Construction Of Self-Efficacy Scale: A Psychometric Study For Students

Bani Mukti, Fatwa Tentama

Abstract: The purpose of this study was to analyze the construct validity and the construct reliability of self-efficacy, and to find indicators that form the construct of self-efficacy. Self-efficacy was measured by three aspects, namely level, generality, and strength. The subjects of this study were 68 students of SMP X. Data collection method in this research was using self-efficacy scale. The data of this research were analyzed by using Structural Equation Modeling (SEM) SmartPLS 3.2.8 with reflective constructs through CFA 2nd Order. Based on the results of the analysis, the aspects and indicators that form self-efficacy were declared valid and reliable. The most dominant aspect in reflecting the construct of self-efficacy was the level with a loading factor value of 0.905. The lowest aspect that reflects the construct of self-efficacy was generality with a loading factor value of 0.602. This result shows that all aspects and indicators were able to reflect and form self-efficacy variables. Therefore, the structural model could be accepted because the theory which describes self-efficacy was in accordance with empirical data that are obtained from the subjects.

Keyword: Construct Reliability, Construct Validity, Generality, Level, Self Efficacy, Strength

1. INTRODUCTION

THe achievement of educational goals can be measured from the acquisition of learning outcomes [1]. Slameto [2] states that learning outcomes are influenced by several factors, one of the factors that can affect learning outcomes is self-efficacy. According to Pajares [3] self-efficacy is a person's belief in his/her ability to be able to successfully achieving goals. Self-efficacy can lead to different behaviors among individuals with the same ability because self-efficacy affects choices, goals, problem solving, and persistence in trying [4]. Self-efficacy plays an important role in motivating behavior to complete challenging work in relation to achieving certain goals [5]. Students who have self-efficacy will remain in the face of obstacles or challenges that are given [6]. Therefore every student is required to have self-efficacy as an effort in realizing educational goals. Self-efficacy is one of the self-potentials that needs to be developed for adolescents, especially junior high school students because self-efficacy can give a strong influence on student learning outcomes, and self-efficacy influences individual task choices, energy, perseverance, and student achievement [7]. Self-efficacy is very important because self-efficacy is able to influence the effort which is done, and how strong its effort is in predicting success that will be achieved [8]. Individuals with high self-efficacy will try harder to overcome existing challenges [5]. Low self-efficacy causes individuals to be unable to do everything around them, and in difficult situations, individuals with low self-efficacy tend to give up easily [5].

Low self-efficacy will increase anxiety and cause avoidance behavior. Individuals will avoid activities that can aggravate the situation, this is not caused by threats but because they feel they do not have the ability to manage things that have risks [9]. Self-efficacy also plays an important role in motivating behavior to complete challenging work in relation to achieving certain goals [5].The concept of self-efficacy is actually the core of social cognitive theory proposed by Albert Bandura. It emphasizes the role of observational learning, social experience, and mutual determinism in personality development [10]. According to Bandura [10] self-efficacy is a person's belief in his ability to exercise some control over one's own functions and events in the environment. Bandura also describes self-efficacy as a determinant of how people feel, think, motivate themselves, and behave [9]. The application of self-efficacy theory to academic behavior is began by [11]. Research has supported that self-efficacy beliefs are significantly related to choice and performance in the realm of academic behavior [9]. At the academic level, self-efficacy refers to beliefs about one's perceived ability to perform academic assignments that are given at a specified level [12]. Most of the available literature on self-efficacy comes from the concept of social cognitive bandura [12]. Self-efficacy is defined as the trust level which is had by individual in his/her ability to take action or achieve specific performance results [12]. Self-efficacy can influence motivation, how much effort which is done will be applied to achieve results, and the level of persistence applied to tasks in the face of difficulties and setbacks [12]. Self-efficacy and performance have been the focus of many studies [14], [15],[16]. Self-efficacy is defined as the trust level of individuals about their ability to take action or achieve specific performance results [9]. Myers [17] states that self-efficacy is the concept that precedes the emergence of the power of positive thoughts, optimistic beliefs about opportunities for success. According to [18] self-efficacy is an individual's beliefs about his ability; the ability to cope with situations and the ability to succeed in a task. According to Alwisol [19] self-efficacy is self-assessment, whether it can do good or bad actions, right or wrong, can or cannot do as required. Ormord [20] generally defines self-efficacy as an individual's assessment of his own ability to carry out certain behaviors or achieve certain goals.

