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The Effect of Habits of Mind on Ability to Construct a Cognitive Instruments with Computerized Systems

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Abstract--- *Future teacher candidates (21st century) possess characteristics including creativity, divergent thinking, critical thinking, mathematical and science competence, digital competence, sense of initiative and entrepreneurship. The purpose of this study is to analyze the influence of habits of mind to the ability to construct cognitive instruments of Mathematics subject in Class V Elementary School with a computerized system. The research method used was surveys on primary school teacher education in Jakarta. In this study, to assess the participants' habits of mind, questionnaires were used, while to know the ability to construct cognitive, the researcher used performance test. Furthermore, in analyzing data, the method used was structural equation modeling. As the result, this study found that there were effects of habits of mind on the ability to construct computerized cognitive instruments. Overall, it can be concluded that higher habits of mind can improve the ability to construct cognitive instruments with a computerized system especially in grade V math subjects in Elementary School.*

Keywords--- *Habits of Mind, Ability to Construct Cognitive Instruments, Computerized Systems.*

I. INTRODUCTION

The Primary School Teacher Education Study Program is equivalent to a graduate education program. The purpose is to prepare students to have jobs with particular skills required to become qualified elementary school teachers.

The graduates of Primary School Teacher Education Study Program who have a strong and positive character will be able to face the challenges of the 21st century. The challenge will result a new approach that is important for students to experience academic and life success covering current social and economic conditions. The following is skills that someone needs to face the challenges of the 21st century:

Creativity, divergent thinking, critical thinking, team working (especially in heterogeneous groups), work autonomy, developed cognitive and interpersonal skills, social and civic competencies, responsible national and global citizenship, consciousness of interdependence, acceptance and understanding of diversity, recognition and development of personal attributes, interactive use of tools, communication in mother tongue and foreign languages, mathematical and science competence, digital competence, sense of initiative and entrepreneurship, accountability, leadership, cultural awareness and expression, physical well-being.

Accordingly, it requires mastery of four main competencies so called 4 C (Creativity, Critical, Collaboration, and

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Communication). These four competencies, in learning can be built through increasing knowledge and developing critical thinking, so that it will form habits of mind. Respecting for individuality and difference and providing a way for consistency not uniformity are demanded in this case. A culture is defined as a person who thinks together, as individual who shares meaning, negotiates and builds culture when groups become more skilled in applying thinking habits. The habit is believed to create organizational renegotiation by incorporating a value system, and this will result a change.

On the other hand, students of the Primary School Teacher Education Program will become teachers or educators. What kind of teacher is needed for 21st century students? While there is recognition that curriculum content, classroom practices, and learning environments must change

Based on the existing problems, and previous related studies, some research questions are proposed in this study: 1. how is the ability of Elementary School Teacher Education students in compiling cognitive instruments in elementary school mathematics? How many donations of habits of mind are Elementary School Teacher Education Study Program students in compiling cognitive instruments in elementary school mathematics? Does habit of mind have a direct effect on the ability to compile cognitive instruments in elementary school mathematics?

Based on the questions, it shows the existence of important and interesting problems to be deeply studied about the influence of habits of mind (habits of mind) on the ability to compile cognitive instruments in elementary school mathematics subjects. Therefore, the problems examined in this study are formulated as follows: Do habits of mind affect the ability to construct cognitive instruments in elementary school mathematics? This study generally aims to analyze the influence of habits of mind on the ability to compile cognitive instruments in elementary school mathematics subjects.

II. LITERATURE REVIEW

Obviously, competence can be learned not only in terms of whether people are competent when solving certain problems (e.g academic, professional, and social), but also in terms of how they think and feel about their competencies. Subjective competencies or perceptions have been largely conceptualized as beliefs or expectations. Ability can be evaluated in some different ways. A person's ability can be evaluated using one absolute standard in a task and by involving standards that change over time, or by involving normative standards as a comparison.

In this study, ability refers to a competency of students of the Primary School Teacher Education Program to do various tasks or activities including an assignment or activity of students to compile cognitive instruments of elementary school mathematics subjects.

The dimensions of cognitive processes including six categories as follows: (1) Remembering: recognizing or recalling knowledge from memory; (2) Understanding: building meaning from various types of functions both written; (3) Implement: carry out or use procedures through implementation; (4) Analyzing: breaking materials or concepts into parts; (5) Evaluating: making judgments based on criteria and standards through checking and criticism; (6)

Furthermore, arranging or constructing tests is initially driven by interest in measuring mental abilities. Their

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conceptualization promotes technology that has long been applied to test construction (Salfador Algarabel and Carmen Dasf). Tests are generally used to assess and measure student learning outcomes especially cognitive learning outcomes related to mastery of teaching materials in accordance with educational and teaching goals. The types of included in the test group were tests of learning achievement, intelligence tests, aptitude tests, and academic ability tests.

