

**THE RELATIONSHIP OF SELF EFFICACY WITH STUDENT
MATHEMATICS LEARNING OUTCOMES THROUGH THE
CONCRETE-PICTORIAL-ABSTRACT (CPA)
APPROACH IN PRIMARY SCHOOLS**

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Article Info	Abstract
<p>History: Submitted January 19th, 2020</p> <p>Revised January 21th, 2020</p> <p>Accepted January 27th, 2020</p>	<p>The low self-efficacy (SE) and student learning outcomes (LO) are the backgrounds of this study. This research is to see the relationship between SE and LO students through the Concrete-Pictorial-Abstract (CPA) approach. The research method used is quasi-experimental, with nonequivalent pretest-posttest control group design in mathematics learning of 119 elementary students in Purwakarta, Subang, Karawang, and Bekasi. The instrument uses a description test and attitude scale. The results of the analysis show that there is no relationship between the achievement and increase of students' SE and LO with the value of R on the achievement and increase of SE and LO respectively 0.044 and 0.053 and significance > 0.05.</p> <p>Keywords: Concrete-Pictorial-Abstract (CPA) approach, Self-Efficacy (SE), Learning Outcomes (LO)</p>

A. Introduction

Indonesia has made good progress in building the foundations needed to improve the quality of basic education. While there is strong progress to celebrate, and most students are now receiving a basic education, equity of access and outcomes remains a critical issue. There is still a huge variation in the quality of learning that students receive across the country and overall achievement is low. It will be difficult to spread excellence across the system until effective assessment tools and transparent data are used to guide decision making and action at the classroom, school, and district levels. The challenge is to keep up the drive for continuous improvement in quality across all provinces and districts in line with the framework for quality improvement set out in Indonesia's National Education Standards (OECD/Asian Development Bank, 2015). The National Education Objectives in our country stated in the Law are expressed by (Hendriana, Rohaeti, & Sumarmo, 2017) concerning the SISDIKNAS Law Chapter II Article 3 reads: "National Education aims to develop the potential of students to

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become human beings who believe in and devote to God The Almighty, having noble, healthy, knowledgeable, capable, creative, independent and being a democratic citizen, and responsible". Education is a process of human guidance through learning that aims to develop the potential of religion, attitudes, intelligence, and skills for their life.

The field of study in elementary school that is quite a highlight of students in mathematics. Mathematics has a very important role in supporting the advancement of science and technology. Mathematics becomes the right tool for problem-solving in science (Rahayu & Hidayati, 2018). The purpose of mathematics according to the National Education National Standards Agency (BSNP) is mathematics learning is given at every level of education, aiming that students can use mathematics to reason (think logically, analytically, systematically, critically, and creatively and the ability to work together) (Rusman, 2014). One of the objectives of the mathematics learning curriculum stated in Permendiknas No. 22 of 2006 is to have an attitude of

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respecting the use of mathematics in life, an attitude of curiosity, attention, and interest in learning mathematics, as well as tenacious and confident in problem-solving (Badan Pengembangan Sumber Daya Manusia Pendidikan dan Penjaminan Mutu Pendidikan, 2011). Confidence in problem-solving is self-efficacy (SE). There are also affective domains that play a positive role in mathematics learning, namely attitudes, self-confidence, and other affective aspects that emerge as the mathematical abilities develop. Based on these explanations it is seen that SE is the affective domain which is one of the goals of mathematics learning (Sopia, 2016).

SE is the belief that someone can master the situation and give positive results (Santrock, 2009). SE plays a role in the progress of education because SE helps students feel confident in their abilities and effectively deal with the difficulties encountered in their learning experiences (Utari, Maridi, & Sugiharto, 2015). Every learning activity that students do at school will show their learning outcomes (LO). The purpose of learning mathematics related

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to LO listed in Permendiknas No. 22 of 2006 is to understand mathematical concepts, explain interrelationships between concepts and apply learning concepts or algorithms, flexibly, accurately, efficiently, and precisely, in problem-solving (Badan Pengembangan Sumber Daya Manusia Pendidikan dan Penjaminan Mutu Pendidikan, 2011). Based on these statements can be given meaning as good LO must be owned by students.

According to the research team PISA in 2001 showed that Indonesia was ranked 9th out of 41 countries in the mathematical literature category. Meanwhile, according to the study TIMMS in 1999, mathematics in Indonesia is ranked 34th out of 38 countries (data UNESCO) Huzzah (Erviana, 2016).