At this time, there are a lot of self-efficacy research with a scale which is made abroad. We cannot use this scale directly in Indonesia, because of differences in language and culture. In the previous validity and reliability research conducted by [21], she examined self-efficacy in which the researcher used the self-efficacy scale compiled by James and Mandzux based on Bandura theory consisting of level, generality, and strength aspects. The results of the factor analysis from the research conducted by Suharsono and Istiqomah (2014) got a self-efficacy scale reliability of 0.877. Next, the research on the development of self-efficacy scale conducted by Ardiyanti [22] showed that the value of the item reliability was 0.91. Whereas in this research of the validity and construct of self-efficacy, the

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researchers also used Bandura theory consisting of aspects of level, generality, and strength by using the SmartPLS 3.2.8 program to test the construct validity and construct reliability of the self-efficacy scale. Based on the analysis results, this study obtained a reliability value of 0.824 Cronbach's alpha value of 0.713 and averange variance extracted value of 0.550. Self-efficacy is the condition when individuals are able to feel their abilities and are confident in their expertise. The indicators of self efficacy are that a person will complete his/her task according to ability, confidence to complete the task, and be able to work under pressure. In daily life, self-efficacy leads individuals to set challenging ideals and persist in the face of difficulties. More than one hundred studies show that self-efficacy predicts worker productivity [23]. When problems arise, a strong sense of self-efficacy drives workers to stay calm and find solutions rather than contemplate their inability. The research conducted by Flores, Ojeda, Huang, Gee, and Lee [24] states that self-efficacy in career decision making is an individual's belief that he/she is able to perform tasks related to making career decisions. Individuals with self-efficacy in making high career decisions will succeed in making career decisions that are right for themselves. According to Bandura [9] there are three aspects of self-efficacy, namely: level, generality, and strength. First; Level, related to the degree of task difficulties encountered. One's acceptance and belief in a task is different, maybe people are limited to simple, medium or difficult tasks. The perception of each individual will be different in looking at the level of difficulty of a task. Second; Generality, Generality is the feeling of ability shown by individuals in different task contexts through their behavior, cognitive and affective. Third; Strength, it is the strength of someone's beliefs about his/her abilities. This is related to the resilience and tenacity of individuals in fulfilling their duties. Individuals who have strong confidence and stability in their ability to carry out a task will continue to survive in their business despite many difficulties and challenges. Experience has an influence on individual self-efficacy. Weak experience will weaken the individual's beliefs as well. Individuals who have a strong belief in their ability will be firm in their efforts to address the difficulties that they are facing. Zimmerman's research [25] states that children who have high efficacy will be more ready to participate, work harder, survive longer and have fewer adverse emotional reactions than those who have lower efficacy.

H: the aspect of self efficacy, that is level, generality, and strength can bulit the construct of self efficacy.