Tests, on the other hand, are specific judgments or certain forms of assessment including tests as part of it. Test is known as a process carried out to measure students' ability to perform certain fields of performance with a certain limited time and particular goals. This generally acts as an entrance gate for teaching students to the advanced learning level in Kedar Prasad Sah. The types of test consist of objective tests and subjective tests. One of the methods used in this study is the multiple choice objective test. This multiple choice questions or statements are an effective way to assign students. By using the multiple choice test form, it shows students to make the correct answers, even though some mark the wrong choice. Besides, students can mark the correct choices for questions and at the same time they can fail to make the correct explanation for their answers. A study conducted by Dulger and Deniz (2017) found that the complexity of student learning processes may not be fully captured through the use of multiple choice questions. This is recognized as one of the weakness of a multiple choice test. However, there are still some the advantages of using multiple choice forms including the students can scrutiny quickly and easily, manually or electronically, it can be carried out in writing so that it can test various high-level thinking skills, and it can cover many areas of content on one exam and it still can be answered during the teaching and learning process. Accordingly, this study employed multiple choice tests to compile cognitive domain instruments. The type questions are specifically for Grade 5 in first semester of Mathematics Elementary School students.

Habits of Mind

Obviously, *every* individual must be ready to face the future challenge. Then, to face the future, then everyone must have ability. Besides, to survive in facing the future challenges, then they must have character, knowledge, and high-level thinking. As one of human characteristic who have habits of thought, it can be formed through habitual patterns carried out continuously. This thinking habit is known as habits of mind (HoM). This thinking habits ALS can grow and develop in students through activities including making observations, hypotheses, and conducting experiments before drawing conclusion in their learning process.

Habit of mind was introduced by Cuoco, Goldenberg, and Mark (1996) as organizers of the principle of a mathematics curriculum in which students think about mathematics as mathematicians. Cuoco, Goldenberg, and Mark (1996) in Lim and Selden (2010) assert:

The idea of "mathematical thinking habits" has been introduced to emphasize the need to help students think about mathematics "as mathematicians." There seems to be considerable interest among mathematics educators and mathematicians in helping students develop mathematical thinking habits. The objectives of this working group are: (a) to discuss various views and aspects of mathematical habits of mind, (b) to explore the path for research, (c) to encourage research collaboration, and (d) to attract doctoral students in this theme.

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Habits of mind can be interpreted as thinking habits. It can be carried out continuously and it will be stronger and settled in the individual so that it is difficult to change. This habit has become culture for individual. One type of habit that is good for improving quality is habits of mind. The habit of thinking in mathematics is known as the mathematical habits of mind (MHM). Cuoco, Goldenberg, and Mark in Lim and Selden (2010) further identified two broad groups of thinking habits, namely:

(a) General thinking habits that cross each discipline, and (b) specific content thinking habits for mathematical discipline. Common thinking habits include "pattern-sniffing," experimenting, formulating, "playing around," inventing, visualizing, and guessing. Mathematical thinking habits, or mathematical approaches to things including big talk, small thinking (for example, instantiating with examples), small talk, big thinking (for example, generalization, abstraction), thinking in terms of functions, using multiple points of view, mixing deductions and experiments , and encourage language (for example, the first assumption of things which are desired exist).

To solve the problems, it requires a strong disposition and intelligent behavior. The habit of thinking means having a disposition towards behaving intelligently when dealing with problems where the answer is not immediately known. When humans experience dichotomy, they are confused by dilemmas, or meet with uncertainty - most effective actions require images as certain intellectual patterns of behavior. When a person uses this intellectual pattern, the result is stronger with higher quality and greater significance than if someone fails to implement patterns of intellectual behavior.

Disposition is a pattern of behavior that is often indicated by the absence of coercion which is a habit of thinking under deliberate and voluntary control for a broad purpose. Disposition should not be confused with habits that have no meaning, for example when stopping due to the traffic lights are red. Disposition is a habit of mind including cognitive and affective attributes that filter knowledge, skills, and beliefs and the impact of actions taken by someone in the classroom or professional work. Thinking habits tend to behave intelligently when faced with problems in which the answers are not immediately known. Costa and Kallick explained that they developed a model of habitual thinking from the study of successful and efficient thinkers from various circles. Another reason for choosing this model is because it includes dispositions that go beyond thinking (Altan, Lane, & Dottin, 2017). The sixteen problems according to Costa and Kallick are as follows:

(1) persisting, (2) managing impulsivity, (3) listening to others with understanding and empathy, (4) thinking flexibly, (5) thinking about thinking (metacognition), (6) striving for accuracy and precision, (7) questioning and posing problems, (8) applying past knowledge to new situations, (9) thinking and communicating with clarity and precision, (10) gathering data through all senses, (11) creating, imagining, innovating, (12) responding with wonderment and awe, (13) taking responsible risks, (14) finding humor, (15) thinking Interdependently, and (16) learning continuously.

Based on the description above, it can be synthesized that habits of mind in this study are habits that are carried out continuously on a person when learning mathematics that will be stronger and more persistent so that it is difficult to change which covers: (1) surviving or not giving up (2) set the heart. (3) listening to the opinions of

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others with empathy, (4) thinking flexibly, (5) thinking metacognitive, (6) trying to work meticulously and precisely, (7) asking questions and posing problems effectively, (8) utilizing old experiences to form new knowledge, (9) thinking and communicating clearly and precisely, (10) utilizing the senses in collecting and processing data, (11) creating, dreaming, and innovating, (12) being enthusiastic in responding, (13) daring to be responsible and facing risk, (14) humorous, (15) interdependent thinking, and (16) continuous learning.