The findings of a SE study affect the choice of action taken and the amount of effort when faced with difficulties and obstacles. Individuals who have high SE choose to do more business and do not despair, but plus a lot of educators who have not yet studied the psychological factors of students related to student learning activities. (Putri & Santosa, 2015).

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Furthermore, the increase in SE students and students who get CPA learning is better than students who get conventional learnings, although the increase in both learnings is still in the low category, this is due to the lack of research time, if the SE of these students is always the teacher does not pay attention then mathematics will be considered difficult subjects and will never be liked by (Putri, 2015) and (Putri, Rahayu, Saptini, & Misnarti, 2016). Generally, mathematics lessons at school are a scourge for students. The abstract nature of mathematical objects causes many students to have difficulty in understanding mathematical concepts. As a result, mathematics learning outcomes are still low (Mashudi, 2016).

Measurement of students' SE towards learning mathematics has not been done in classrooms that are taught by teachers. Interview and observes findings, students still tend to be apathetic towards mathematics. This could be expected to cause SE students to decline. It is very important to note, if students already do not believe in their abilities, it will greatly disrupt the learning process which must continue
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every day in the next material. This indicates that learning is still centered on the cognitive aspects, thereby reducing the opportunity to develop student SE that influences student success in learning mathematics. Decreasing SE students allows the determination of learning methods are still on the use of direct learning methods or only focus on the cognitive domain (Saputra, 2016). In line with this opinion, SE students can be developed with a learning approach that emphasizes the active role of students in the learning process (Moma, 2014). In this case, the researcher sought to provide a solution with the CPA Approach. Because the advantages of the CPA approach are useful as manipulatives that are pleasing to students if students are happy they are excited in learning (Putri, 2017). This is consistent with the statement of learning will be effective, if students are happy. Besides, excitement in learning has been proven to have an extraordinary effect on student LO (Darmansyah, 2011).

The CPA approach to learning tries to create proximity to students or the real world of children, namely the
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concrete and pictorial stages, this is following Piaget's theory of learning, the concrete operational level ie the concrete operational period is between the ages of 7-11 years, this level is the beginning of rational thinking, this means children have logical operations that can be applied to concrete problems (Dahar, 2011). Based on the strengths of the CPA approach it is considered to be increasing SE and LO of students because CPA can make meaningful learning for students with concrete and pictorial processes. This is following the SE aspects which are studied through four sources, namely mastery experience, vicarious experience, social persuasion, and emotional state (Bandura, 1994). The CPA approach is a three-step instructional approach that is very effective in teaching the mathematical concepts of (Putri, Rahayu, Saptini, & Misnarti, 2016). CPA approach is based on Bruner's idea emphasizing full conceptual understanding, students change "experience into a world model" in three different ways namely enactive, iconic and symbolic. (Lee & Tan, 2014). CPA is an approach through a concrete stage which is done by manipulating objects

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directly, drawing stage by applying the results of manipulation of objects directly in the form of images, and the final symbolic stage is to change it in an abstract form as typical of mathematics itself (Yuliyanto, Turmudi, Agustin, Putri, & Muqodas, 2019).

Other research shows the CPA approach makes it easy for mentally retarded children to understand mathematics because this approach children learn with three stages. The combination of these stages is very helpful for mentally retarded children to understand census numbers (Ramadhan, 2012). CPA is an approach through three stages, namely Concrete as a stage of the manipulation process, Pictorial as a stage of connecting the manipulation process and Abstract as an explanation that mathematics is learning that uses symbols, and numbers (Yuliyanto, Putri, & Rahayu, 2019). Based on some of the aforementioned understandings the CPA approach is an approach that focuses on understanding concepts, this approach consists of three stages namely a concrete stage then application with images, and an abstract level of capability stage. Each approach has steps for implementation, as does the

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CPA approach. CPA learning syntax is as follows: 1) Select concrete objects that are used to introduce conceptual understanding of the material students learn; 2) Guide students to participate independently using concrete objects by giving instructions and cues; 3) Replace the use of manipulative objects with pictures; 4) Use strategies to help students remember learning that has been done before. This serves as a process of transitioning the use of images to the use of numbers or symbols, and 5) Encourage students to use numbers or symbols in completing mathematical tasks, and this activity focuses on fluency (Flores, 2010).

