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# The Influence of English Language Mastery Against the Results of Student's Answers on Problems of Mathematics PISA

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### Abstract

This research aims to know the influence of the mastery vocabulary, grammar, and reading comprehension against students' answers of problems PISA mathematics, either directly or indirectly. This research used path analysis as a research design. 100 respondents of the research were the students of state yunior high school South Jakarta. Data collection was done through the research instrument in the form of questions about vocabulary, grammar and reading comprehension, while the mathematical problems uses PISA of year 2012. Before performing data analysis performed multiple statistical tests which is a requirement in the analysis line i.e.:Normality Test; Its Homogeneity Test; as well as a test of the significance of the regression coefficients and linearity. The results of the analysis found that there were: direct influence of vocabulary knowledge mastery against the students' answers on the results of mathematical problems' of PISA; the direct influence of the mastery of grammar against students ' answers on the results of mathematical problems' of PISA; direct influence of vocabulary knowledge mastery against reading comprehension; the direct influence of the mastery of grammar students ' answers on reading comprehension; direct influence reading comprehension towards the students ' answers on the results of mathematical problems ' of PISA; indirect influences mastery vocabulary knowledge against the students ' answers on the results of mathematical problems ' of PISA through reading comprehension; and the indirect influence of grammatical against students ' answers on the results of mathematical problems ' PISA through reading comprehension.

Key words: vocabulary mastery knowledge, grammar, reading comprehension, the result of solving math problems, and PISA.

### 1. Introduction

1.1. Background of the study

English language is the language most widely used throughout the world, therefore it called the international language, so English is the language that must be masterd by the students, as source of knowledge many are written in English. English language for the students of Indonesia is the second language, but most of the students of junior high school or senior high school yet mastered English language well, this is due to the number of hours of English language tuition is still lacking to reach maximum results, also level comptence of teachers vary widely including infrastructure laboratories language has not been adequately.

The average value of the results of English subject National examination at Junior High School year 2018 is 51.32 (Friana, 2018). To be mastered a readings in language three things that need to be controlled are: vocabulary mastered, grammar and comprehension. Sedita (2005) states that students who lack adequate vocabulary have difficulty getting meaning from what they read, so they read less because they find reading difficult. As a result, they learn. While Tarigan (2011) states that the quality of language skills is tied to the quality of its own vocabulary. Astika (2015) Learning vocabulary is one of the components in language teaching that is essential to reading comprehension. Aguirre-Muñoz, Chang, & Sanders (2015) state that function grammar has been shown to increase students' writing confidence and attitudes. While the things that English learning support for students is users ' language environment, and the competence of English teachers in the teaching at the school. Including language usage habits at home will affect academic achievement, according to the research conducted by Sandoval-Hernández & Białowolski (2016) Impact of the test language being spoken at home was significant to student performance in three educational systems (Chinese Taipei, Hong Kong and Singapore). Raja, Selvi (2011) states that Environment' is the leading cause for the problems in learning English as perceived by +1 students while comparing it with the other two dimensions namely 'Attitude' and 'Teacher's Competence.

To be able to work on problems of mathematics in English as in PISA, PISA test participants should understand the terminology and language used in the problems. The linguistic needs of ELL students and the inadequate preparation of teachers to support the mathematical requirements of these students have highlighted the need for math instructors to improve their knowledge about language (Smith, 2017).

Activities in PISA tested capabilities are the field of reading literacy, mathematics literacy, and science literacy where the problems with using text English language. The programed for International Student Assessment (PISA) is a test of international academic activities devoted children aged 15 years. These activities

have been conducted since the year 2000 each of the three annual initiated by the OECD: Organization for Economic Co-operation and Development. Relation to OECD Economic mathematics literacy (2016) defines mathematical literacy is an individual's capacity to formulate, employ and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena. It assists individuals to recognize the role that mathematics plays in the world and to make the well-founded judgments and decisions needed by constructive, engaged and reflective citizens. Therefore, each student must master basic math knowledge to be applied in other situations and conditions.