III. METHODOLOGY / MATERIALS

The study was conducted in February - April 2019 and carried out in the Primary School Teacher Education Study Program, Faculty of Education, Universitas Negeri Jakarta. This study is quantitative in nature to answer the research objectives. The survey method is aimed to conduct a research activity by collecting relatively limited data from large numbers of cases. The selection of survey methods in this case is considered to be more appropriate because this method emphasizes the discovery of information about variables rather than information about individuals. In this study, survey was conducted to collect the data that is about habits of mind and the ability to compile cognitive instruments mathematics subjects of elementary school. The Team of the Directorate of Primary and Secondary Education, Ministry of Education and Culture of the Republic of Indonesia (2017) believes that in preparing written test instruments it is developed or prepared through some steps: (1) Checking basic competencies and indicators; (2) Establishing the objectives of the assessment; (3) Arrange the grid; (4) Writing questions based on the grid and rules for writing questions; and (5) Preparing scoring guidelines.

This study uses the path analysis technique to analyze the pattern of relationships between variables in order to determine the direct influence which consists of habits of mind (X) and the ability to compile cognitive instruments in mathematics of elementary school (Y). The main subjects of this analysis are correlated variables.

The data needed in this study include: (1) habits of mind (X) and the ability to compile cognitive instruments in mathematics of elementary school (Y). To collect data on habits of mind, it was used a questionnaire with a Likert scale form consisting 5 choices. Furthermore, data on the ability to compile cognitive instruments in mathematics of elementary school was collected using performance appraisal through rater assessment.

The ability to compile the cognitive instrument of mathematics of elementary school was carried out by respondents in the form of a set of multiple choice tests for class V Semester 1 based on the 2013 curriculum consisting 40 items with material which includes: (1) addition and subtraction of two fractions with different denominators, (2) multiplication and division of fractions and decimals, (3) comparison of two different magnitudes (speed as a comparison of distance with time, discharge as a ratio of volume and time), and (4) percent and scale through plan, with each subject matter 10 items . The observation sheet was used by the rater to measure the ability of respondents to compile cognitive instruments in mathematics of elementary school.

The habit of mind instrument is based on 50 statements. The pilot study was conducted on 30 participants. The results of the habits of mind instrument on pilot study obtained the calculation of the validity coefficient using Pearson's product moment formula, the 45 item coefficient statement validity was valid, and it found 5 invalid statement items. Reliability coefficient with 45 items valid statement, obtained the calculation results of 0.94

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including very high categories. In analyzing the data analysis, it used SEM (Structural Equational Model) which is based on component or variance known as Partial Least Square (PLS).

IV. RESULTS AND FINDINGS

The ability to compile cognitive instruments in mathematics of elementary school was in the form of a set of multiple choice tests for class V Semester 1 based on the 2013 curriculum consisting 40 items with material including: (1) addition and subtraction of two fractions with different denominators, (2) multiplication and division of fractions and decimals, (3) comparison of two different magnitudes (speed as a comparison of distance with time, discharge as a ratio of volume and time), and (4) percent and scale through a plan consisting 10 items of question.

The preparation of written test instruments is developed or prepared through the following steps: (1) Checking basic competencies and indicators; (2) Establishing the objectives of the assessment; (3) Arrange the instruments; (4) Writing questions based on the rules for writing questions; and (5) Prepare scoring guidelines. The results of recapitulation of respondents' answers are shown below.

Table 4.1: Assessment of the Ability to Arrange Cognitive Instruments by Rater

No.	Dimension	Indicator	Average		Average
			Rater 1	Rater 2	
1.	Material	Writing KD and formulating indicators	2,32	2,31	2,315
2.		Set assessment goals	2,86	2,71	2785
3.		Organizing instruments	2,14	2,17	2,155
4.		Arranging questions based on the rules of writing questions	2,90	2,78	2,840
5.		Prepare scoring guidelines and answer keys	2,94	2,73	2,835
6.	Construction	Stating the problem as clearly as possible	2,94	2,63	2,785
7.		The choice of words has the correct meaning	2,96	2,70	2,830
8.		Avoid setting complex and unclear words	2,95	2,58	2,765
9.		Insert all the information needed to make an answer	2,10	2,02	2,060
10.		Avoid using ineffective words	2,13	2,21	2,170
11.		Formulating the questions as precisely as possible	2,17	2,18	2,175
12.		The level of difficulty of the questions according to the group and the intended purpose	2,16	2,24	2,200
13.		Avoid cues towards unnecessary correct answers	2,07	2,31	2,190
14.	Language	Using appropriate Bahasa Indonesia (PUEBI)	2,68	2,52	2,600
15.		Avoiding expressions fosters multiple interpretations	2,80	2,41	2,605
16.		Avoid using taboo language	2,75	2,63	2,690
17.		Avoid the use of language that can offend students	2,57	2,49	2,530
Average			2,56	2,45	2,502

Based on Table 4.1, it can be seen that the ability to compile cognitive instruments assessed by 2 raters has implemented very high or excellent cognitive instrument preparation marks. This is based on the average value of the respondent's score of 83.39 which is categorized as very high. This can be interpreted that the respondents gave very high appreciation for each item of statement about scores rubric in the preparation of cognitive instruments.

