

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

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ABSTRACT: The purpose of this study was to test the theoretical model stating that: "The Influence/Role of Growth Mindset directly, Parental Social Support, Emotional Intelligence through self-efficacy on students' self-regulated learning Fit (in accordance) with empirical data?". And also to determine the correlation relationship between variables, namely: 1). Testing the Influence of Growth Mindset directly on Self-Regulated Learning. 2). Testing the Influence of Parental Social Support directly on self-regulated learning 3). Testing Parental Social Support on self-regulated Learning through self-efficacy. 4). Testing the influence of emotional intelligence directly on self-regulated learning. 5). Testing the influence of Emotional Intelligence on self-regulated learning through self-efficacy. 6). Testing the Influence of self-efficacy on self-regulated learning. **The research method** is a quantitative survey method, and data analysis with SEM (AMOS version 24, Population & sample are students of SMAN Kota Bekasi and SMAN Kabupaten Bekasi totaling 240 samples. **The results of the study explain** 1). The relationship between GM-SRL with a value of $P = 0.007 < 0.05$, then H1 is accepted, meaning that there is a direct influence of Growth Mindset on self-regulated learning. 2). The relationship between DS-SRL with a value of $P = 0.025 < 0.05$, then H2 is accepted, meaning that there is a direct influence of Parental Social Support on self-regulated learning. 3). The relationship between KE-SRL with a value of $P = 0.000 < 0.05$, then H3 is accepted, meaning that there is a direct influence of Emotional Intelligence on self-regulated learning. 4). The relationship between DS-SE -SRL with a value of $P = 0.013 < 0.05$, then H4 is accepted, meaning that there is an influence of Parental Social Support on Self-regulated learning through the mediator Self Efficacy. 5). The relationship between KE-SE-SRL with a value of $P = 0.010 < 0.05$, then H5 is accepted, meaning that there is an influence of Emotional Intelligence on Self-regulated learning through the Self-efficacy variable. 6) The relationship between SE-SRL with a value of $P = 0.000 < 0.05$, then, H6 is accepted, meaning that there is an influence of Self Efficacy on self-regulated learning. So it can be concluded that the study with $N = 240$ is significant, meaning that because the value of $P < 0.05$ means that H_a is accepted and all variables are Valid, stated to have a role in self-regulated learning.

KEYWORDS: Keywords: Self-Regulated learning, Growth Mindset, Parental Social Support, Emotional Intelligence and Self Efficacy

I. INTRODUCTION

BACKGROUND OF THE PROBLEM

The results of the PISA (Programme for International Student Assessment) study, an education program managed by the Organisation for Economic Co-operation and Development (OECD) to measure student abilities in various countries around the world in 2022. The assessment of Indonesian students ranked 68th out of 81 countries, previously in 2018 Indonesian students were ranked 74th out of 79 countries. This PISA study was conducted on 690 thousand students studying mathematics aged 15 years, from 81 countries. Assessments in minimum abilities include discipline, literacy, numeracy, character surveys and learning environment surveys. The results of the survey conducted by the Programme for International Student Assessment (PISA) in 2018 and 2022, namely the reading, Science, and Mathematics ability scores of Indonesian students are relatively low. Mathematical ability is an individual's ability to understand and use mathematical principles, both in the context of mathematics itself and in various areas of everyday life. This ability covers various aspects, such as understanding concepts, reasoning, problem solving, communication, and connections between mathematical concepts. Mathematics is a subject that reveals the overall structure of numbers or figures related to arithmetic operations and which includes solving calculations and learning science from the results

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

of human thought related to ideas, processes, and reasoning, creative arts, in the form of symbols or terms that are the result of mutual agreement, whose existence is used in everyday life, especially in the development of science and technology.

Sumarno and Mufarrihah (2019) classify basic mathematical abilities into five standards of ability, namely: a) Mathematical understanding; b) mathematical problem solving; c) mathematical reasoning; d) mathematical connections; and e) mathematical communication. The National Council of Teachers Mathematics (NCTM) sets standards for mathematical abilities such as problem solving, reasoning and proof, communication, connections, and representation that students should be able to have. Febriyanti & Ihsan Imami's (2021) research explains that students' abilities in self-regulated learning in class VIIID students in mathematics learning seem to have different percentage levels at each phase. In the planning phase, the average score was 27.47%, then in the implementation phase, the average score was 33.02% and in the evaluation phase, the lowest average score was 24.30%. While overall, the application of self-regulated learning in class VIIID students is still very low with an average of 28.96%, meaning that almost half of the students are in the stage of being able to learn independently. However, considering these less than satisfactory results, students' self-regulated learning in mathematics learning needs to be improved. This is a task for educators to be able to create good learning conditions and make the latest innovations so that students become interested in learning independently, in order to achieve student learning goals, and make students who are able to achieve success in their learning. The Regulation of the Minister of National Education explains that the subject of mathematics aims for students to have the following abilities: (1) understand mathematical concepts, explain the relationship between concepts and apply concepts or algorithms flexibly, accurately, efficiently and precisely in solving problems, (2) use reasoning on patterns and properties, perform mathematical manipulations in making generalizations, compile evidence, or explain mathematical ideas and statements, (3) solve problems which include the ability to understand problems, design mathematical models, solve models, and solve models and interpret the solutions obtained, (4) communicate ideas with symbols, tables, diagrams or other media to clarify situations or problems, (5) have an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, attention and interest in studying mathematics, as well as a persistent and confident attitude in solving problems. The ability to manage learning independently is often also referred to as self-regulated learning. Zimmerman was the first researcher of self-regulated learning, in (1989), in his research he stated that with Self Regulated Learning students can be observed to what extent their active participation in directing metacognitive processes, motivation and behavior while they are learning. The metacognitive process is a process where students are able to direct themselves while learning, are able to plan, organize, direct themselves and conduct self-evaluation at various levels during the learning process.

Previous studies that prove the factors that influence self-regulated learning include,

- 1) Research by Aimah and Ifadah (2014), found that self-regulated learning is influenced by three main factors, namely, self-confidence (self-efficacy), motivation and goals. Self-efficacy affects how individuals think, feel, motivate themselves, and act.
- 2) Research by Damayanti, Aransik, Srigustini (2021) found that research using Path Analysis showed that self-efficacy influenced Self-Regulated Learning by 45.3%, self-efficacy influenced metacognitive abilities by 20.4%, Self-Regulated Learning influenced metacognitive abilities by 24.59% and self-efficacy influenced metacognitive abilities through Self-Regulated Learning by 11.28%.
- 3) Research by Oktariani, Munir, Aziz (2020) found that Self Efficacy contributed to Self-Regulated Learning by 9.3%. Peer social support contributes to Self-regulated Learning by 7.3%. Self-efficacy and peer social support influence Self-regulated Learning by 12.9%, this means that there are still 87.1% other factors that can influence Self-regulated Learning.
- 4) Research by Lubis & Lubis, (2016), found the results of the hypothesis test that there is a relationship between social support and students' self-regulated learning. The better the social support provided by parents to students, the better the students' self-regulated learning.
- 5) Research by Karina. (2014) states that emotional skills are important to provide in the child's learning process, because this can improve the child's academic achievement and school performance. It is further explained that emotional skills can provide basic information to children in an effort to find ways to resolve interpersonal disputes more positively, children will have greater self-confidence, not blame themselves if something happens and feel that they have many supporters, namely teachers and parents who they can ask for help.
- 6) Research by Nabila, Suharsono, Mustafa (2020) found the results of the hypothesis test that there is a correlation between emotional intelligence and self-regulated learning with a significance value of $0.030 < 0.05$, meaning a significant positive correlation.
- 7) Research by Endriati (2017) found a positive and significant relationship between emotional intelligence and self-regulated learning. The higher the emotional intelligence, the higher the self-regulated learning of students because emotions influence the learning process and also play a role in student involvement in learning something.
- 8) Research by Waode, Ahmad, Novita (2023) explains that there is a significant influence between self-efficacy and self-regulated learning. The coefficient of determination value is 0.392, so it can be concluded that self-efficacy has an influence of 39.2% on self-regulated learning, where 60.8% is influenced by other variables that the researcher did not examine.
- 9) Research by Mrazek et al., (2018), found that students who have a positive view of the efforts needed to achieve learning goals tend to be

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

able to develop good self-regulated learning. Positive views are related to mindset. A growth mindset that is well developed by students will help students to be able to manage themselves in learning. Students who have a growth mindset will focus on the learning process rather than the results, so that when facing challenges they will be more persistent in achieving their goals.