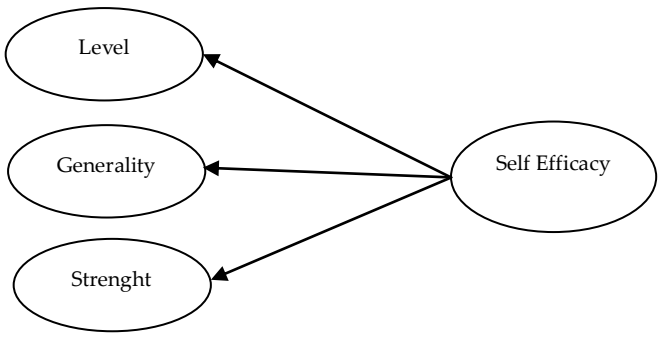

***Fig. 1**. Conceptual Framework for self efficacy variables*

One of the approaches that can be used in testing the construction of measuring instrument is Confirmatory Factor Analysis. Confirmatory Factor Analysis (CFA) is one of the main approaches in factor analysis. CFA can be used to test the dimensionality of a construct. This test is used to measure the model (model measurement) so that it can describe the dimensions and indicators of behavior in reflecting latent variables namely quality of work life by looking at the factor loading of each aspect that forms a construct. Confirmatory Factor Analysis (CFA) is also used to test the validity of the extract and the reliability of the extracts from the indicators (items) forming latent construct [26]. The CFA used in this study is a second order confirmatory factor analysis (2nd Order CFA); it is a measurement model that consists of two levels. The first level of analysis is carried out from the latent construct of the dimension to its indicators and the second analysis is carried out from the latent construct to its dimension construct [26]. Based on the description above, this study aimed to analyze the construct validity and construct reliability of self-efficacy, as well as to find indicators that form the construct of self-efficacy. Considering the importance of the self-efficacy variable, the research on the reliability and validity of the construct of self-efficacy scale is important because the understanding of the self-efficacy construct always develops as a multidimensional construct.

2 METHOD

2.1 Participant

In this study, the research subjects were 68 students of SMP X. The subjects consisted of male and female genders who were willing to participate in the study.

2.2 Research Design

The design in this study was semi-construction. The researcher made a scale design using theoretical collaborative studies with direct information obtained from the data in the field. The advantage of using this semi-construction design was to strengthen existing theories and reproduce as many behavioral indicators as possible. Then testing the psychometric properties, including one confirmatory factor analysis [27].

2.3 Instrument

The self-efficacy scale was arranged by the researchers based on the aspect of self-efficacy proposed by Bandura [9]. The aspects that were used in constructing the scale of this research were level, stability, and generality. The scaling method on the self-efficacy scale used Likert scale model which was developed by the researchers using four answer choices. This scale consisted of 21 items/statements with two directions favorable and unfavorable statements. The score in this statement can be seen in table 1:

TABLE 1

THE SCORE OF SELF-EFFICACY SCALE

Statement	Favorable Score	Unfavorable Score
SS	4	1
S	3	2
TS	2	3
STS	1	4

In the first aspect of the level, it used the example statement:

"I feel that it is difficult to do assignments in front of the class even if the teacher appointed or not appointed" and "difficult subject matter makes me not confident". In the second aspect of generality, it used the example statement: "I feel that it is hard to focus on studying before the exam if the learning time specified by the teacher is only a little" and "If my parents have a problem, it disrupts my concentration in learning". The third aspect is strength with the example statement: "I feel that I can do assignments in front of the class even if I am appointed or not appointed by the teacher" and "I believe that I can do many different tasks with a maximum effort".

TABLE 2

BLUEPRINT OF EFFICACY SCALE

Aspect	Indicator	No Item	Total
Level	Someone will complete the task based on his/her ability	8,9,11,12 ,15,17,18 , 20	8
Generality	Completing the main task with other tasks simultaneously in a certain time	3,5,6,7,1 9	5
	Planning based on schedule		
Strength	Confidence to complete work tasks under pressure / conditions	1,2,4,10, 13, 16, 14,21	8
	Total		21

2.4 Validity and Reliability

This research was intended to test the validity and reliability of efficacy measures constructs for outer model testing using the smartPLS 3.2.8 program. Construct validity test which was conducted was confirmatory to show how well the results obtained from the use of measuring devices with reference to the theory used to define a construct. The construct validity test included convergent validity which referred to the result of a loading factor value of > 0.5. It was considered significant, while the average variance extracted (AVE) value of > 0.5 and the discriminant validity was performed by comparing the roots of the average variance extracted or AVE where the value must be higher than the correlation between existing aspects. Furthermore, the reliability test was conducted with the aim to demonstrate the internal consistency of the measuring instruments used. The trick was to look at the value of composite reliability and Cronbach's alpha which according to Cooper the value that must be owned > 0.6 [28].