The syntax of the CPA approach is the concrete stage which is done by manipulating objects directly, the stage of drawing by applying the results of manipulation of objects directly into visual form, and the symbolic stage that is changing it towards abstract as typical of mathematics. Bruner's learning theory which is in line namely learning mathematics will be more successful if in the learning process students are allowed to manipulate objects using mathematics learning media, such as teaching aids (Lestari & Yudhanegara, JPSD Vol. 6 No. 1, Maret 2020 ISSN 2540-9093 E-ISSN 2503-0558

2017). In line with the advantages of CPA, including giving students structured ways of learning mathematical concepts, students build rapport when moving through a level of concrete understanding towards the abstract, making learning involves all students with learning disabilities in mathematics be explicitly taught using a multi-sensory approach follow Universal Design for Learning guidelines, research has proven that this method is effective, can be used at all grade levels, in line with NCTM standards, helping students learn concepts before learning rules, can be used in groups small or whole class (Benard, 2012). The advantages of the CPA approach based on the three syntaxes, namely the gradual learning process that is the concrete stage, is useful to make learning closer to students because students can feel directly learned, pictorial becomes a concrete process bridge to the abstract on learning and the process of abstracting in mathematical language, this process makes learning meaningful for students.

The learning domains are cognitive, affective, and psychomotor. The area
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that was less raised in the study is effective, one of the affective domains that are quite interesting according to researchers is SE. SE beliefs function as determinants of the direction of motivation, influence, and human actions (Bandura, 1989). Furthermore, SE is the belief that one's behavior produces differences in Bandura, Pajares, Goddard, Hoy & Hoy, Schunk & Pajares, Zimmerman (Slavin, 2006). SE in the form of a person's thoughts and feelings that will affect perseverance, actions, efforts, flexibility in differences, and the realization of the goals, of this individual, so that SE related to one's ability often determines outcomes before actions occur (Damanhuri, Nulhakim, & Mukhtar, 2016).

From the previous description, SE is a person's belief in his ability to assess, manage, and carry out activities, challenges, and carry out tasks that are well following his experience. If the SE is improved, it will affect the LO.

Bandura as the originator of the SE explained the dimensions of the SE aspects, namely: covering three dimensions, including (a) Magnitude, namely assessing his own beliefs and

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abilities in overcoming various difficulties in completing tasks. (b) Generality means evaluating one's self-belief in certain activities (c) Strength, endurance and tenacity in fulfilling his duties (Bandura, 1994). SE students have several indicators to see how much SE they have. These indicators are 1) Confidence in one's abilities; 2) Confidence in facing difficult tasks; 3) Confidence in facing challenges; 4) Confidence in completing specific tasks; 5) Confidence in completing several different tasks (Lestari & Yudhanegara, 2017). Based on the description aspects and indicators studied consisted of four aspects and three indicators, SE aspects namely personal experience, the experience of others, verbal persuasion and psychological indexes. Each aspect contains three indicators, namely confidence in being able to complete difficult, challenging, and different tasks.

During the learning process, there are of course outcomes obtained, namely learning outcomes, LO is planned learning and learning atmosphere that makes students learn so that there are changes in (Utari, Maridi, Yulianto dkk

& Sugiharto, 2015). LO is a series of physical and mental activities to obtain behavior change as a result of individual experiences interacting with the environment about cognitive, affective and psychomotor Djamarah (Marjan, Arnyata, & Setiawan, 2014). LO is changed in behavior as a result of the

experiences gained in the learning process. Based on the description revealed the problem raised is whether there is a relationship between the achievement and improvement of mathematics LO with elementary school students' SE?.

B. Research Methodology

The type of study is a quasi-experimental design. This study is the Nonequivalent Control Group Design. This design of the experimental and control group was not chosen randomly (Sugiyono, 2016). The population is elementary school students in Purwakarta, Subang, Karawang, and Bekasi. The sample consisted of four classes, in two elementary schools in Karawang District consisted of 59 experimental students and 60 control students in fifth grade. The sampling

technique was purposive sampling, which was taking the sample with consideration (Martono, 2014). The research instruments consisted of Student LO tests, SE scale. Based on the trial scale the SE scale instruments found 24 items were used. For the LO instrument test results obtained 8 valid items. Linear Regression Test is used to see the relationship between variables. The following table criteria for the relationship between variables (Lestari & Yudhanegara, 2017).