10) Research by Sari.A (2022), found that there was a significant positive influence at the $p = 0.05$ level, self-efficacy affects self-regulated learning through Growth Mindset,

11) Research by Hanapi and Agung (2018), explains that Self-efficacy is influenced by social support variables. Their research describes that there is a relationship between peer social support and self-efficacy in completing a thesis in students. And self-efficacy affects self-regulated learning. This means that self-efficacy can be a mediator between parental social support and self-regulated learning. 12) Kristiana, K's research (2015) explains, From the data analysis of 60 teachers from XYZ school, it was found that emotional intelligence has a significant effect on self-efficacy. While self-efficacy affects students' self-regulated learning. This means that self-efficacy can be said to be a mediator between emotional intelligence and self-regulated learning.

From the description of the research above which explains the relationship between the variables studied in this study, it can be concluded that the self-efficacy variable can be a mediator variable for the parental social support variable, and the emotional intelligence variable, while the growth mindset variable has a direct effect on self-regulated learning. So from this description, the researcher concluded that the self-efficacy variable mediates the parental social support variable, and the emotional intelligence variable, and the Growth Mindset variable has a direct effect on the self-regulated learning variable,

Based on the description above, the variables that are suspected of influencing self-regulated learning in high school students in Bekasi City and Bekasi Regency are self-efficacy as a mediator of parental social support and emotional intelligence, and growth mindset has a direct effect on self-regulated learning.

Based on the description above, this study intends to examine learning problems in mathematics subjects in high school students with endogenous variables of self-regulated learning in high school students in Bekasi City and Bekasi Regency. For this reason, this study is entitled: Self-regulated learning model in learning mathematics in public high school students in Bekasi City and Regency.

RESEARCH PROBLEMS

Based on the background of the problems above, several problems can be identified related to self-efficacy, parental social support, emotional intelligence, growth mindset, and self-regulated learning of students in Bekasi City and Regency.

Learning in high school students in grade XII throughout Indonesia, especially Bekasi City and Bekasi Regency, will face a period of preparation for entering college. There are two conditions that will be passed through the preparation period for the Exam at school and the preparation period for entering college, namely readiness to learn by being able to manage the learning process independently, and understanding learning patterns to prepare for taking the college entrance test. This requires good self-regulated learning in high school students. To achieve learning and preparation for entering college. What is needed personally by students is good self-confidence (self-efficacy), parental social support, and emotional intelligence with a Growth Mindset that is oriented towards the future. Based on the results of observations made, self-management in learning is a problem that must be overcome by high school students in Bekasi City and Bekasi Regency in particular and high school students throughout Indonesia in general.

The variable of self-regulated learning of students is influenced by several factors that will encourage students to be able to develop it. This study focuses on the factors that influence self-regulated learning in high school students, where, self-regulated learning as an endogenous variable, Growth mindset, Parental social support, and Emotional intelligence as exogenous variables and Self-Efficacy as a mediator.

Furthermore, the problem in this study is formulated into the following research question:

"Does the Theory that states that Growth Mindset has a direct effect, Parental Social Support and Emotional Intelligence through Self Efficacy have an effect on students' self-regulated learning (Fit) according to Empirical Data?"

In addition, this study also aims to determine the correlation between variables, namely:

1. Testing the direct effect of Growth Mindset on self-regulated learning.
2. Testing the direct effect of Social Support on self-regulated learning
3. Testing the effect of parental social support on self-regulated learning through Self Efficacy.
4. Testing the direct effect of Parental Social Support on Self vEfficacy.
5. Testing the Influence of Emotional Intelligence Directly on Self-Regulated Learning.
6. Testing the Influence of Emotional Intelligence on Self Efficacy.
7. Testing the Influence of Emotional Intelligence on Self-Regulated Learning through Self Efficacy
8. Testing the Influence of Self Efficacy on Self-Regulated Learning

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

RESEARCH DESIGN

Based on the description of the research problem above, the research design is:

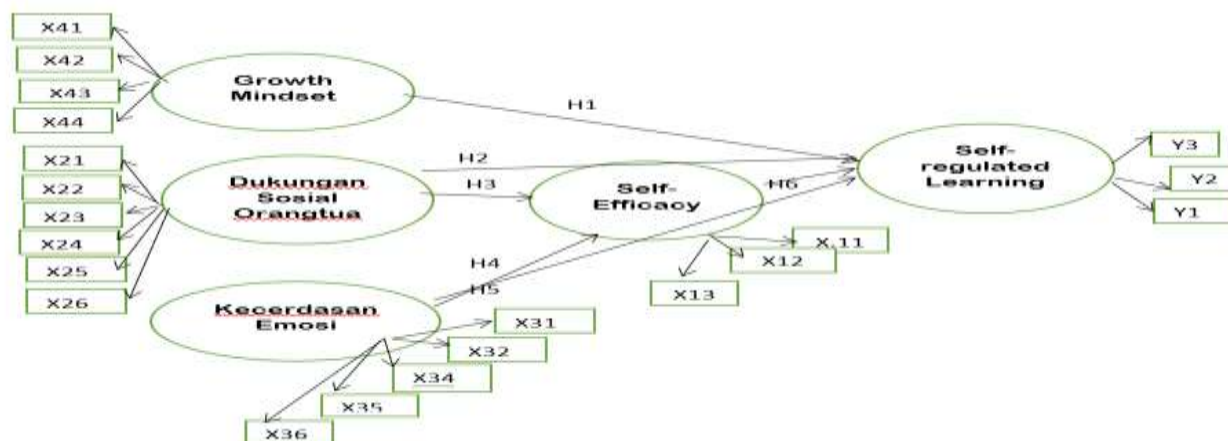


Figure: 2.1: Research Design of Self Regulated Learning Model in Learning Mathematics in Bekasi City and Bekasi Regency

RESEARCH METHOD

The variables presented in the study are five variables consisting of endogenous variables, exogenous variables and mediator variables, namely: 1) Endogenous variables: Self-regulated learning 2). Exogenous variables consisting of: a). Growth Mindset, b). Parental Social Support. c). Emotional Intelligence. d). Mediator Variable: Self-efficacy. The research instrument is measured using a Likert scale with a Likert of 5, namely: never = (TP) = 1 Ever (P) = 2, Quite Ever (CP) = 3 Often (Sr) = 4, Always (SI) = 5, which has been tested on 60 Student SMAN students with the following results:

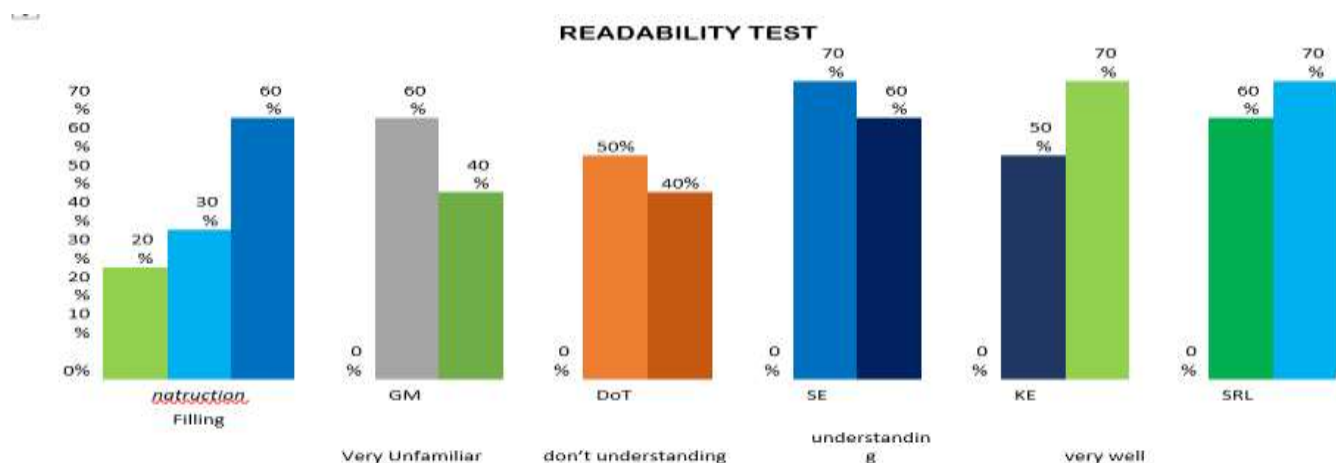


Figure 2.2 Readability Test Results

Figure 2.2 shows that most students are able to understand the items of each measurement construct given and also the instructions for filling it in. And all students who were asked in the readability test already understood and comprehended the readability instructions. Population and sample of this research in high schools in Kota Bekasi dan kabupaten bekasi are all high school students in Bekasi City and Regency. Students in high schools who have taken the Computer-Based Written Exam (UTBK). Based on the data in Table 1. From 25 high schools in Bekasi City and Regency. From the selected high school data, the researcher selected six (6) high schools that have implemented UTBK, taken from 3 high schools in Bekasi City and 3 high schools in Bekasi Regency as the research population as follows:

Table 4.1 Population in schools in Bekasi city and district

No	School Name	Number of class IX	Information
1	SMAN 2 Bekasi	605 Student	At Bekasi city
2	SMAN 1 Bekasi	605 Student	At Bekasi City
3	SMAN 4 Bekasi	605 Student	At Bekasi City

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

4	SMAN 1 Tambun Selatan	605 Student	At Bekasi regency
5	SMAN 2 Tambun Selatan	605 Student	At Bekasi Regency
6	SMAN 1 Cikarang Utara	605 Student	At Bekasi regency
Total		3.630 Siswa	

Based on Table.1 above, the research population is students in six selected senior high schools, namely three senior high schools in Bekasi City, and three senior high schools in Bekasi Regency. with a total of 3,630 students. The research sample is part of the population in 6 schools and is taken as part, namely 40 in each senior high school in Bekasi City and Bekasi Regency, totaling 240 students consisting of grades X - XI who have followed the Based on Table.1 above, the research population is students in six selected senior high schools, namely three senior high schools in Bekasi City, and three senior high schools in Bekasi Regency. with a total of 3,630 students. The research sample is part of the population in 6 schools and is taken as part, namely 95 in each senior high school in Bekasi City and Bekasi Regency, totaling 240 students consisting of grades X - XI who have followed the learning mathematics subjects

Estimation of Research Instrument Reliability

Table 4.2 Reliability Test

Variable	Cronbach's Alpha	critical point	Note
Parental Social Support	0,984	0,6	Reliable
Growth Mindset	0,990	0,6	Reliable
Inteligency emosi	0,990	0,6	Reliable
Self Efficacy	0,705	0,6	Reliable
Self Regulated learning	0,832	0,6	Reliable

Based on Table 4.2 above, each variable has a reliability coefficient greater than the critical point (0.6), so it is concluded that all variables are reliable.

Mahalanobis distance is needed for each observation on all variables of an observation in a multidimensional space. The outlier test is carried out with the Mahalanobis Distance criteria at the $p < 0.001$ level. This Mahalanobis Distance is evaluated using X^2 at the same degree of freedom as the number of variable indicators used in the study. In this study, the number of indicators used was 21 so that at the p level of 0.001 the X^2 table value was 46,797. So if the highest Mahalanobis Distance value is lower than 46,797, it means there is no outlier data. Presented in the following table:

Table 4.3 Mahalanobis Distance Test

Group	Description						Conclusion
Total data of 240 respondents	Observation number	189	23	19	1	37	No outliers
	Mahalanobis d-squared	45,433	44,455	43,917	43,617	40,206	
	p1	0,002	0,002	0,002	0,003	0,007	
	p2	0,580	0,324	0,158	0,065	0,371	
State Senior High School 1 Bekasi City	Observation number	61	55	19	34	23	No outliers
	Mahalanobis d-squared	38,803	33,567	33,297	32,746	32,614	
	p1	0,010	0,040	0,043	0,049	0,051	
	p2	0,628	0,900	0,781	0,692	0,530	
State Senior High School 2 Bekasi City	Observation number	42	7	94	16	4	No outliers
	Mahalanobis d-squared	37,825	35,811	35,357	34,912	33,975	
	p1	0,014	0,023	0,026	0,029	0,036	
	p2	0,725	0,644	0,445	0,294	0,266	
State Senior	Observation number	62	90	32	24	69	No outliers

**Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency
(Analysis of Amos Version 24 Application)**

High School 4 Bekasi City	Mahalanobis d-squared	37,676	36,666	36,541	36,143	33,544	
	p1	0,014	0,018	0,019	0,021	0,041	
	p2	0,740	0,523	0,270	0,141	0,341	
State Senior High School 1 North Cikarang, Bekasi Regency	Observation number	71	41	37	9	17	No outliers
	Mahalanobis d-squared	45,068	36,063	35,876	35,176	34,979	
	p1	0,002	0,022	0,023	0,027	0,028	
	p2	0,149	0,609	0,363	0,255	0,134	
	Observation number	57	60	65	55	74	
	Mahalanobis d-squared	39,193	37,883	36,578	34,571	34,357	
South Tambun 1 State Senior High School, Bekasi Regency	p1	0,009	0,013	0,019	0,031	0,033	No outliers
	p2	0,589	0,361	0,265	0,350	0,208	
	Observation number	41	32	48	30	10	No outliers
South Tambun 2 State Senior High School, Bekasi Regency	Mahalanobis d-squared	39,822	38,633	37,775	37,683	37,557	
	p1	0,008	0,011	0,014	0,014	0,015	
	p2	0,526	0,276	0,142	0,045	0,013	

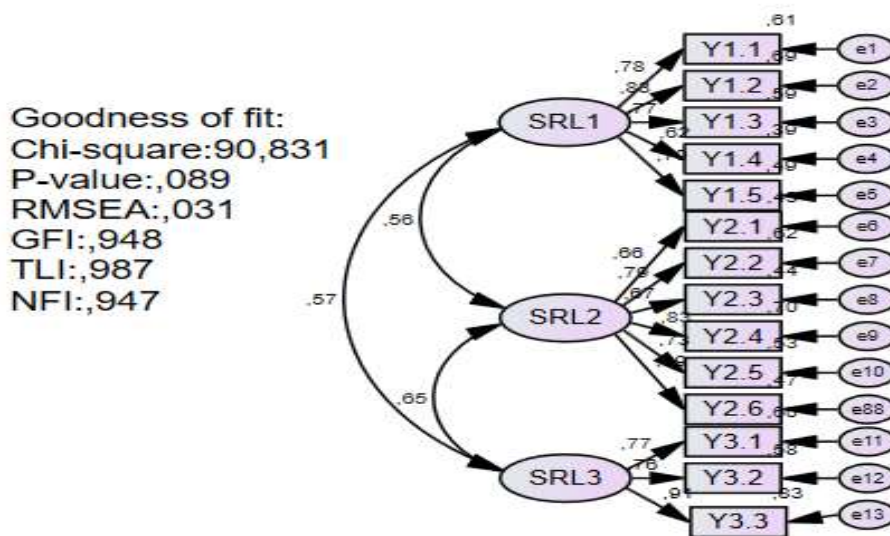
Based on table 4.3 above, the highest Mahalanobis Distance value in each data group is lower than the X2 table (46.797), meaning there are no outliers.

Confirmatory Factor Analysis (CFA) test variables

Researchers tested the suitability of the measurement model using the Confirmatory Factor Analysis (CFA) model. The following analysis results show items that have good factor loading, namely above or equal to 0.5 (items that have a loading factor below 0.5 are dropped). The analysis results have also been modified to obtain a better file index.

A. Self Regulated Learning Variable

Based on the Confirmatory Factor Analysis (CFA) test for Self Regulated Learning, the results presented are obtained.



Gambar 2.3. CFA Self Regulated Learning

Indeks loading factor dan realibilitas pada variabel Self Regulated Learning disajikan dalam tabel berikut:

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

Table 4.4 Loading Factor Index and Reliability of Self Regulated Learning Variables

Dimensions	Item	Loading Factor Value	Status	CR
Y1 (Meta Kognisi)	Y1.1	0.779	Valid	0.860
	Y1.2	0.832	Valid	
	Y1.2	0.770	Valid	
	Y1.4	0.622	Valid	
	Y1.5	0.697	Valid	
Y2 (Motivasi)	Y2.1	0.657	Valid	0.881
	Y2.2	0.788	Valid	
	Y2.3	0.667	Valid	
	Y2.4	0.834	Valid	
	Y2.5	0.730	Valid	
	Y2.6	0.775	Valid	
Y2 (Perilaku)	Y2.1	0.759	Valid	0.831
	Y2.2	0.909	Valid	
	Y2.2	0.687	Valid	

Based on the initial table 4.9, it is known that 14 items have a Loading Factor of ≥ 0.5 . Meanwhile, from the results of the construct reliability (CR) test, the construct reliability coefficient is classified as good, namely ≥ 0.7 . The goodness of fit index on the Self Regulated Learning Variable is presented in the following table.