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Of the three components, namely material dimensions, construction dimensions, and language dimensions got the highest score from 2 raters compared with the ability indicators to arrange other cognitive instruments with very high categories assessed by 2 raters, the dimension of language with average score indicator is 2.606, compared to the average score of the indicators of the material dimensions and construction dimensions of 2.586, and 2,397 respectively.

The average score of language dimension indicators is 2.606, meaning that the degree of assessment given by the rater is very high (in the range 2.50–3.00). The description obtained from this average value is that respondents in compiling cognitive instruments by paying attention to language factors in accordance with PUEBI (Indonesian Spelling General Guidelines), avoiding expressions fostering multiple interpretations, avoiding the use of local language / taboo, and avoiding the use of language that can offend students, have very high sensitivity.

The assessment by the rater was considered moderate for the construction dimension (2,606), there were eight indicators, namely stating the questions as clearly as possible, word choices had the correct meaning, avoiding complex and odd word settings, entering all the information needed to make answers, avoid entering ineffective words, formulate the questions as precisely as possible, the level of difficulty of the questions according to the group and the intended purpose, and avoid cues to unnecessary correct answers.

The Habits of Mind variable in this study uses measurements from sixteen problems according to Costa and Kallick as follows: persisting, (2) managing impulsivity, (3) listening to others with understanding and empathy, (4) thinking flexibly, (5) thinking about thinking (metacognition), (6) striving for accuracy and precision, (7) questioning and posing problems, (8) applying past knowledge to new situations, (9) thinking and communicating with clarity and precision, (10) gathering data through all senses, (11) creating, imagining, innovating, (12) responding with wonderment and awe, (13) taking responsible risks, (14) finding humor, (15) thinking Interdependently, and (16) learning continuously.

Of the 45 items with a Likert scale (1 - 5) in 100 respondents and based on calculations with the Excel program, the habits of mind variable obtained the average final score of the respondents was 181.27 with a theoretical score (44 - 220) or on a scale of 100, the average score is 72.51. These results are in the high category with a score of 4,028 in the range of scores (4-5).

Structural Equational Model (SEM) based on component or variance is known as Partial Least Square (PLS). This method is for causal-predictive analysis. PLS is aimed to find predictive linear relationships between variables (component-based predictive model)

Convergent Validity testing of the measurement model with reflexive indicators is assessed based on the correlation between the item score / component score and the construct score calculated by PLS. Individual indicators are considered valid if they have a correlation value above 0.70. However, in the research stage of developing the scale, loading factors of 0.50 to 0.60 are still acceptable. The output of the correlation between the indicators and the construct are shown in Table 4.2 below:

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Table 4.2: Convergent Validity Result

	Habits of Mind	Kemampuan ...
x10	0.503	
x11	0.516	
x12	-0.144	
x13	0.066	
x14	0.380	
x15	0.130	
x16	0.219	
x17	0.013	
x18	0.068	
x19	0.284	
x2	0.136	
x20	0.023	
x21	0.437	
x22	0.616	
x23	0.329	
x24	0.206	

	Habits of Mind	Kemampuan ...
x25	-0.120	
x26	0.190	
x27	0.324	
x28	0.408	
x29	0.131	
x3	0.334	
x30	0.475	
x31	0.471	
x32	0.283	
x33	0.239	
x34	0.530	
x35	0.572	
x36	0.370	
x37	0.502	
x38	0.435	
x39	0.182	

	Habits of Mind	Kemampuan ...
y11		0.684
y12		0.586
y13		0.576
y14		0.465
y15		0.690
y16		0.676
y17		0.148
y2		0.522
y3		0.574
y4		0.409
y5		0.528
y6		0.626
y7		0.569
y8		0.608
y9		0.549
x1	0.235	

	Habits of Mind	Kemampuan ...
x4	0.349	
x40	0.406	
x41	0.396	
x42	0.482	
x43	-0.450	
x44	0.232	
x45	0.474	
x5	0.573	
x6	0.080	
x7	0.214	
x8	-0.032	
x9	0.031	
y1		0.083
y10		0.589
y11		0.684
y12		0.586

Source: Smart PLS output, 2019

The Convergent Validity 1 result is shown.