## 1.2. The study of theory.

1.2.1. PISA Mathematical problems. In mathematical problems such as PISA tests 3 aspect i.e. the content, context, and competence. Aspects of the content consist of 4 parts: the changes and relationships (Change and relationship), shape and space (Space and Shape), quantity (Quantity), as well as data and uncertainty (Uncertainty and data). Aspects of the context there are 4 namely: personal context, jobs context, public context, and the context of the scientific aspects of the competence consists of 3 groups: reproductive groups, groups of connections, and group reflections (OECD, 2010). Problems found in PISA developed six categories, namely student math skills level 1 (low) to 6 (high) that correlates with cognitive ability of students. It is in accordance with the taxonomy of thinking ability of Benjamin s. Bloom, according to Setiawan, Diah, & Lestari (2014) state that the problems at PISA level thinking according to Bloom. Bloom states that there are two levels in mathematical thinking of students, i.e. Low Order Thinking (C1-C3), and High Order Thinking (C4-C6). Error analysis of students in solving the question of PISA study conducted by Karimah (2017) states that on 3 of the subject chosen, errors in understanding the problem (54.5%), errors in transform problem (36.4%), and errors in the process skills (9%) students cannot identify what is known and what is asked on reserved. The biggest mistake students is to understand the problem, it is with an understanding of its English language. Thus if students do not understand what is read or can't listen to what he is, then he will not master the math problems. Pratiwi, et. al. (2015) State that reading is one form of interaction with the language, and therefore reading is language activities. The reader is confronted with the words, phrases and sentences, as well as media-visual media that complement them, which form a whole with the script-write shared. As a receptive language, read the follow-up can be correlated with listening.

1.2.2. Understanding vocabulary is defined as a word that should be known in a language to communicate whether oral or writing. Neuman & Dwyer (2009) states that vocabulary can be defined as " words we must know to communicate effectively; words in speaking (expressive vocabulary) and words in listening (receptive vocabulary)". Vocabulary can be viewed as the main tool to understand a language especially on English as a second language, because in order to understand a sentence a student should understand the meaning of each word in the sentence. Alqahtani (2015) states that vocabulary knowledge is often viewed as a critical tool for second language learners because a limited vocabulary mastery is an individual's great skill in using words of a language, which is acquired based on their own interest's needs and motivation. vocabulary mastery plays an important role in the four language skills and it has to be considered that vocabulary mastery is one of the needed components of language. For the students of Indonesia are weak in vocabulary, they will not understand the questions in English, so that comprehension vocabulary is a serious thing for students of Indonesian students is a matter of serious concern and their quest for finding suitable way to improve vocabulary knowledge is getting more intense

Even in the use of everyday life communication using English vocabulary play an important role, such as listening to the caller, talking to others, read the book, and write in English. Nation (2011) states that "In English as a second language (ESL) and English as a foreign language (EFL) learning vocabulary items plays a vital role in all language skills (i.e. listening, speaking, reading, and writing)". But there is indeed a gender difference in terms of mastery vocabulary development with female students have a significant vocabulary size, and Alharbi (2015) states that lexical competence requires rigorous activities in order to master vocabulary knowledge and to assist in language usage. Any plan to use a particular strategy for learning another language must be continuous so L2 learners who are at the beginning can build upon their knowledge of vocabulary and language.

1.2.3. Grammar is a grammatical structure of the language rules to understand in reading the text correctly. Coghill and Stacy (2003) define that the grammar of a language is the set of rules that govern its structure. Grammar determines how words are arranged to form meaningful units. Kimball (2010) states that the study grammar in order that we may express our thoughts correctly. Grammar is the involvement of three dimension

referenced by the linguistic (morfo) syntax, semantics, and pragmatics that represents the dimensions of the form, meaning, and usage dimension (Utami, 2017). Therefore the role of grammar can provide the skills of someone writing a text. Based on the results of the calculation of the correlation coefficient value t calculate the quantity then 7.445 compared with the t table with 5% confidence level with n = 30 amounted to 1.4. Thus it can be concluded that there is a relationship between mastery of grammar variable X, against narrative writing skills English language variable Y (Santosa, 2017), little is currently known about how grammar and reading comprehension for English as a foreign language develop and interact in a bilingual primary school context (Anja K. Steinlen, 2017), and it is very important for learners to know grammar in case they want to be proficient in the language (Khoso, 2018). Therefore, as has been expressed above, it can be concluded that grammar is an important component to understand the sentences in a text is read by students.