Table 4.5 Goodness of Fit for Self-Regulated learning variables

Parameter	Analysis Result Value	Fit Criteria	Conclusion
CFI	0.990	≥ 0.90	Good fit
TLI	0.987	≥ 0.90	Good fit
IFI	0.990	≥ 0.90	Good fit
RMR	0.023	≤ 0.05	Good fit
GFI	0.948	≥ 0.90	Good fit
RMSEA	0.031	≤ 0.08	Good fit
Chi Square	90.831	Kecil	Good fit
P	0.089	≥ 0.50	Good fit
AGFI	0.926	≥ 0.90	Good fit

Source: processed primary data, 2025

Based on the index above, it can be concluded that the Self-Regulated Learning Variable measurement model is suitable or fits the empirical data because it has met the 9 fit criteria.

B. PARENTAL SOCIAL SUPPORT VARIABLE

Based on the Confirmatory Factor Analysis (CFA) test for the Parental Social Support Variable, the results presented are obtained.

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

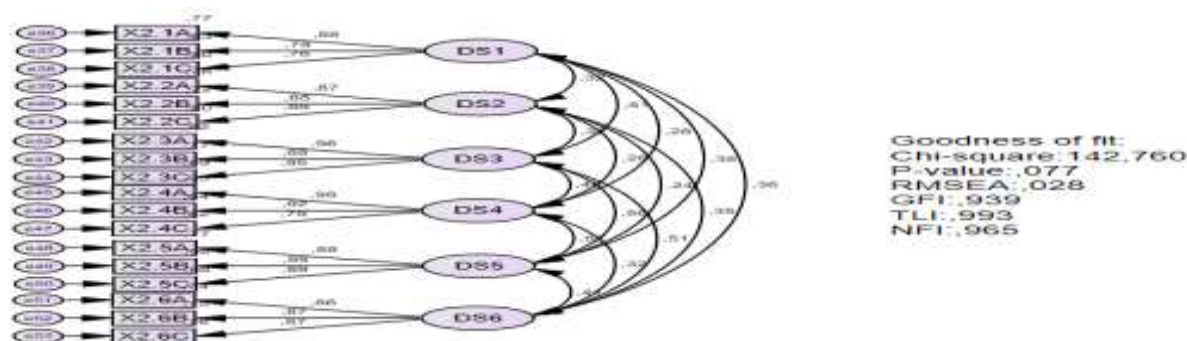


Figure 2.4; CFA of Parental Social Support Variables

The loading factor index and reliability of the Self Regulated Learning variable are presented in the following table:

Table 4.6 Loading Factor Index and Reliability of the Parental Social Support Variable

Dimensions	Items	Loading Factor Value	Status	CR
DSO1	X2.1A	0.877	Valid	0.857
	X2.1B	0.794	Valid	
	X2.1C	0.777	Valid	
DSO2	X2.2A	0.870	Valid	0.904
	X2.2B	0.848	Valid	
	X2.2C	0.893	Valid	
DSO3	X2.3A	0.958	Valid	0.948
	X2.3B	0.875	Valid	
	X2.3C	0.946	Valid	
DSO4	X2.4A	0.976	Valid	0.924
	X2.4B	0.916	Valid	
	X2.4C	0.786	Valid	
DSO5	X2.5A	0.879	Valid	0.967
	X2.5B	0.988	Valid	
	X2.5C	0.988	Valid	
DSO6	X2.6A	0.859	Valid	0.900
	X2.6B	0.868	Valid	
	X2.6C	0.870	Valid	

Based on the initial table 9, it is known that 18 items have a Loading Factor of ≥ 0.5 . Meanwhile, from the results of the construct reliability (CR) test, the construct reliability coefficient is classified as good, namely ≥ 0.7 . The goodness of fit index on the **Parental Social Support Variable** is presented in the following table.

Table 4.7 Goodness of Fit of Parental Social Support

Parameter	Analysis Result Value	Fit Criteria	Conclusion
CFI	0.994	≥ 0.90	Good fit
TLI	0.993	≥ 0.90	Good fit
IFI	0.994	≥ 0.90	Good fit
RMR	0.013	≤ 0.05	Good fit
GFI	0.939	≥ 0.90	Good fit
RMSEA	0.028	≤ 0.08	Good fit

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

Chi Square	142.760	Kecil	Good fit
P	0.077	≥ 0.50	Good fit
AGFI	0.913	≥ 0.90	Good fit

Source: processed primary data, 2025

Based on the index above, it can be concluded that the Self-Regulated Learning Variable measurement model is suitable or fits the empirical data because it has met the 9 fit criteria.

C. Self-Efficacy Variable

Based on the Confirmatory Factor Analysis (CFA) test for the Self Efficacy Variable, the results presented are obtained.

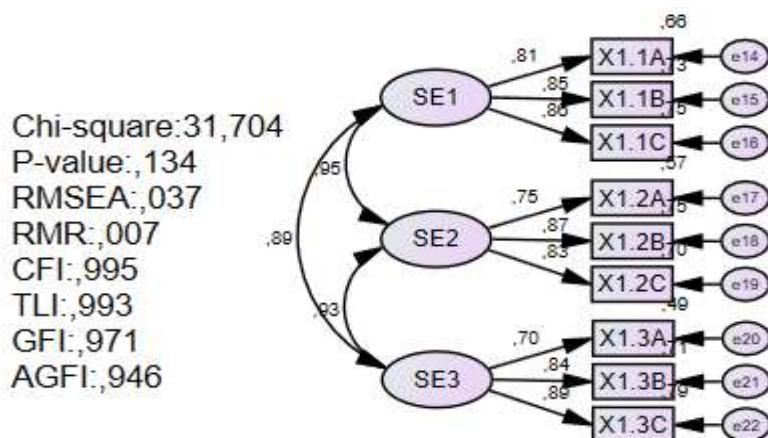


Figure 2.5. CFA Self Efficacy Variable

The loading factor and reliability indexes for the self-efficacy variable are presented in the following table:

Table 4.8 Loading Factor Index and Reliability of Self Efficacy Variable

Dimensions	Items	Loading Value	Factor	Status	CR
SE1	X1.1A	0.810		Valid	0.880
	X1.1B	0.855		Valid	
	X1.1C	0.863		Valid	
SE2	X1.2A	0.754		Valid	0.859
	X1.2B	0.865		Valid	
	X1.2C	0.834		Valid	
SE3	X1.3A	0.700		Valid	0.854
	X1.3B	0.840		Valid	
	X1.3C	0.891		Valid	

Based on table 4.4, it is known that there are 9 items with Loading Factor values ≥ 0.5 . Meanwhile, from the results of the construct reliability (CR) test, the construct reliability coefficient is classified as good, which is ≥ 0.7 . The goodness of fit index on the Self Efficacy Variable is presented in the following table.

Tabel 4.5 Goodness of Fit variabel Self Efficacy

Parameter	Loading Factor Value	Fit Criteria	Conclusion
CFI	0.995	≥ 0.90	Good Fit
TLI	0.993	≥ 0.90	Good Fit
IFI	0.995	≥ 0.90	Good Fit

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

RMR	0.007	≤ 0.05	Good Fit
GFI	0.971	≥ 0.90	Good Fit
RMSEA	0.037	≤ 0.08	Good fit
Chi Square	31.704	Kecil	Good fit
P	0.134	≥ 0.50	Good fit
AGFI	0.946	≥ 0.90	Good Fit

Sumber: data primer diolah, 2025

Based on the index above, it can be concluded that the Self Efficacy Variable measurement model is suitable or fits the empirical data because it meets the 9 fit criteria.