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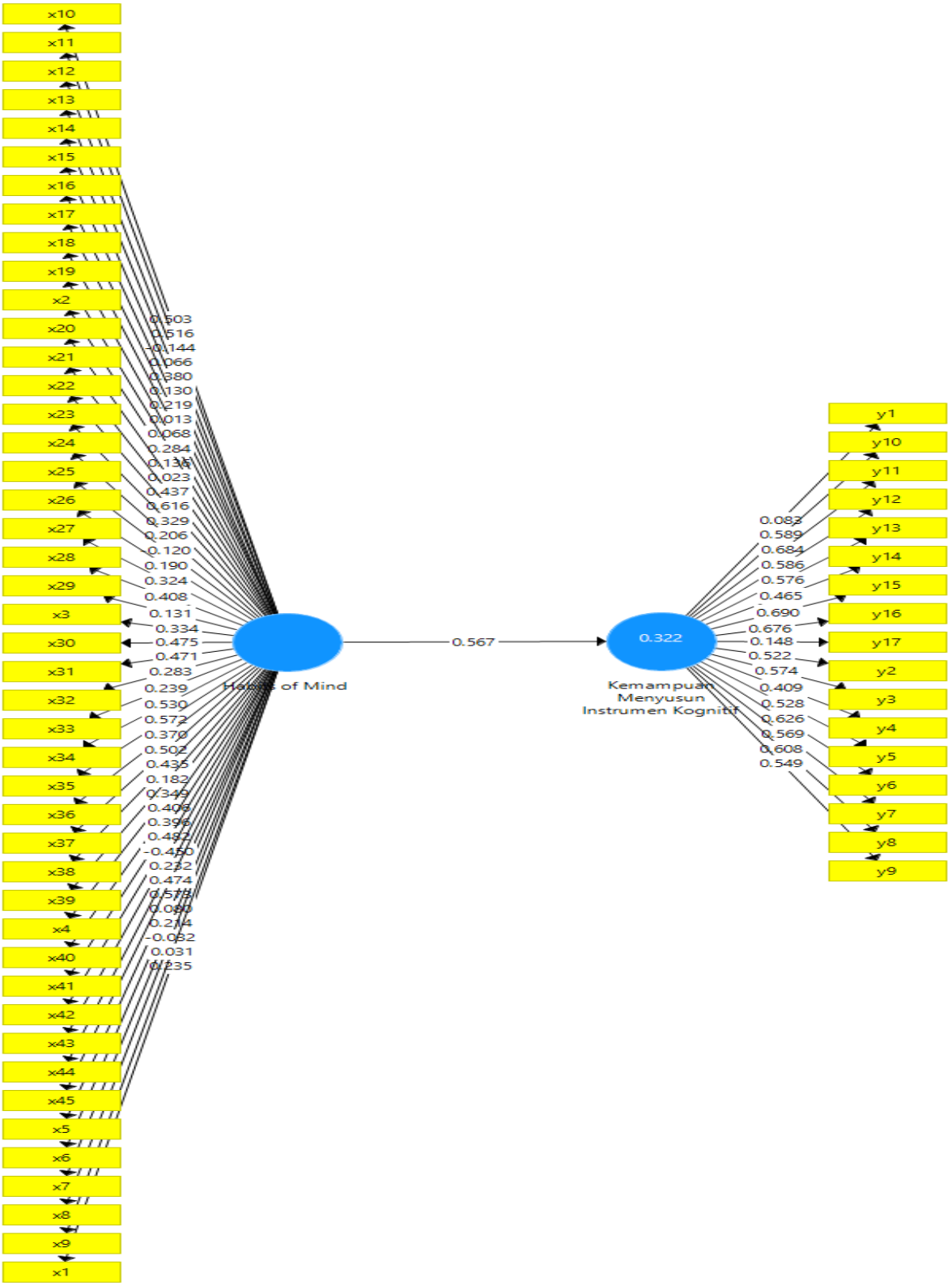

Figure 4.1: The Result of Convergent Validity 1

Source: Output Smart PLS, 2019.

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The parameters of a variable are valid or are the right compiler to measure the variable if it has a loading factor greater than 0.4. Then, the ideal condition is if the loading factor value has a value greater than 0.7, but a value greater than 0.5 is also valid. But if the conditions do not allow due to many loading factors that have values below 0.5, but still greater than 0.4 then it is still valid. These results are shown in Figure 4.2 and Table 4.3 below.