1.2.4. Reading comprehension. According to Pujianti (2017) states that reading comprehension is a process to recognize or identify the text, then recall the contents of the text. Reading comprehension can also mean as an activity to make the order of descriptions/to organize text content, it could evaluate all at once can respond to what is expressly states or implied in the text. For our students in Indonesia English language is a second language, therefore to read understanding a text or reserved in the English language, language learning strategies need to be able to understand what is read. For most second language learners who are already literate in previous language, reading comprehension is primarily a matter of developing appropriate, efficient comprehension strategies (Brown, 2000). Reading comprehension is an understanding of text that is read or the process of constructing meaning from a text. As comprehension takes place, words are decoded and associated with their meanings in the reader's memory, so that the meanings derived from one word, phrase, or sentence are not lost before the next is processed (Shubhada Ponkshe, 2013). The results obtained from reading must be understand, namely the ability of readers to understand the content of the script or information implied presented in the manuscript he read. Pratiwi et al. (2015) state that in order to improve reading comprehension for students there is a method that is reading aloud with the dialogikal reading. Survati, Furaidah; & Saukah (2017) state that it is evidenced that dialogic reading instruction facilitates students' comprehension of texts, the development of vocabulary and development of oral language. While Abatyihun (2018) states that Comprehension is far more than recognizing words and remembering their meanings. It is a complex cognitive process that cannot be understood without a clear awareness of the role and meaning of the vocabulary in a passage of text.

## 1.3. Research quentions

Based on background of the study, the following research questions are addressed, as follows:

- 1. Is there a direct significant influence of the vocabulary mastery against reading comprehension?
- 2. Is there a direct significant influence of grammar mastery against reading comprehension ?
- 3. Is there a direct significant influence of the vocabulary mastery against a student's answer on the results of the PISA mathematics?
- 4. Is there a direct significant influence of grammar mastery against a student's answer on the results of the PISA mathematics?
- 5. Is there a direct significant influence of reading comprehension of students answers on the results of the PISA mathematics?
- 6. Is there an indirect significant influence of Vocabulary mastery against the student's answer on the results of the PISA mathematics through reading comprehension? Aand
- 7. Is there an indirect significant influence of grammar against a student's answer on the results of the PISA mathematics through reading comprehension?
- 1.4. The purpose of this research

The purpose of this research is to know:

1. The direct influence of vocabulary mastery against the direct influence of the answer on the results of PISA mathematics students;

- 2. The direct influence of the mastery of grammar against a student's answer on the results of the PISA mathematics;
- 3. The direct influence of vocabulary mastery against direct influence of reading comprehension; the direct influence of the mastery of grammar against reading comprehension;
- 4. The direct significant influence of grammar mastery against a student's answer on the results of the PISA mathematics,
- 5. The direct significant influence of reading comprehension of students answers on the results of the PISA mathematics,
- 6. The indirect significant influence of Vocabulary mastery against the student's answer on the results of the PISA mathematics through reading comprehension, and
- 7. The indirect significant influence of grammar against a student's answer on the results of the PISA mathematics through reading comprehension.

### 2. Research Design

This quantitative research method used was survey with causal technique, while the data are analyzed with the approach path analysis. In analyzing the influence of one variable against another variable, consisting of two kinds, namely: endogenous variables and exogenous variables. Exogenous variables influence either directly or indirectly against endogenous variables. While the endogenous variables are the variables that can affect other endogenous variables. Endogenous variables in this study is the result of PISA math test (X4). Whereas the exogenous variables included: mastery of the vocabulary (X1); grammar (X2); and reading comprehension (X3). Thus structural path analysis model in Figure 1, is as follows.



Figure 1. Influence of Structural Model of Variales.

2.1. Sample Population and Data Gathering Instruments

The population in this research of state junior high school located in Jagakarsa subdistricts in South Jakarta. The sampling techniques used in this research was Simple Random Sampling with 100 students. Research carried out at the time of school year 2018/2019 in July until October 2018. The technique of data collection for variable mastery vocabulary, grammar, and reading comprehension by using research instrument shaped multiple choice question, the correct answer is given a score of 1 and a wrong answer is given a score of 0, then the instrument tested before used in research. The instrument tested before used in the study, other than members of the sample. Testing instruments include test validity (validity) and test the reliability (reliability). From the results of the test are obtained details of the instruments that are valid and invalid. Invalid instrument discarded (not used in research), provided a valid instrument having regard to all the instruments, indicators must be in a valid questions.