2.5 Data Analysis

Data in this study were analyzed using the SmartPLS 3.2.8 program with reflective constructs through the 2nd Order CFA. According to Abdillah and Hartono [29], PLS is a variance-based structural equation analysis (SEM) that can simultaneously test measurement models to test the validity and reliability.

3 RESULT

Based on the results of the outer model test analysis on the scale of self-efficacy which was conducted using smart PLS program 3.2.8, these produced an Outer model that can be seen in Figure 1.

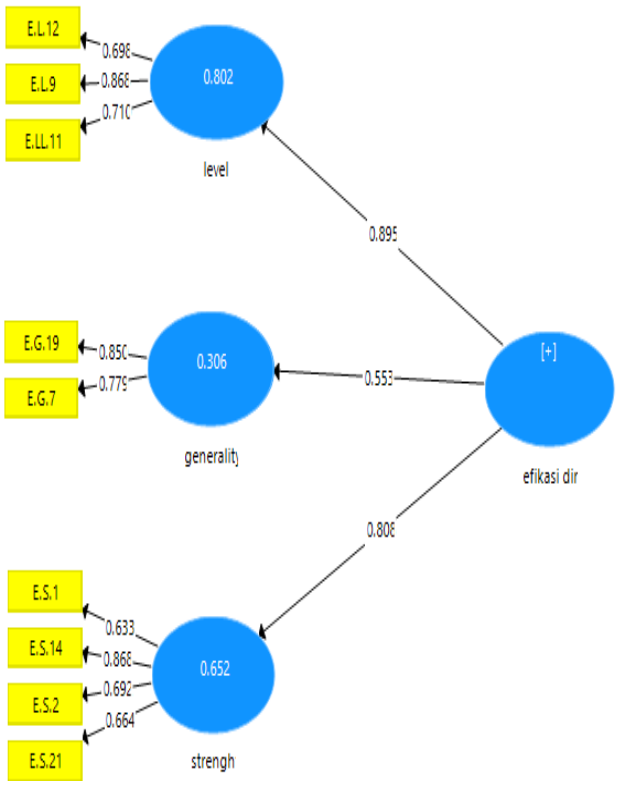

***Fig. 2**. The outer test output the self-efficacy construct model*

3.1 Validity Test Result

Based on the test of convergent validity on the outer model shows that the loading factor value > 0.5 can be shown in table 3.

TABLE 3

LOADING FACTOR VALUE (VARIABLE-ASPECT)

Aspect	Loading factor Value	Information
Level	0.905	Valid
Generality	0.602	Valid
Strength	0.728	Valid

Based on the test of convergent validity on the outer model, the loading factor values obtained from aspects to the indicators which have a value > 0.5. These can be seen in table 4.

TABLE 4

LOADING FACTOR VALUE (ASPECT-INDICATOR)

Item	Loading factor Value	Information
EL.9	0.870	Valid
EL 11	0.593	Valid
EL.12	0.783	Valid
E.G.7	0.705	Valid
E.G.19	0.903	Valid
E.S.1	0.529	Valid
E.S.2	0.709	Valid
E.S.14	0.915	Valid
E.S.21	0.653	Valid

Based on the convergent validity test value, it shows that the

average root value of variance extracted AVE in the construct of self-efficacy is 0.550 with the average variance extracted or AVE value in each aspect which can be seen in table 5.