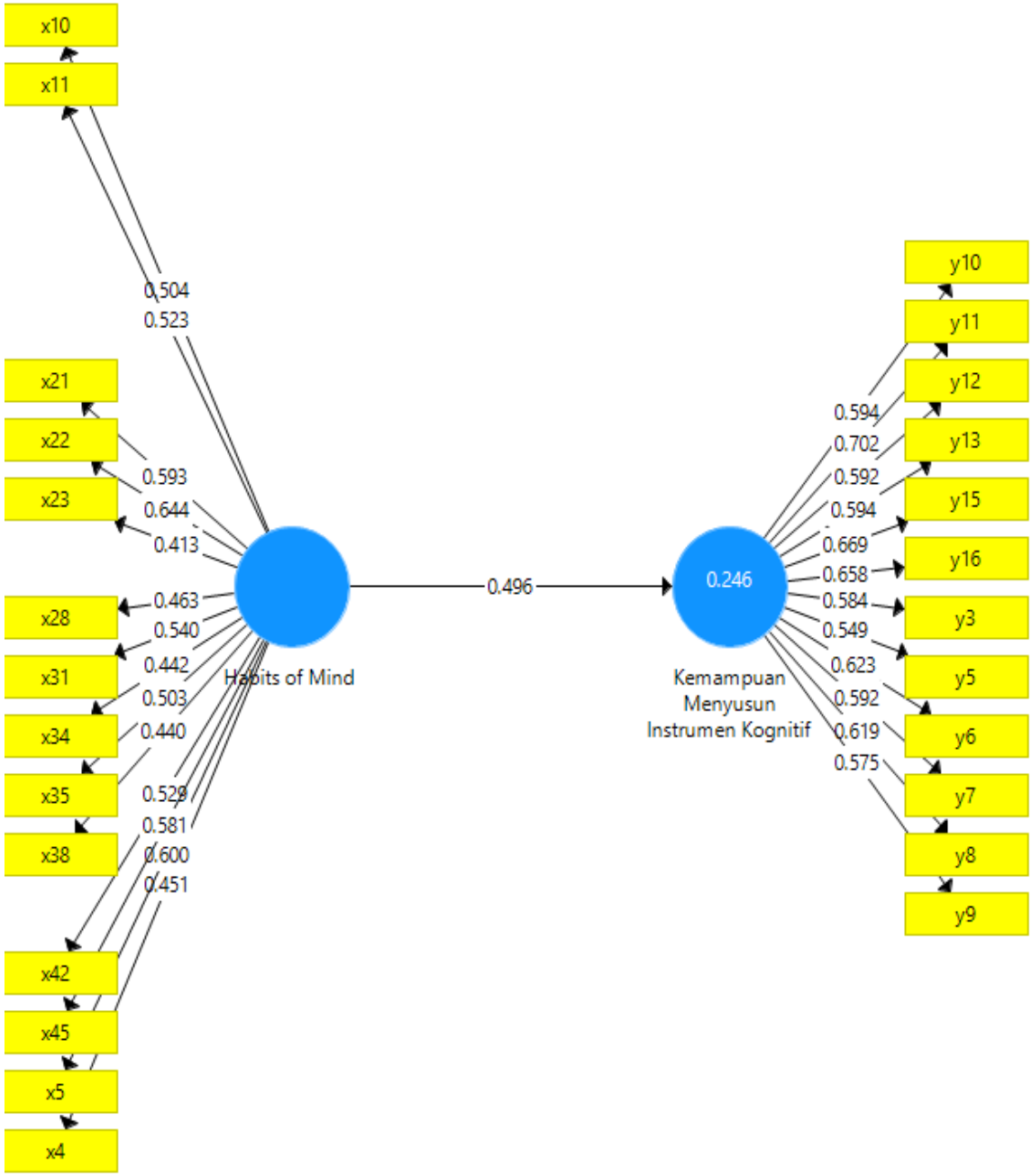

Figure 4.2: Convergent Validity 2 Result

Source: Output Smart PLS, 2019.

The convergent validity 2 results table is shown below.

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Table 4.3: Convergent Validity 2 Result

	Habits of Mind	Kemampuan ...
x10	0.504	
x11	0.523	
x21	0.593	
x22	0.644	
x23	0.413	
x28	0.463	
x31	0.540	
x34	0.442	
x35	0.503	
x38	0.440	
x42	0.529	
x45	0.581	
x5	0.600	
y10		0.594
y11		0.702
y12		0.592
y13		0.594
y15		0.669
y16		0.658
y3		0.584
y5		0.549
y6		0.623
y7		0.592
y8		0.619
y9		0.575
x4	0.451	

Source: Smart PLS output, 2019

From these results, it was found that there were several indicators which turned out to be not the right or appropriate measurement to measure the variables, namely:

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Table 4.4: Indicator that is not a Measure of Habits of Mind

No.	*Indicator*
1.	Listening to the opinions of others with empathy
2.	Thinking flexibly
3.	Thinking about thinking (metacognitive)
4.	utilizing prior or past experience to form new insights
5.	Humorous

Source: Output of Smart PLS, 2019 processed.

The following table 4.5 shows appropriate an indicator to measure habits of mind, namely:

Table 4.5: Habits of Mind Assessment Indicator

No.	*Indicators*	*Parameter*
1.	Endure or never give up	x4, x5
2.	Set coincidences	x10, x11
3.	Work accurately and appropriately	x21, x22
4.	Asking and giving problems effectively	x23
5.	Thinking and communicating clearly and appropriately	x28
6.	Utilizing the senses in collecting and processing data	x31
7.	Creating, imagining, and innovating	x34
8.	Eager in responding	x35
9.	Dare to be responsible and face risks	x38
10.	Thinking interdependently	x42
11.	Learning continuously	x45

Source: Output of Smart PLS, 2019, processed.

The following is an indicator to measure the ability to compile cognitive instruments in grade V math subjects of elementary school, namely:

Table 4.6: Indicators of Measuring Ability to Arrange Cognitive Instruments

No.	*Indicator*	*Parameter*
1.	Material	y3, y5
2.	Construction	y6, y7, y8, y9, y10, y11, y12, y13
3.	Language	y15, y16

Source: Output of Smart PLS, 2019, processed.

Discriminant validity test, reflective indicators can be seen in cross-loading between indicators and their constructs. An indicator is valid if it has the highest loading factor to the intended construct rather than loading factors to other constructs. Thus, latent contracts predict indicators on their blocks better than indicators on other blocks.

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Table 4.7: The Result of Discriminant Validity with Cross Loading Test

	Habits of Mind	Kemampuan Menyusun Instrumen Kognitif
x10	0.504	0.232
x11	0.523	0.210
x21	0.593	0.261
x22	0.644	0.313
x23	0.413	0.194
x28	0.463	0.208
x31	0.540	0.282
x34	0.442	0.233
x35	0.503	0.316
x38	0.440	0.185
x42	0.529	0.321
x45	0.581	0.235
x5	0.600	0.336
y10	0.247	0.594
y11	0.410	0.702
y12	0.336	0.592
y13	0.311	0.594
y15	0.385	0.669
y16	0.356	0.658
y3	0.233	0.584
y5	0.203	0.549
y6	0.268	0.623
y7	0.288	0.592
y8	0.281	0.619
y9	0.206	0.575
x4	0.451	0.057

Source: Smart PLS output, 2019

From Table 4.7, it can be seen that the value of cross loading constructs habits of mind with the indicator is higher than the cross loading indicator of the ability to construct cognitive instruments with other constructs (habits of mind).

