitriyani, 2018). Individuals with high self-efficacy can effectively plan and succeed in completing tasks² (Bandura, as cited in Ahmad & Safaria, 2013). High self-efficacy individuals are those who understand their capabilities and can effectively plan their activities, while those with low self-efficacy struggle to accomplish their tasks² (Bandura, as cited in Ahmad & Safaria, 2013).

Problem-solving is about overcoming difficulties, while critical thinking is about generating ideas to address these difficulties⁶ (Seferoğlu & Akbıyık, as cited in Cansoy & Türkoğlu, 2017). Examining the predictive power of problem-solving skills can contribute to determining effective policies for problem-solving and developing critical thinking disposition⁶ (Cansoy & Türkoğlu, 2017). Problem-solving involves critical thinking and producing solutions by processing information (Seferoğlu & Akbıyık, as cited in Cansoy & Türkoğlu, 2017). The aim of problem-solving is to overcome or resolve difficulties, and critical thinking is employed to find ideas to address these challenges⁶ (Seferoğlu & Akbıyık, as cited in Cansoy & Türkoğlu, 2017). Revealing the predictive strength of problem-solving skills and critical thinking disposition in teachers can contribute to determining effective policies for problem-solving and developing critical thinking disposition⁶ (Cansoy & Türkoğlu, 2017).

Interpersonal interactions rank among the most prevalent and typical issues that people encounter. The difficulties people encounter in interpersonal interactions have a profound impact on them and rank among the most important aspects of their lives. People identify, develop, or uncover efficient or adaptable coping mechanisms for certain difficult situations as part of the cognitive-affective-behavioral process known as problem-solving. ⁷(Yüksel, as cited in Erozkán, 2013). Problem-solving thus involves the ability to plan, organize, act, evaluate, adopt, and summarize. Being skilled in problem-solving can significantly impact life success (Aksu, 1989; Belzer, D'Zurilla, & Maydeu-Olivares, 2002; D'Zurilla, Nezu, & Maydeu-Olivares, 2004 as cited in Erozkán, 2013). Interpersonal self-perception can influence the frequency of

interactions and other social behaviors. Interpersonal problem-solving is the process of investigating the problem with the approach which to overcome it (D'Zurilla & Nezu, as cited in Erozkán, 2013). Successful interpersonal problem-solving is crucial for psychological adjustment as it affects adaptive functioning in various stressful situations. Effective interpersonal problem-solving requires the capacity to define interpersonal problems, find feasible solutions, and make rational choices among solutions that lead to predetermined goals. Interpersonal problem-solving skills influence individuals' self-efficacy expectations. Self-efficacy refers to an individual's belief in their ability to organize and transform their skills into behavior⁷ (Bandura, as cited in Erozkán, 2013).

Based on the explanations and empirical theoretical studies above, this research aimed to investigate the differences in treatment using metacognitive strategies on the self-efficacy, and problem-solving skills of Second Semester of University Students in both suburban and urban areas. The main objective is to determine which group, self-efficacy or problem-solving skills, benefits more from the implementation of metacognitive strategies. In summary, this study is conducted to understand the influence of metacognitive strategies on the self-efficacy, and problem-solving skills of English language learners as a foreign language.

METHODS

This research employed a quantitative approach using a Quasi-Experimental design as its research methodology. The Quasi-Experimental design is chosen because the researcher did not have a sufficiently large sample and can only obtain two intact classes with a total of 100 students. These samples are then assigned to the experimental group and the control group.

After forming the two groups, the researcher developed research instruments to collect data from both groups, such as tests to assess the extent of differences or similarities in the abilities of the two groups and distributing questionnaires to gather data on the comparison of self-efficacy and problem-solving skills. The test instrument consists of 20 items, and each item is scored 5 for a correct answer and 0 for an incorrect answer. The next instrument is in the form of a

questionnaire, using a Likert scale with response criteria ranging from "very good/appropriate" with a score of 5, "good/appropriate" with a score of 4, "fairly good/appropriate" with a score of 3, "less good/appropriate" with a score of 2, to "not good/appropriate" with a score of 1.

Then the researcher tested its validity. Validity is the process of obtaining information or data by measuring what should be measured⁹(Fraenkel & Wallen, 2009). For example, measuring the weight of an object using a scale rather than a measuring tool for its length or height. There are several types of validity to test an instrument, one of which is criterion validity. In criterion validity, the researcher took and correlated data from the scores obtained from the instrument distributed to students as a sample with the results of scores obtained from the students' academic report documents (report cards) at their school. Then, the researcher examined the level of validity using Pearson Product Moment Correlation or Coefficient (PPMC) based on the correlation coefficient criteria as follows:

Very Valid	: 0.80 – 1.00
Valid	: 0.60 – 0.80
Moderately Valid	: 0.40 – 0.60
Less Valid	: 0.20 – 0.40
Not Valid	: 0.00 – 0.20

Next is to test the level of instrument reliability before using it to collect data from the sample. Reliability is the process of obtaining final data results from the level of consistency of various tools or measurement principles of a unit or target to be measured⁹ (Fraenkel & Wallen, 2009). There are several types of reliability to test the consistency level of the instrument used in the research, including test-retest, equivalent forms, equivalent forms/retest, internal consistency, and scoring observer agreement/inter-rater⁹ (Fraenkel & Wallen, 2009). In this study, the researcher used the test-retest reliability, where the same test instrument is administered to the students at two different times: during the first- and second-class sessions in the morning and during the second semester of Informatics Department and Information System Department, with a time limit of 35 minutes for each test session. Subsequently, the researcher processed the data collected using the Pearson-Product Moment Coefficient formula to determine the reliability of the instrument.