As for the mathematics test results by using problem-solved PISA year 2012. Of the four content problems such as PISA in the current study that is used is a matter of dealing with numbers, or referred also about quantity. The number (quantity) is concerned with the relationship of numbers and number patterns, among others, the ability to understand the size, pattern numbers, and everything associated with numbers in everyday life, such as counting and measuring certain. Included in this number is the ability of content reason quantitatively, represents something in the numbers, understand mathematical steps, counting on the outside of the head, and conducting assessments (Silva, Zulkardi, & Darmawijoyo, 2011).

### 2.2. Research Hypothesis

With the research hypothesis as follows: there is a direct influence of the sigmnifikan vocabulary mastery against the student's answer on the results of the PISA mathematics; There is a direct influence of sigmnifikan mastery of grammar against a student's answer on the results of the PISA mathematics; There is a direct influence of sigmnifikan vocabulary mastery against reading comprehension; There is a direct influence of sigmnifikan reading comprehension; There is a direct influence of the sigmnifikan reading comprehension; There is a direct influence of the sigmnifikan reading comprehension of students ' answers on the results of the PISA mathematics; a significant indirect influence on mastery of vocabulary answer against students on the results of the PISA mathematics through reading comprehension; and a significant indirect influence on grammar towards an answer on the results of PISA mathematics students through reading comprehension.

### 3. Analysis and Discussion

### 3.1 Requirements Analysis

Statistical tests are a requirement in path analysis to be done are: a test of Normality of error; Its Homogeneity Test; as well as a test of the significance of the regression Coefficients and linearity. Based on the analysis of the data obtained can be explained as the following.

3.1.1. Test Of Normality Distribution Error (Y  $-\hat{Y}$ ). Statistical tests to test the normality of the distribution of the error in this study is to test the Lilliefors, and conditions of this test is if the statistics Lcount < Ltable (= 0.05) then the data is gaussian error. Conversely, if the Lo > Ltable (= 0.05) then the data is not Gaussian. Data normality test score error read understanding of the vocabulary (X3 on X1), the results of calculating statistics Lilliefors, with Lcount =: 0.079. This value turns out to be smaller than Ltable (n = 100;  $\alpha$  = 0.05) = 0.089. Thus it can be states that the distribution of error estimates of reading comprehension (X3) on vocabulary (X1) over comes from a Gaussian population. Data normality test score read understanding of the grammar of languages (X3 to X2), the results of calculating statistics Lilliefors, Lcount = 0.081. So that the value is smaller than the Ltable (n = 100;  $\alpha$  = 0.05) = 0.089. Thus it can be states that the distribution of error estimates of reading comprehension (X3) on grammar (X2) comes from a Gaussian population. Data normality Test Score results of the PISA math test over the vocabulary (X4 on X1), the results of calculating statistics Lilliefors value Lcount =: 0.083. So the value turns out to be smaller than Ltable (n = 100;  $\alpha = 0.05$ ) = 0.089. Thus it can be states that the distribution of the error estimate results of PISA math test (X4) for vocabulary (X1) derived from a Gaussian population. Data normality test score performance of principla error over the grammar (X4 on X2), the results of calculating statistics Lilliefors, value: Lcount = 0.085. So this value turns out to be smaller than Ltable (n = 100;  $\alpha = 0.05$  = 0.089. Thus it can be states that the distribution of the error estimate results of PISA math test (X4) over grammar (X2) comes from a Gaussian population. Then test the normality of the data the error score results of the PISA math test and reading comprehension of the principal (X4 on X3), the results of calculating statistics Lilliefors, Lcount = 0.086. Schingga this value is smaller than the Ltable (n = 100;  $\alpha = 0.05$ ) = 0.089. Thus it can be states that the distribution of the error estimate results of PISA math test (X4) on reading comprehension (X3) comes from a Gaussian population. Therefore thus all data between 4 variables are Gaussian, and so qualified for the trip is continued research analysis.