Another method for viewing discriminant validity is to look at the square root of average variance extracted (√AVE) value of each construct with a correlation between constructs and other constructs in the model, so it is said to have good discriminant validity.

From Table 4.7, it can be seen that the square root value of AVE of the calculation has a greater value than the correlation value between latent variables, then the construct in the model that is estimated to meet discriminant validity criteria or AVE square root value meets the required value.

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Table 4.8 Square Root of Average Variance Extracted

	Habits of Mind	Kemampuan Menyusun Instrumen Kognitif
Habits of Mind	0.520	
Kemampuan Menyusun Instrumen Kognitif	0.496	0.614

Source: SmartPLS output, 2019

The composite reliability and cronbach alpha are aimed to test the reliability of instruments in a research model. To measure internal consistency and the value, it must be above 0.60. If all the values of the latent variable have a composite reliability value or cronbach alpha ≥ 0.7, means the construct has good reliability or the questionnaire used as a tool in this study has been reliable or consistent.

Based on Table 4.9, it can be seen that the composite reliability test results and the test results of cornbach alpha show satisfactory values, because all values of latent variables have a composite value of 7 0.7 according to Ghozali (2014).

Table 4.9: Cronbachs Alpha and Composite Reliability Test Results

	Cronbach's Alpha	Composite Reliability
Habits of Mind	0.793	0.836
Kemampuan Menyusun Instrumen Kognitif	0.850	0.878

Source: Output Smart PLS, 2019.

The inner model test is the development of models based on concepts and theories in order to analyze the relationship between exogenous and endogenous variables described in the conceptual framework. The stages of testing of the structural model (inner model) are carried out by the following steps:

Look at the R-square value which is a model of goodness-fit. The structural model indicates that the model in the ability variable composes cognitive instruments is low, because it has a value below 0.33.

The influence of independent latent variable models, namely habits of mind on the ability to construct cognitive instruments provides an R-square value of 0.246 which can be interpreted that construct variability in ability to construct cognitive instruments can be explained by habits of mind variability of 24.6% while 75.4% explained by other variables outside the research as shown in the following table.

Table 4.10: R^2 value of Endogen Variable

	R Square
Kemampuan Menyusun Instrumen Kognitif	0.246

The estimated value for track relationships in the structural model must be significant. This significance value can be obtained by the boost rapping procedure. To see the significance of the hypothesis, it is done by looking at the value of the coefficient parameter and t-statistical significance value on the algorithm boost rapping report. To find out significant or not significant, it can be seen in the T-table at 0.05 (5%) alpha = 1.96, then t-table compared by t-count (t-statistics). If the t-statistic is greater than t-table at alpha 0.05, the hypothesis is accepted, and vice

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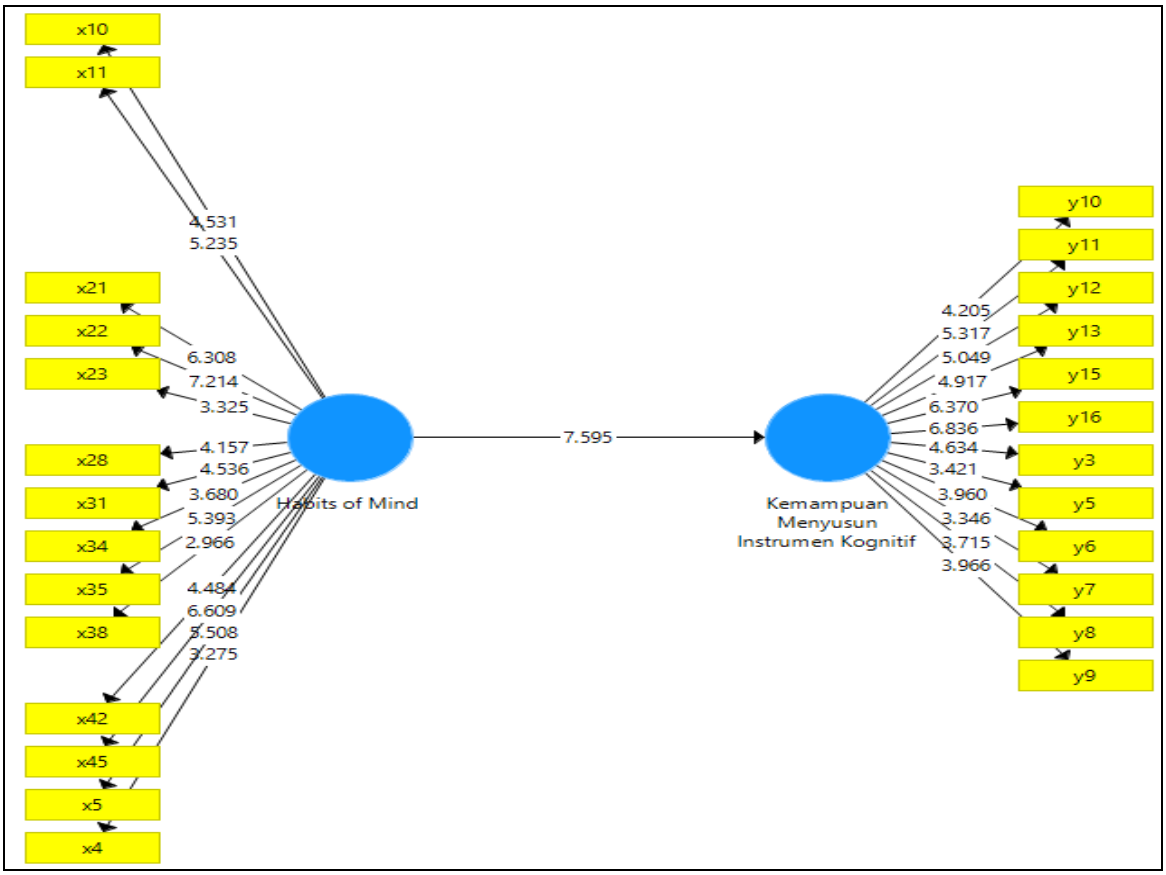
versa.