TABLE 5

THE VALUE OF AVERAGE VARIANCE EXTRACTED (AVE)

Aspect	AVE Value	Information
Generality	0.657	Valid
Level	0.574	Valid
Strength	0.511	Valid

3. 2 Discriminant Validity

Based on the discriminant value, this shows that the results of the AVE root value in each aspect must be higher than the root value of the average variance extracted or AVE in other aspects, so that the discriminant validity criteria are fulfilled. The root value of the average variance extracted or self-efficacy construct AVE can be seen in table 6.

TABLE 6

THE ROOT VALUE OF AVERAGE VARIANCE EXTRACTED (AVE) OF THE CONSTRUCT OF SELF EFFICACY

Aspect	Generality	Level	Strength
Generality	0.810	0.455	0.174
Level	0.465	0.757	0.611
Strength	0.174	0.611	0.715

3. 3 Construction Reliability Test

Based on the results of the reliability test that has been done, the value of Composite Reliability and Cronbach alpha's > 0.7 can be obtained, therefore the items which are used in this study are reliable and these can be seen in Table 7.

TABLE 7

VALUE OF COMPOSITE RELIABILITY AND CRONBACH'S ALPHA OF SELF EFFICACY CONSTRUCT

Variable	Composite Reliability	Cronbach's Alpha	Introduction
Self-efficacy	0.824	0.713	Reliable

The results of construct reliability testing using Confirmatory Factor Analysis 2nd Order in Table 6 above show that constructs have good reliability and give meaning that aspects that measure constructs/latent variables of self-efficacy can fulfill one-dimensional criteria [30]. This is indicated by the Composite Reliability value of 0.824 and Cronbach's Alpha 0.713. The validity and reliability test of the construct results in valid and reliable items that are able to reflect aspects of self-efficacy, namely the items at number 1, 2, 7, 9, 11, 12, 14, 19, and 21 while the items that are not able to reflect self-efficacy are the item at number 3, 4, 5, 6, 7, 8, 10, 13, 15, 16, 17, 18, and 20. Based on the processing and analysis of research data through the aspects of the variable/self-efficacy construct that was formed by using the Confirmatory Factor Analysis 2nd Order, the results show that the model is acceptable, because all aspects are able to reflect on the variables/constructions that are formed.

4 DISCUSSION

Based on the results of the analysis of construct validity and construct reliability, the aspects and indicators that form self-efficacy are declared valid and reliable so that all aspects and indicators are able to reflect and form students' self-efficacy. In this study, it is proven that the aspect level has the highest loading factor value of 0.895 as a constructor of the construct of self-efficacy compared to other aspects, namely the strength indicator with a loading factor of 0.808; and generality with a loading factor of 0.553. The most dominant aspect is the level aspect that can reflect self-efficacy which the main indicator is able to complete the task based on his/her ability. The form of concrete behavior is being able to learn the material delivered by the teacher in class and being able to do the tasks given by the teacher. The weakest aspect in reflecting self-efficacy is the generality aspect where the main indicator is completing the main task with other tasks simultaneously in a certain time and planning according to the schedule. The specific behavior is that students complete all assignments of each subject given by the teacher and students can complete their assignments according to the time specified by the teacher. The results of this study are in accordance with self-efficacy proposed by Sherer, et al [31] which shows that self-efficacy has a Cronbach alpha reliability coefficients value of 0.70 but its value is lower than this study which is 0.713. The results of this study are expected to provide an overview of the validity and reliability of the construct of self-efficacy in the educational context in Yogyakarta. Therefore it can be used as a reference in further research related to self-efficacy.

5 CONCLUSION

The conclusion in this study is that the aspects and indicators that form self-efficacy are declared valid and reliable. The most dominant aspect in reflecting the construct of self-efficacy is the level with a loading factor value of 0.905. The lowest aspect that reflects the construct of self-efficacy is generality with a loading factor value of 0.602. All aspects and indicators are able to reflect and form a construct of self-efficacy. Therefore, the structural model can be accepted because the theory describing self-efficacy is in accordance with empirical data which are obtained from the subjects.

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