42.556. The results turned out to be smaller than  $\chi^2_{\text{table}}(\alpha_{=0.05; \text{dk}=66}) = 85,96$ . Thus it can be states that variant a grouping of reading comprehension (X3) on grammar (X2) is a population that has a homogeneous Variant. Grouping variants of its homogeneity test results of PISA math test on the vocabulary (X4 on X1), the results of calculating the statistical Chi Square calculating variants of variable clustering results of PISA math test (X4) on vocabulary (X1), value  $\chi^2_{\text{count}} = 49.386$ . This value turns out to be smaller than  $\chi^2_{\text{table}}(\alpha_{=0.05; \text{dk}=53}) = 70,99$ . Thus it can be states that math test results group variants of PISA (X4) for vocabulary (X1) is a population that has a homogeneous variant. Grouping variants of its homogeneity test results of PISA math test on grammar (X4 on X2), the results of calculating the statistical Chi Square calculating variants of variable clustering results of PISA math test (X4) on the grammar (X2), earned value  $\chi^2_{\text{count}} = 62.596$ . This value turns out to be smaller than  $\chi^2_{\text{table}}(\alpha_{=0.05; \text{dk}=66}) = 85,96$ . So it can be states that math test results group variants of PISA (X4) over the grammar (X2) = 62,596. Grouping variants of its homogeneity test results of PISA math test over reading comprehension (X3), earned value (tcount = 64.07. This value obtained is smaller than (table ( $\alpha = 0.05; \text{dk} = 52$ ) = 69.83. Thus it can be states that math test results group variants of PISA (X4) on reading comprehension (X3) come from a population that has a homogeneous variant. Thus it is said that overall the results of count tests its homogeneity test results from a population state of PISA math test over reading comprehension (X3) come from a population that has a homogeneous variant. Thus it is said that overall the results of count tests its homogeneity variant is derived from a population group with a homogeneous variant.

3.1.3. Test of linearity of Regression Model and its significance. This was done so that the requirements of variables exogenous and endogenous structural model formulated in the relationship significant and linear. Therefore conducted a test of the significance of the linear regression model and linearity of a simple suit model relationships between variables that are formulated in the model of research. significance and linearity of reading comprehension (X3) on understanding vocabulary (X1). Counting of linear regression model in prediction of variable simple reading comprehension (X3) and understanding vocabulary (X1) produces a model of alleged, i.e.  $X = 26.70 + 0.75 \times 1$ . The results of the analysis (ANAVA) against variants of this model are obtained that the regression model of 94.13 Fcount greater than Ftable ( $\alpha = 0.01$ ) = 6.90. Thus it can be states that the alleged the regression model is very significant. Furthermore, the value of the Matching of 0.96 Fcount out smaller than Ftable ( $\alpha = 0.05$ ) = 1.60. It is states that the relationship between the X 3 with the X 1 is linear. Significance and linearity of reading comprehension (X3) on grammar (X2), counting of linear regression model in prediction of variable simple reading comprehension (X3) and grammar (X2) produces models suggest that X3 = 46.72 + 0.55X2. The results of the analysis (ANAVA) against variants of this model are obtained that the regression model of 20.16, Fcount greater than Ftable ( $\alpha = 0.05$ ) = 6.90. Thus it can be states that the alleged the regression model is very significant. Furthermore, the value of 1.20 Fcount, suitable out smaller than Ftable ( $\alpha = 0.05$ ) = 1.62. It states that the relationship between reading comprehension with grammar is linear. Next the significance and results of the PISA math test Linearity  $(X_4)$  on vocabulary  $(X_1)$ , counting of model regressi linear sederhana variabel hasil tes matematika PISA (X4) and vocabulary (X1) generate the model suggest that the results of the PISA math test ( $X_{4}$ ) = 11,79 + 0,88 X<sub>1</sub>. The results of the analysis (ANAVA) against variants of this model are obtained that the regression model of Fcount 211.51 greater than Ftable ( $\alpha = 0.01$ ) = 6.90. Thus it can be states that the alleged the regression model is very significant. Furthermore, the value of the matching of 0.98 Fcount out smaller than Ftable ( $\alpha = 0.05$ ) = 1.60. This suggests that the relationship between the results of the PISA math test with the understanding of the vocabulary is linear. Next the significance of linearity of reading comprehension and math test results of PISA (X 4) over the grammar (X2), simple linear regression models of counting variable results of PISA math test (X4) and grammar (X2) produces models suggest that X4 = 16.30 +0.84 X1. The results of the analysis (ANAVA) against variants of this model are obtained that the regression model of 50.94 Fcount greater than Ftable ( $\alpha = 0.05$ ) = 6.90. Thus it can be stated that the alleged the regression model is very significant. Furthermore, the value of the Matching of 1.56 Fcount out smaller than Ftable ( $\alpha$  = (0.05) = 1.62. This suggests that the relationship between the results of the PISA math test with grammar is linear. Next the significance and results of the PISA math test linearity (X 4) on reading comprehension (X 3), linear regression model prediction the calculation of the simple variable results of PISA math test (X 4) and reading comprehension (X 3) produces the model suggest that  $X = 37.81 + 0.62 \times 3$ . The results of the analysis (ANAVA) against variants of this model are obtained that 56.73 Fcount regression model of greater than Ftable  $(\alpha = 0.01) = 6.90$ . Thus it can be states that the alleged the regression model is very significant. Furthermore, the value of 1.20 Fcount suitable out smaller than Ftable ( $\alpha = 0.05$ ) = 1.60. This suggests that the relationship between the results of the PISA math test with grammar is linear.