D. Growth Mindset Variable

Berdasarkan pengujian *Confirmatory Factor Analysis* (CFA) untuk Variabel Growth Mindset, diperoleh hasil yang disajikan

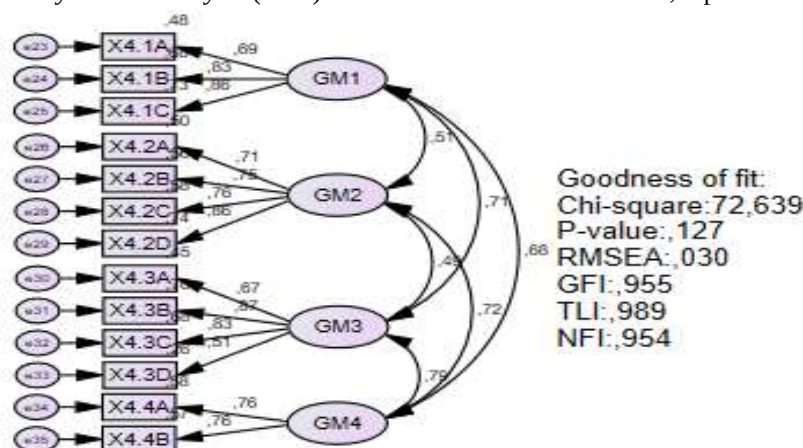


Figure 2.6 CFA Growth Mindset Variable

The loading factor and reliability indexes for the Growth Mindset variable are presented in the following table:

Table 4.9-Index of Loading Factor and Reliability of Growth Mindset Variable

Dimensions	Items	Loading Factor Value	Status	CR
GM1	X4.1A	0.690	Valid	0.836
	X4.1B	0.828	Valid	
	X4.1C	0.857	Valid	
GM2	X4.2A	0.710	Valid	0.854
	X4.2B	0.746	Valid	
	X4.2C	0.759	Valid	
	X4.2D	0.861	Valid	
GM3	X4.3A	0.674	Valid	0.819
	X4.3B	0.872	Valid	
	X4.3C	0.826	Valid	
	X4.3D	0.511	Valid	
GM4	X4.4A	0.759	Valid	0.730
	X4.4B	0.758	Valid	

Based on table 4.6, it is known that 13 items each have a Loading Factor of ≥ 0.5 . Meanwhile, from the results of the construct reliability (CR) test, the construct reliability coefficient is classified as good, namely ≥ 0.7 . The goodness of fit index on the Growth Mindset Variable is presented in the following table.

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

Table 4.10 Goodness of Fit for the Growth Mindset variable

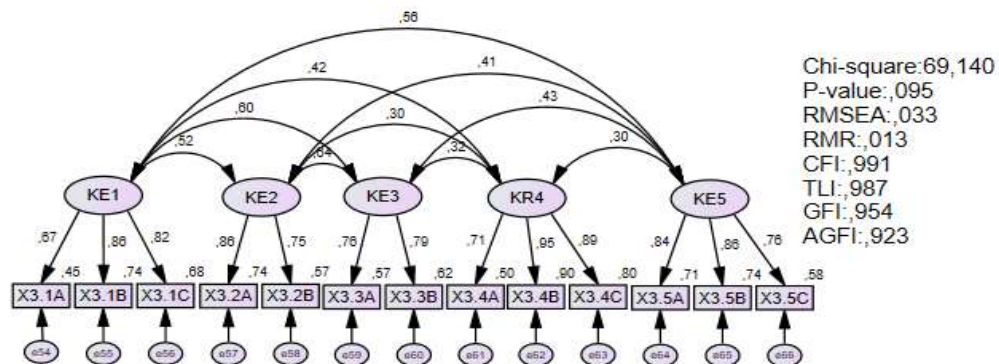
Parameter	Analysis Result Value	Fit Criteria	Conclusion
CFI	0.992	≥ 0.90	Good Fit
TLI	0.989	≥ 0.90	Good Fit
IFI	0.992	≥ 0.90	Good Fit
RMR	0.015	≤ 0.05	Good Fit
GFI	0.955	≥ 0.90	Good Fit
RMSEA	0.030	≤ 0.08	Good fit
Chi Square	72.639	Kecil	Good fit
P	0.127	≥ 0.50	Good fit
AGFI	0.931	≥ 0.90	Good Fit

Source: processed primary data, 2025

Based on the index above, it can be concluded that the Growth Mindset Variable measurement model is suitable or fits the empirical data because it meets the 9 fit criteria.

E. C. Emotional Intelligence Variables

Based on the Confirmatory Factor Analysis (CFA) test for the Emotional Intelligence Variable, the results presented are as follows:



Gambar 2.7. CFA Variabel Kecerdasan Emosi

The loading factor and reliability indexes of the Emotional Intelligence variable are presented in the following table:

Table 4.11 Loading Factor Index and Reliability of Emotional Intelligence Variables

Dimensions	Items	Loading Factor Value	Status	CR
KE1	X3.1A	0.673	Valid	0.832
	X3.1B	0.863	Valid	
	X3.1C	0.822	Valid	
KE2	X3.2A	0.861	Valid	0.791
	X3.2B	0.754	Valid	
KE3	X3.3A	0.756	Valid	0.748
	X3.3B	0.789	Valid	
KE4	X3.4A	0.705	Valid	0.890
	X3.4B	0.951	Valid	
	X3.4C	0.892	Valid	
KE5	X3.5A	0.840	Valid	0.862
	X3.5B	0.861	Valid	
	X3.5C	0.763	Valid	

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

Based on table 4.8, it is known that there are 13 items with Loading Factor values ≥ 0.5 . Meanwhile, from the results of the construct reliability (CR) test, the construct reliability coefficient is classified as good, which is ≥ 0.7 . The goodness of fit index on the Emotional Intelligence Variable is presented in the following table.

Table 4.12 Goodness of Fit of Emotional Intelligence variables

Parameter	Analysis Result Value	Fit Criteria	Conclusion
CFI	0.991	≥ 0.90	Good Fit
TLI	0.987	≥ 0.90	Good Fit
IFI	0.991	≥ 0.90	Good Fit
RMR	0.013	≤ 0.05	Good Fit
GFI	0.954	≥ 0.90	Good Fit
RMSEA	0.033	≤ 0.08	Good fit
Chi Square	69.140	Kecil	Good fit
P	0.095	≥ 0.50	Good fit
AGFI	0.923	≥ 0.90	Good Fit

Source: processed primary data, 2025

Based on the index above, it can be concluded that the measurement model of the Emotional Intelligence Variable is suitable or fits the empirical data because it has met the 9 fit criteria.

Overall Validity and Reliability Test

The measurement model is assessed by testing convergent validation and discriminant validity. Convergent validity is assessed from the measurement model that determines whether each estimated indicator can validly measure the dimensions of the concept being tested. A measuring instrument has convergent validity if the AVE (average variance extracted) value is ≥ 0.5 .

Discriminant validity testing is carried out to see each item is not the same as other constructs in the model. Discriminant validity is achieved if there is a low correlation between two variables that should not be correlated with each other. A measuring instrument has discriminant validity if ($\sqrt{\text{AVE}}$) the average variance extracted (AVE) $>$ from the correlation value between variables.

Meanwhile, reliability means the consistency of the measuring instrument or the reliability of the instrument used in the research process. A measuring instrument is declared construct-reliable if it has a CR value ≥ 0.7 .

The results obtained in the research model, namely starting from the initial research model, are as follows:

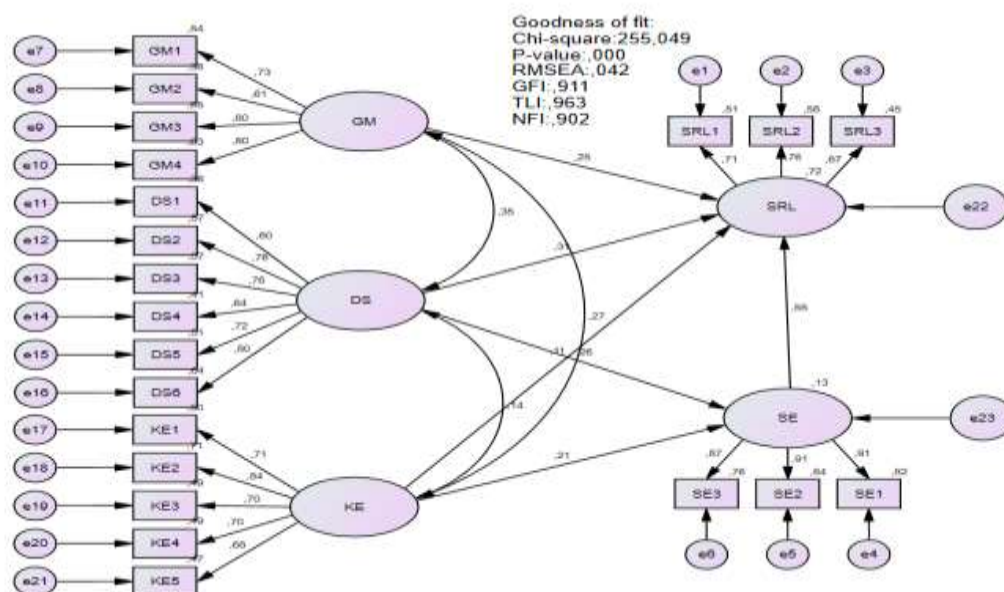


Figure 2.8 initial research model

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

Table 4.13. Concurrent CFA Fit Index

Parameter	Analysis Result Value	Fit Criteria	Conclusion
CFI	0.969	≥ 0.90	Good fit
TLI	0.963	≥ 0.90	Good fit
IFI	0.969	≥ 0.90	Good fit
RMR	0.016	≤ 0.05	Good fit
GFI	0.911	≥ 0.90	Good fit
RMSEA	0.042	≥ 0.90	Good fit
Chi Square	255.049	Kecil	Good fit
P	0.000	≥ 0.05	Bad fit
AGFI	0.885	≥ 0.90	Marginal fit