Tabel 1
Guilfors Empirical Rules

Value of r	Interpretation
$0,00 < r < 0,20$	Very weak relationship (ignored, considered non-existent)
$0,20 \leq r < 0,40$	Low relationship
$0,40 \leq r < 0,70$	Moderate / sufficient relationship
$0,70 \leq r < 0,90$	Strong / high relationship
$0,90 \leq r \leq 1,00$	Very strong / high relationship

C. Research Result and Discussion

The recapitulation of the results of increasing SE and LO is presented in the correlation analysis with the linear regression test for achieving and Table 2 below:

Table 2
Recapitulation of Linear Regression Test Achievement & Improvement of SE & LO

Linear Regression Test	r Achievement of LO	r Improvement of SE	<i>p-value</i> (sign. 1 tailed)	Criteria
r Achievement of SE	0,044	-	0,318	Ho accepted
r Improvement of LO	-	0,053	0,284	Ho accepted

Findings in Table 2 of Self Efficacy and Learning Outcomes achieve p-value (sign. 1 tailed) greater than 0.05 means that Ho is accepted and there is no correlation between Self Efficacy and Learning Outcomes achievement, meaning that when high Self Efficacy achievement is not guaranteed high Learning Outcomes achievement, as well as achievement of Learning Outcomes medium and low. For Self Efficacy and Learning Outcomes increases with a p-value (sign. 1 tailed) greater than 0.05 means that Ho is accepted then there is no correlation between Self Efficacy and Learning Outcomes increases, which means that if the Self Efficacy increase is not possible then the Learning Outcomes

increase will be high, as will the medium increase and low.

Based on the findings in the research, that there is no relationship or correlation between the Self Efficacy with Learning Outcomes students, meaning that students who have a high Self Efficacy cannot be certain that their Learning Outcomes are high and vice versa.

This finding is quite in line with the findings of several studies including learning variables and Self Efficacy does not interact significantly in the achievement of students' science Learning Outcomes (Amanda, Subagia, & Tika, 2014). This study is quite different but not significant with the statement that there is a relative

contribution of SE (X1) to the academic achievement of students, and the value of $R = 0.472$. If the value is confirmed by the value of the interpretation of the closeness of the relationship from Guilford shows the relationship is in the medium criteria (moderate-high association) (Warsito, 2009).

Based on gender found the same thing, there is no relationship between Self Efficacy with the student mathematics Learning Outcomes (Fitriani, 2017). The findings are quite different but not significant only $<50\%$ ie the higher the Self Efficacy the higher the work readiness, and vice versa, with an effective contribution of 45.6% (Utami & Hudaniah, 2013). Self Efficacy is a critical factor in Self Regulated Learning (SRL) (Bandura, 1977), apparently, in Self Regulated Learning there is a positive correlation between Self Regulated Learning strategies and student achievement (Latipah, 2010). Based on the discussion outlined Self Efficacy has quite an influence on Learning Outcomes students although it is still in the low to moderate category.

Subsequent research showed that the results were not much different,

namely the correlation test results showed that there was a positive and significant relationship between self efficacy based on gender and science learning outcomes. The coefficient values generated in the correlation test indicate a low relationship between self efficacy based on gender and science learning outcomes (Hartini, 2019). On the other hand According to the analysis of the relationship between self-efficacy and learning outcome, there is real evidence to suggest that self efficacy does affect the learning outcome. However, expectancy and decision involvement were not significantly correlated with the dependent variable (Liyanage, 2007).

The cause of not finding a significant relationship between self-efficacy and mathematics learning outcomes is also caused by the lack of accuracy of students in doing their work because they are too confident with the results of their work. In line with the importance of accuracy, research results show a substantial correlation between accuracy and confidence will be observed if, because of variations in conditions, there are considerable variabilities across participants in the

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ability to identify the target. Manipulations that affected accuracy also affected confidence in the same direction, and when data were collapsed across conditions, the accuracy-confidence correlation was substantial (mean $r = 0.59$) (Lindsay, Read, & Sharma, 1998). This inaccuracy is because students are in too much of a hurry and cannot control their emotions. The results showed a positive relationship between self-regulated and learning-related emotions. Moreover, it was found that there was no significant difference between males and females students in the relationship between self-regulated and learning-related emotions (Jdaitawi, 2019). Then the development of Self Efficacy and Learning Outcomes needs to be done so that students can solve problems in life.

D. Conclusion

Achievement and improvement of Self Efficacy and Learning Outcomes there is no correlation between the two. These findings indicate students who have a high SE can not be ascertained high Learning Outcomes and vice versa. This finding is expected to be a consideration for educational drivers in schools to pay attention to students' affective aspects and contribute to the development of science, especially learning in Indonesia.

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