After determining the results of validity and reliability, and if they indicate a minimum level of good validity and reliability, the data collection process proceeds. The researcher administered a pre-test to both the experimental and control groups before providing any treatment. The pre-test was given with a time allocation of 70 minutes for the participants to answer. The data were then collected and processed using a computer for computation. Subsequently, the researcher proceeds with giving treatment to both groups, where the experimental group received treatment using self-efficacy, while the control group received treatment using problem-solving techniques. The duration of the treatment was relatively the same, conducted over ten sessions, with each session covering the same subject matter but using different approaches or methods.

Finally, after completing the treatment process within the allocated time, the researcher administered post-test to both groups using the same type of questions and time allocation as the pre-test. After collecting the post-test data, computation and analysis were carried out to assess the effects of the treatment on both groups.

Meanwhile, the data collection process from the questionnaire was conducted in a closed-ended manner and selected based on the students' knowledge and experience related to metacognitive strategies, self-efficacy, problem-solving, learning processes, and so on. This was done using a Likert scale, with data in ordinal or graded form.

The collected data was then processed for analysis using the ANCOVA formula to determine whether there is a significant difference or similarity between the experimental group given self-efficacy and the control group given treatment using problem-solving. The SPSS 22 software is used as a tool to facilitate data input and to present the processed data for easy interpretation.

FINDING AND DISCUSSION

Based on the data collected and obtained, including the results of the validity and reliability tests of the instrument created by the researcher and distributed to the subjects or students, it can be concluded that the instrument is valid and reliable. The main data collection process then

continues to determine the influence of metacognitive strategies on self-efficacy and problem-solving skills of second semester of university students in Madura in the English subject.

To test the hypotheses formulated based on the theory and research questions, the researcher tests the following hypotheses:

- a. Metacognitive strategies have a significant effect on the self-efficacy of second semester of university students in Madura.
- b. Metacognitive strategies do not have a significant effect on the problem-solving skills of second semester of university students in Madura.

These hypotheses will be examined to ascertain how metacognitive techniques affect the results of self-efficacy and problem-solving abilities in the context of second semester students' learning outcomes.

After collecting data from the tests and questionnaires administered to both the experimental and control groups, the data was then processed and computed for analysis and interpretation using the SPSS application. The data was analyzed using the Analysis of Covariance (ANCOVA) formula, in accordance with the Quasi-Experimental research design. The researcher presented the results of the data analysis as follows:

Tabel. Tests of Between-Subjects Effects

Dependent Variable: Learning Strategies

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18,283 ^a	61	,300	1,696	,042
Intercept	97,090	1	97,090	549,294	,000
Self_Efficacy	7,344	15	,490	2,770	,006
Problem_Solving	1,771	12	,148	,835	,615
Self_Efficacy * Problem_Solving	6,075	34	,179	1,011	,485

Error	6,71700	38	,177		
Total	250,000	100			
Corrected Total	25,000	99			

a. R Squared = ,731 (Adjusted R Squared = ,300)

Based on the statistical data table above, the researcher demonstrates and interprets the suitability of the ANCOVA model to determine if it is appropriate or correct. Since the significance/probability values in the "Sig" column are less than 0.05, specifically $0.042 < 0.05$, the model is considered suitable or correct.

Furthermore, the researcher interpreted the significance difference between the variables of self-efficacy and problem-solving based on the significance level of 0.05. The significance value for self-efficacy is 0.006, which is smaller than 0.05 ($0.006 < 0.05$), while the significance value for problem-solving is 0.615, which is greater than 0.05 ($0.615 > 0.05$). As for the combined variable of self-efficacy and problem-solving, the significance value is 0.485, which is greater than 0.05 ($0.485 > 0.05$). The degrees of freedom (df) for this analysis are 100, with an average error rate of 0.177.

Therefore, in this ANCOVA model, the role of the covariate in determining the difference in means for self-efficacy and problem-solving was not significant. In other words, the covariate variable did not have a significant effect on the difference in mean values for self-efficacy and problem-solving. From the data, it can be inferred that there is a highly significant difference between self-efficacy and problem-solving among students in the second semester of Informatics Department. This can be interpreted as the metacognitive strategy having a significant impact on problem-solving among second semester students of Informatics Department in suburban areas.