Source: processed primary data, 2025

Based on the image above, the initial model obtained an inadequate Goodness of fit (GOF) value. Therefore, in order to obtain a good fit index scale, a model modification was carried out by adding correlation between errors. so that in the end it obtained an adequate GOF and in accordance with the requirements. The correlation between errors that was added is in the following relationship:

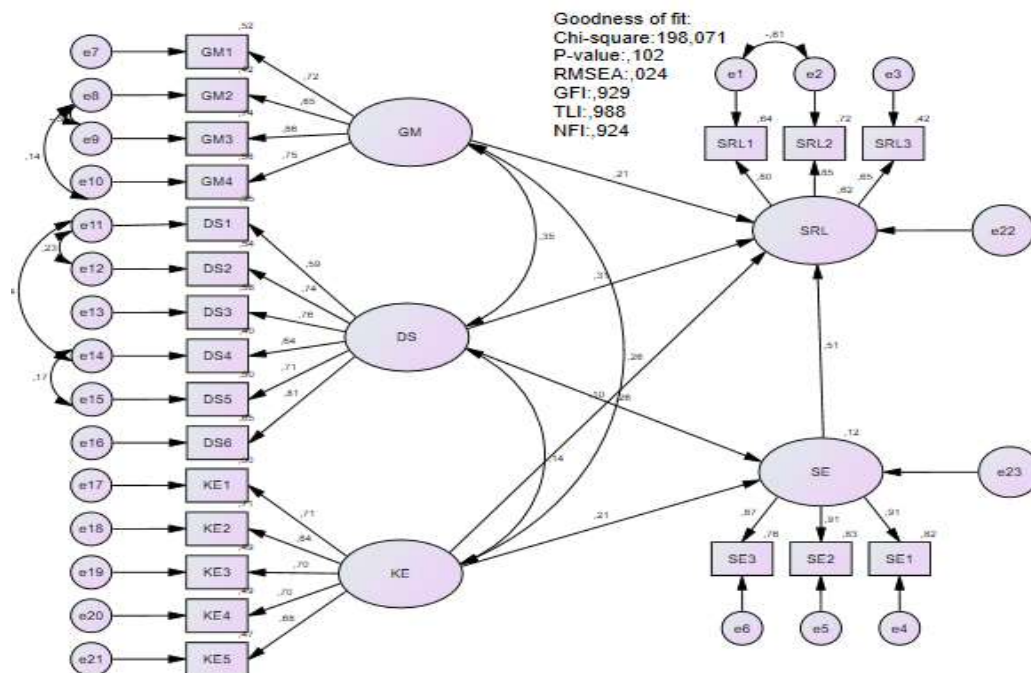
Tabel 4.14 Correlation table between added errors

			M.I.	Par Change
e23	<-->	GM	5,055	,031
e18	<-->	DS	4,157	-,014
e18	<-->	e22	5,162	-,019
e18	<-->	e19	5,077	,019
e16	<-->	e23	8,005	-,037
e14	<-->	e15	8,513	,036
e13	<-->	e22	5,557	-,022
e12	<-->	e17	4,773	-,021
e11	<-->	e15	6,179	-,029
e11	<-->	e14	8,558	-,035
e11	<-->	e12	12,188	,038
e10	<-->	e18	4,067	,017
e10	<-->	e16	4,574	-,019
e8	<-->	e10	6,877	,026

**Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency
(Analysis of Amos Version 24 Application)**

			M.I.	Par Change
e8	<-->	e9	9,838	-,028
e7	<-->	e20	7,243	,027
e7	<-->	e13	4,447	,021
e5	<-->	e16	5,191	-,014
e3	<-->	DS	5,050	-,026
e3	<-->	e22	4,819	,029
e3	<-->	e11	5,602	-,036
e2	<-->	e17	6,729	,030
e2	<-->	e3	4,079	,035
e1	<-->	e2	6,186	-,038

After adding the correlation between errors, the following results were obtained:



Gambar 2.9 Model penelitian modifikasi

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

The CFA fit index results are presented in the following table:

Table 4. 15 Concurrent CFA Fit Indices

Parameter	Analysis Result Value	Fit Criteria	Conclusion
CFI	0.990	≥ 0.90	Good fit
TLI	0.988	≥ 0.90	Good fit
IFI	0.990	≥ 0.90	Good fit
RMR	0.016	≤ 0.05	Good fit
GFI	0.929	≥ 0.90	Good fit
RMSEA	0.024	≥ 0.90	Good fit
Chi Square	198.071	Kecil	Good fit
P	0.102	≥ 0.05	Good fit
AGFI	0.905	≥ 0.90	Good fit

Based on the table above, the final model obtained a Goodness of fit (GOF) value that was adequate. The results of the correlation calculation between variables and $\sqrt{\text{AVE}}$ are shown in the following table. Meanwhile, the results of the validity test are as follows:

Table 4.16 Results of Validity and Construct Reliability Tests

VARIABEL	SRL	SE	DS	KE	GM
SRL	0.769				
SE	0.652	0.897			
DS	0.548	0.285	0.711		
KE	0.318	0.243	0.139	0.730	
GM	0.422	0.143	0.35	0.257	0.781

Table 4.17 Results of Validity and Construct Reliability Tests

Groups	Variable	CR	VE	AVE root	Result
Gabung	Self Regulated Learning: (Y)	0.811	0.592	0.769	> 0.5; Valid
	Self Efficacy (X1)	0.925	0.805	0.897	> 0.5; Valid
	Parental Social Support (X2)	0.858	0.505	0.711	> 0.5; Valid
	Emosional Inteligensi (X3)	0.789	0.533	0.730	> 0.5; Valid
	Growth Mindset (X4)	0.861	0.610	0.781	> 0.5; Valid

Based on the table above, it is known that all variables have convergent validity because AVE is more than 0.5. In addition, all variables are considered to have discriminant validity because the root value ($\sqrt{\text{AVE}}$) of the average variance extracted (AVE) is > from the correlation value between variables. All variables are considered reliable because the CR value is more than 0.7. Meanwhile, the results of the validity test are as follows:

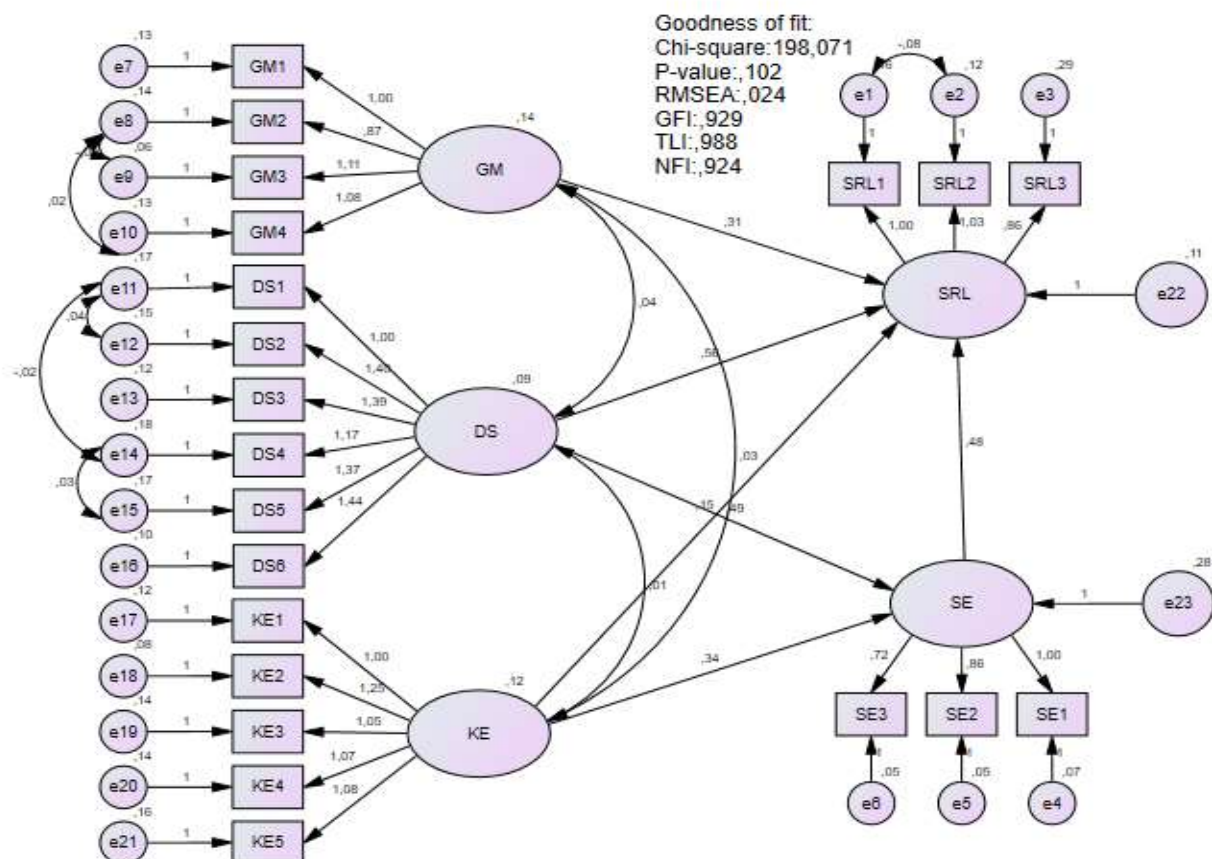
Table 4.18. Result Test Validity Research varianble