Source: Smart PLS, 2019

Figure 4.3: Full Model Bootstrapping

Table 4.11: Hypothesis Results Test

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Habits of Mind -> Kemampuan Menyusun Instrumen Kognitif	0.496	0.065	7.595	0.000

Source: SmartPLS, 2019

H1: habits of mind have a positive effect on the ability to construct cognitive instruments.

The results of statistical tests show that the t-statistic value is 7.595> 1.96 (Table 4.11 and Figure 4.3). Based on the results of these tests, H1 is accepted (proven) that is habits of mind have an impact on increasing the ability to develop cognitive instruments.

The study of the influence of habits of mind on the ability to compile cognitive instruments in mathematics subjects in grade V semester 1 was an attempt to examine the position of whether or not the ratings of respondents respond to their implementation. The results of this study also prove the hypothesis proposed. Based on the objectives, previous research gaps, hypotheses, and the results of data analysis, the discussion of the results of the study combines comprehensively the theories, the results of previous studies, and empirical facts that occur in the

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objects studied to verify the research findings, whether strengthening or reject the theory or the results of previous research or new findings.

The results of the study found that habits of mind had a positive effect on the ability to construct cognitive instruments. These results are in accordance with hypothesis 1 meaning that if the habits of mind are increasingly accustomed, it will be a factor that encourages increased ability to develop cognitive instruments.

Habits of mind is as a habit of thinking or tendency to behave intelligently or to form certain intelligent behavioural patterns that can encourage students' success in solving problems. Habits of mind imply that this behaviour requires a discipline of mind that is trained in such a way that it becomes the habit of continuing to try to do wiser and smarter actions. This can be understood because all forms of actions taken by an individual are a consequence of the habits of his or her mind. When facing a problem, someone tends to form certain patterns of intellectual behaviour that can encourage individual success in solving the problem. Meanwhile, the cognitive domain relates to intellectual learning outcomes which consist of six aspects, namely remember, understand, apply, analyze, analyze, evaluate, and create.

Teacher skills are a key component in the success of implementing a learning model. Therefore, the teacher or prospective teacher needs to be prepared in advance in order to understand well the steps of learning. Teachers or prospective teachers must always improve their ability to be able to teach effectively. Thus, students of Elementary School Teacher Education Study Program as prospective teachers must use habits of mind so that it will improve the ability to develop cognitive instruments in mathematics subjects especially in Elementary Schools.

When analyzed using loading factors, measuring habits of mind, which is an indicator of thinking about trying to work carefully and precisely (x21 and x22) is the most dominant measure in measuring habits of mind to encourage the ability to develop cognitive instruments especially in increasing language indicators (y15 and y16) as the most dominant indicator in reflecting the ability to construct cognitive instruments, namely indicators which avoids expressions fostering multiple interpretations (y15), and avoiding the use of local / taboo language (y16). When working in mathematics learning accuracy and accuracy of measuring and calculating are the initial capital so that mathematical work becomes correct. Thus, being precisely needs to be emphasized when learning mathematics and needs to be the focus of attention.

Then, indicator of thinking about thinking (metacognitive) at x17, x18, x 19 in this study is not the right or appropriate measurement to measure the variable. This finding contrasts with the rational of learning of mathematics about problems, especially the parameters of understanding what is known and unknown. This is important so that students can change from the language of daily problems to the language of mathematics. On the other hand, metacognitive is a term on knowledge after factual knowledge, conceptual knowledge, and procedural knowledge. This means that metacognitive is the highest level of knowledge. This metacognitive generally emphasizes the awareness of one's thinking about their own thought processes, meaning a form of cognition, a higher thought process that involves active control of cognitive processes.

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V. CONCLUSION

The results of statistical tests show that the t-statistic value is 7.595> 1.96. Based on the results of the tests, H1 is accepted (proven) that is habits of mind affect the ability to compile cognitive instruments in grade V math elementary school subjects in semester 1. Furthermore, the findings of this study have an impact on increasing the ability to develop cognitive instruments if the students' habits of mind in elementary school teacher education are high.

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