Based on the data analysis and interpretation provided above, it can be concluded that the metacognitive strategy significantly influences problem-solving skills among second semester students of Informatics Department in suburban areas more than their self-efficacy. This is consistent with some

theories suggesting that problem-solving skills are a key component of academic success, especially in subjects like mathematics⁵. Problem-solving is also considered one of the essential domains or focus areas in 21st-century learning¹².

The research results indicate that the impact on problem-solving is slightly different from the impact on self-efficacy, with problem-solving skills showing a more moderate to good level compared to self-efficacy, which is only moderately good¹⁸. Problem-solving is characterized as a cognitive-affective-behavioral process in which individuals identify, discover, or develop effective or adaptive coping responses for specific problem situations⁷ (Yüksel, in Erozkan, 2013). It involves the ability to plan, organize, take action, evaluate, adopt, and summarize. Proficiency in problem-solving can have a significant impact on life success⁷ (Aksu, 1989; Belzer, D'Zurilla, & Maydeu-Olivares, 2002; D'Zurilla, Nezu, & Maydeu-Olivares, 2004 in Erozkan, 2013).

Interpersonal self-perception can affect the frequency of interactions and other social behaviors. The ability to describe interpersonal issues, locate practical solutions, and make logical decisions among available options are necessary for effective interpersonal problem-solving in order to accomplish certain objectives. Since it affects adaptive functioning in a variety of stressful settings, interpersonal problem-solving is seen as a crucial component of psychological adjustment. It is also associated with coping and moderates the negative effects of high-pressure life events⁷. The skills in interpersonal problem-solving can affect people's self-efficacy expectations.

Similarly, the factors influencing the problem-solving skills of the students in this study are related to the implementation of metacognitive strategies. This is in line with the theory of metacognition, which refers to the awareness of a person's cognitive processes and products, along with the controlled regulation of mental activities and methods¹⁸. Control (executive aspects) and knowledge of the current state and cognitive processes are the two fundamental characteristics of metacognition¹⁸. The former refers to the utilization of metacognitive strategies, while the latter includes

people's knowledge (i.e., individual and universal traits that affect learning), task knowledge, and strategy knowledge.

Moreover, promoting high levels of literacy among students is challenging in the learning world. Students need to apply various strategies when interpreting and evaluating what they read, drawing supported conclusions, and developing high-order thinking skills¹⁸. The benefits of metacognitive instruction in English language learning, such as listening¹⁸, are acknowledged in the literature. Metacognitive instruction has the potential to make students more sensitive to the learning process and assist them in developing metacognitive knowledge.

They cross several disciplines, including thinking and memory, learning and motivation, and learning and cognitive development, by taking into account the crucial function of learning techniques and metacognitive awareness¹⁴.

The above theories align with the application of metacognitive strategies in problem-solving for English language learners as a foreign language in classroom learning with existing materials, conducted by teachers, showing significant positive effects on building self-awareness through metacognitive strategies. This seems to be very suitable and appropriate for the developmental characteristics of English language learners in suburban areas, rather than just imparting knowledge for future success through metacognitive strategies. The purpose of their research, which has been achieved, is to organize existing teaching strategies and systems to facilitate the development of metacognition in learners, which is not just knowledge about cognition but cognitive regulation referred to as metacognitive skills¹². In their study, they organized activities in cognitive and metacognitive skills to understand metacognitive skills, encompassing various and diverse activities under the title of metacognition¹².

The implementation of metacognitive strategies during the learning process has received positive responses from the students, as indicated by the distributed questionnaires. The results of this implementation show that students actively participate in the learning process, with the teacher acting as a facilitator to meet their learning needs and encourage their conscious

knowledge development (metacognition). Therefore, based on the results and discussions, it can be concluded and illustrated that the application of metacognitive strategies has a significant and influential effect on problem-solving for English language learners as a foreign language in suburban areas.

CONCLUSION AND RECOMMENDATION

Based on the explanations above, the author can conclude that metacognitive strategies are strategies that can have a highly significant influence on students' problem-solving skills, and a slightly less significant impact on students' self-efficacy compared to problem-solving. This means that problem-solving among English language learners as a foreign language in suburban areas is more suitable and effective due to the application of metacognitive strategies carried out by teachers during the learning process.

Due to the limited sources and explanations presented in this paper, the author suggests to the readers that the scope of this discussion is quite broad and can be focused on specific subject aspects such as mathematics, language, natural sciences, social sciences, and similar subjects. Therefore, further research can be conducted to obtain comprehensive and in-depth findings and to maximize the use of other references.

For future researchers, it is recommended to explore different research approaches from this study, such as qualitative research, development research, and similar approaches. For teachers, practitioners, and education observers, it is essential to implement metacognitive strategies in the education and classroom settings to develop competencies and achieve readiness for the digital and technological world. This will enable them to contribute meaningfully to society, whether in the industrial or governmental sectors, and to formulate policies that align with educational needs.

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