Variabel	Dimensi	Item	Nilai Loading Faktor	Status	CR
Y (SRL)	Y1	Y1.1	0.799	Valid	0.811
	Y2	Y2.1	0.846	Valid	
	Y3	Y2.1	0.649	Valid	

**Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency
(Analysis of Amos Version 24 Application)**

X1 (SE)	SE1	X1.1A	0.906	Valid	0.925
	SE2	X1.2A	0.914	Valid	
	SE3	X1.3A	0.871	Valid	
X2 (DSO)	DSO1	X2.1A	0.592	Valid	0.858
	DSO2	X2.2A	0.736	Valid	
	DSO3	X2.3A	0.764	Valid	
	DSO4	X2.4A	0.636	Valid	
	DSO5	X2.5A	0.705	Valid	
	DSO6	X2.6A	0.808	Valid	
X3 (KE)	KE1	X3.1A	0.710	Valid	0.789
	KE2	X3.2A	0.843	Valid	
	KE3	X3.3A	0.697	Valid	
	KE4	X3.4A	0.703	Valid	
	KE5	X3.5A	0.684	Valid	
X4 (GM)	GM1	X4.1A	0.871	Valid	0.861
	GM2	X4.2A	0.719	Valid	
	GM3	X4.3A	0.650	Valid	
	GM4	X4.4A	0.862	Valid	

Berikut ini merupakan gambar hasil perhitungan unstandardized solutions hybrid Model Full:



Gambar 2.10. Unstandardized solutions hybrid Model Full

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

The following is a picture of a standardized hybrid solution.:

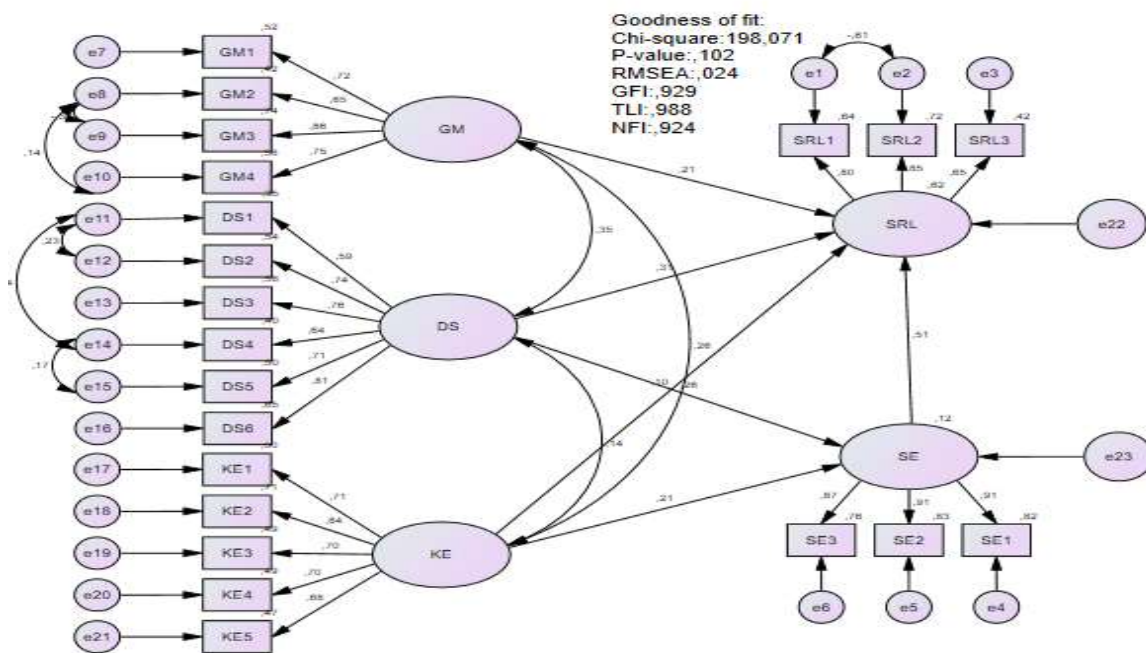


Figure 2.11 standardized solutions hybrid Full Model after modification by adding correlation

Based on the results of the output of unstandardized solutions hybrid Full Mode, the following can be seen:

Table 4.19 Results of Structural Relationships between Direct Variables

Role test	factor loading	CR	Description
DS ---> SE	0.487	3.473	Positive and significant influence
KE ---> SE	0.338	2.919	Positive and significant influence
GM ---> SRL	0.309	3.644	Positive and significant influence
DS ---> SRL	0.563	4.791	Positive and significant influence
KE ---> SRL	0.147	1.789	no effect
SE ---> SRL	0.477	8.253	Positive and significant influence
DS ---> SE ---> SRL	0.130	Sobel test	Positive and significant influence
KE ---> SE ---> SRL	0.105	Sobel Test	Positive and significant influence

Minor Hypothesis 1:

There is a direct, positive and significant role of the Parental Social Support variable on the Self Efficacy variable. From the results of the data analysis, it was obtained $\beta = 0.487$ with a CR value of $3.473 > 1.96$. Thus, it can be concluded that the Parental Social Support variable plays a direct, positive and significant role on the Self Efficacy variable. If the determination value (r^2) is calculated, it can be concluded that the contribution of Emotional Intelligence to Self Efficacy is 0.237 or equal to 23.7%. This means that if calculated directly, without other variables, Parental Social Support can play a role on the Self Efficacy variable by 23.7%.

Minor Hypothesis 2:

There is a direct, positive and significant role of the Emotional Intelligence variable on the Self Efficacy variable. From the results of the data analysis, it was obtained $\beta = 0.338$ with a CR value of $2.919 > 1.96$. Thus it can be concluded that the Emotional Intelligence variable plays a direct, positive and significant role on the Self Efficacy variable. If the determination value (r^2) is calculated, it can be concluded that the contribution of Emotional Intelligence to Self Efficacy is 0.114 or equal to 11.4%. This means that if calculated directly, without other variables, Emotional Intelligence can play a role on the Self Efficacy variable by 11.4%.

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

Minor Hypothesis 3:

There is a direct, positive and significant role of the Growth Mindset variable on the Self Regulated Learning variable. From the results of the data analysis, it was obtained $\beta = 0.309$ with a CR value of $3.644 > 1.96$. Thus it can be concluded that the Growth Mindset variable plays a direct, positive and significant role on the Self Regulated Learning variable. If the determination value (r^2) is calculated, it can be concluded that the contribution of Emotional Intelligence to Self Regulated Learning is 0.095 or equal to 9.5%. This means that if calculated directly, without any other variables, then Growth Mindset can play a role in the Self Regulated Learning variable by 9.5%.

Minor Hypothesis 4:

There is a direct, positive and significant role of the Parental Social Support variable on the Self Regulated Learning variable. From the results of the data analysis, it was obtained $\beta = 0.563$ with a CR value of $4.791 > 1.96$. Thus, it can be concluded that the Parental Social Support variable plays a direct, positive and significant role in the Self Regulated Learning variable. If the determination value (r^2) is calculated, it can be concluded that the contribution of Parental Social Support to Self Regulated Learning is 0.317 or equal to 31.7%. This means that if calculated directly, without any other variables, then Parental Social Support can play a role in the Self Regulated Learning variable by 31.7%.

Minor Hypothesis 5:

There is no direct, positive and significant role of the Emotional Intelligence variable on the Self Regulated Learning variable. From the results of the data analysis, it was obtained $\beta = 0.147$ with a CR value of $1.789 < 1.96$. Thus, it can be concluded that the Emotional Intelligence variable does not play a direct, positive and significant role on the Self Regulated Learning variable.

Minor Hypothesis 6:

There is a direct, positive and significant role of the Self Efficacy variable on the Self Regulated Learning variable. From the results of the data analysis, it was obtained $\beta = 0.477$ with a CR value of $8.253 > 1.96$. Thus, it can be concluded that the Self Efficacy variable plays a direct, positive and significant role on the Self Regulated Learning variable. If the determination value (r^2) is calculated, it can be concluded that the contribution of Parental Social Support to Self Regulated Learning is 0.228 or equal to 22.8%. This means that if calculated directly, without other variables, Self Efficacy can play a role on the Self Regulated Learning variable by 22.8%.

In the next hypothesis test, the researcher analyzed the mediation relationship. The result as follows:

Input:		Test statistic:	p-value:
t_a	3.473	Sobel test:	3.20110974
t_b	8.253	Aroian test:	3.18133099
		Goodman test:	3.22126203
Reset all		Calculate	

Figure 2.12 Sobel Results of Hypothesis Test 7

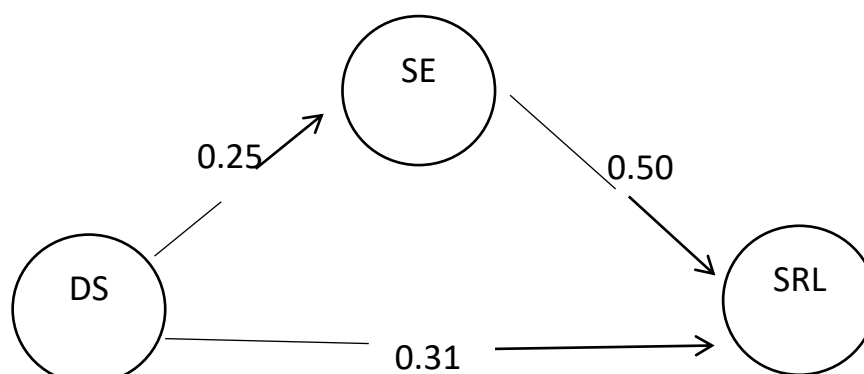


Figure 2.13 Overview of the Role of Hypothesis 7

Minor Hypothesis 7:

There is a direct, positive and significant role of the Parental Social Support variable on the Self Regulated Learning variable through the Self Efficacy variable as a mediator. Self Efficacy acts as a partial mediator variable because the role through the mediator variable compared to the direct role of Parental Social Support on Self Regulated Learning both remain significant. This

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

can be proven through the Sobel test by entering the t value (CR) into the formula on the Sobel calculator resulting in a z value = 3.201, $p < 0.05$ so that the mediator is significant.

In the next hypothesis test, the researcher analyzed the mediation relationship. The results are as follows.

Input:		Test statistic:	p-value:
t_a	2.919	Sobel test:	2.7519418
t_b	8.253	Aroian test:	2.73416021
		Goodman test:	2.77007489
		Reset all	Calculate

Figure 2.14 Figure. Sobel Results of Hypothesis Test 8

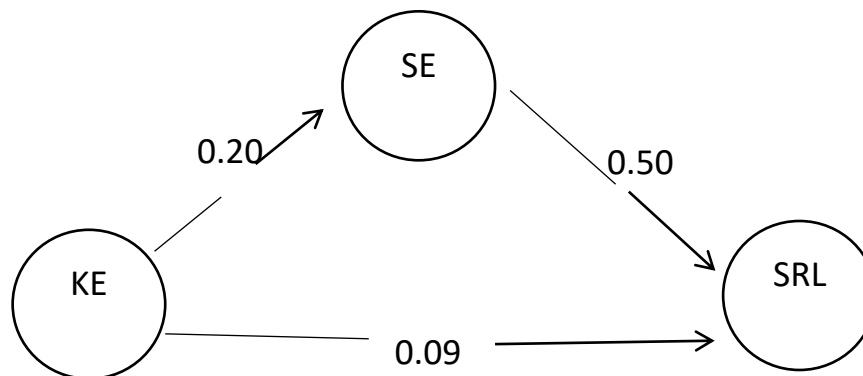


Figure 2.15. Overview of the Role of Hypothesis 8

Minor Hypothesis 8:

There is a direct, positive and significant role of the Emotional Intelligence variable on the Self Regulated Learning variable through the Self Efficacy variable as a mediator. Self Efficacy acts as a partial mediator variable because the role through the mediator variable compared to the direct role of Emotional Intelligence on Self Regulated Learning both remain significant. This can be proven through the Sobel test by entering the t value (CR) in the formula on the Sobel calculator producing a z value = 2.752, $p < 0.05$ so that the mediator is significant.

RESEARCH MODEL FINDINGS

In this study, a model was found in the research in the initial design planned as follows:

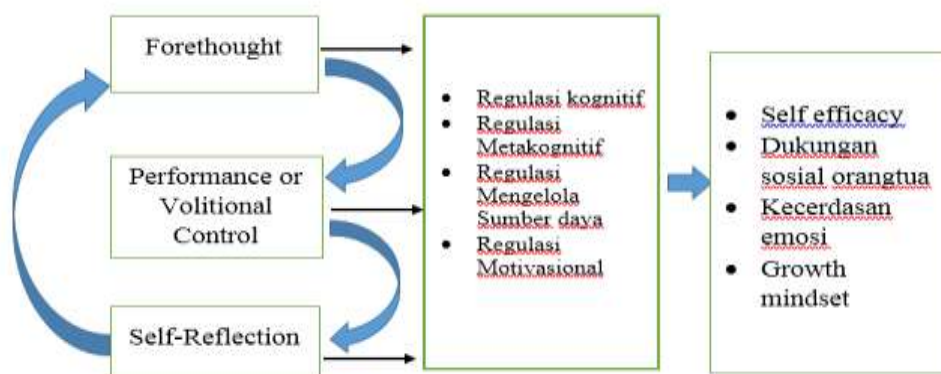


Figure: 2.16 Self-regulated learning model in learning mathematics in Bekasi City and Regency

Based on the results of the study which show that:

- growth mindset, Parental Social support, Emotional intelligence, and self-efficacy play a role in students' Self-regulated learning, it is recommended that schools pay attention to the variables that play a role in learning problems, especially the Growth Mindset variable on self-regulated learning.

Self-Regulated Learning Model in Learning Mathematics in State High School Students in Bekasi City and Regency (Analysis of Amos Version 24 Application)

- b) Parental social support plays a role in self-regulated learning and self-efficacy, making students quickly give up on the challenges they face and feel motivated to feel confident that whatever challenges they are able to face.
- c) Emotional Intelligence plays a direct role in Self-regulated learning, so there is a positive relationship (one way) with Self-regulated learning. Self-awareness needs to be developed (recognizing in making decisions with various considerations, good, good enough and bad).
- d) Parental Social Support for self-regulated learning through the mediator variable self-efficacy shows a positive relationship between self-regulated learning through self-efficacy, so when carrying out learning activities with the Merdeka Belajar curriculum, parents provide facilities in learning, especially in providing a sense of togetherness as a family that always supports students in learning. and parents provide continuous advice, as well as recognition of children's abilities has an impact on motivation that changes bad behavior. So the higher the parental support, the more the students' self-regulated learning will increase. And strong self-efficacy also contributes to further improving students in learning the "Merdeka Belajar" program.
- e) Emotional Intelligence Against self-regulated learning through self-efficacy shows a positive relationship, this means when carrying out learning activities with the "Merdeka Belajar" curriculum. Emotional Intelligence is shown by the students' ability to learn, the higher the parental support, the more the students' self-regulated learning will increase. So the more self-efficacy will increase self-regulated learning in students to motivate themselves and survive frustration, control themselves, manage emotions, motivate themselves, empathy, recognize other people's emotions, social skills (building relationships). The higher the emotional intelligence, the higher the self-efficacy and the greater the impact on students' self-regulated learning in learning in the "Independent Learning" program
- f) The role of self-efficacy in self-regulated learning explains the positive direction relationship and shows a unidirectional relationship, and it can be said that there is an influence of self-efficacy on self-regulated learning when carrying out learning activities with the Independent Learning curriculum. Parental social support is shown by providing facilities in learning, especially in providing a sense of togetherness as a family that always supports students in learning. and parents always provide continuous advice, as well as recognition of children's abilities that have an impact on motivation that changes bad behavior. The higher the parental support, the more students' self-regulated learning increases.

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