#### 3.2. Discussions

The next step is the determination coefficient and testing line on path analysis (path analysis), which include: the determination of the coefficient of correlation of antarvariabel in structural models, determination and testing the significance of the coefficient on line on each substructure, as well as the determination of the great influence of direct and indirect variables exogenous endogenous variables in the model towards structural. At a yield of

percountan antarvariabel in the correlation matrix of structural model of the whole of the correlation coefficients antarvariabel are marked positive, this suggests that there is a positive relationship of structural models in betwen variabels. In addition, the entire value of the correlation coefficient is significant at the  $\alpha = 0.01$ . Then the path coefficients significance test results on each substructure substructure-1 and-2 that all coefficients of Substructure line t count-1 is the vocabulary and grammar of each is 7.88 and 6.04 greater t table = 0.01; 97 = 1.98. Thus, all the line coefficient of the substructure-1 is significant or different real with zero.

Likewise the causal influence of the antarvariabel on the substructure-2 consists of an endogenous variable, namely the results of PISA math test and three variables are exogenous, i.e., vocabulary, grammar, and reading comprehension. The correlation coefficient matrix of exogenous antarvariabel each is 5.95, 5.70, and 5.79 greater thant table t = 0.01; 97 = 1.98. Thus, all the line coefficient of the substructure-2 is significantly different or real zero.

The results of the calculations of the great determination of the influence of direct and indirect variables exogenous variables in the model of endogenous against structural variable direct influence is a big vocabulary and grammar against variable read understanding on sub-structure 1 each 0.43 0.41, and the next big influence of exogenous variables the vocabulary, grammar, and reading comprehension endogenous variable math test results of PISA on the substructure-2, with each value 0.43, 0.27, and 0.34. While the large influence of indirect vocabulary against PISA math test results through reading comprehension was 0.71, and great influence is not direct grammar against PISA math test results through reading comprehension is 0.68.

The results of the calculation of the coefficient used to test the hypothesis posed and measuring influence either directly or indirectly against exogenous variables are endogenous variables in the structural model. The withdrawal of the inference hypothesis is done through the calculation of the value of the Statistic t each path coefficient, provided if t count > path coefficient is significant then the t table and vice versa if tcount < t table then insignificant. Based on all the results of the entire proposed hypotheses obtained tcount >t table, then the entire Ho is rejected, there is thus a direct influence: there is a vocabulary against reading comprehension, there is a direct influence of grammar against reading comprehension, there is a direct influence of grammar against reading comprehension, there is a direct influence of reading comprehension math test results PISA math test Results, there is a direct influence of grammar against PISA, There is indirect grammatical influence against PISA math test Results through reading comprehension. The results of the structural model of percountan analyzed in research consist of two substructure, i.e. substructure substructure-1 and-2. Substructure-1 there is an endogenous variable, namely, reading comprehension and two variables exogenous influence directly, i.e., vocabulary and gramma.

3.2.1. Path coefficient  $p_{11}$ . Direct influence of vocabulary against reading comprehension of 0.43 with path coefficient 0.53, and tcount = 7.88. At  $\alpha = 0.01$  retrieved table = 2.63. Because the value of tcount (7.88) > t table (2.63), then the line very significant coefficients, then the direct influence of vocabulary against reading comprehension is very significant. Previous research results by Wulan (2010)states that based on the results of the analysis, which play a role in the ability to read is the cognitive aspect i.e. mastery of vocabulary, Gu (2017) states that generally speaking, learners with a large vocabulary size are able to get higher score when doing multiple choice reading comprehension, (Nouri & Zerhouni, 2016) states that In connection with the relationship between vocabulary size, depth and reading comprehension, the results indicate a positive but moderate relation. In order to improve English vocabulary learning in schools, the role of a teacher is very important to plan the appropriate teaching methods, for students who are learning the English language that is not their everyday language, so also a teacher must know the characteristics of the age group of the students themselves. The teachers should be concerned that teaching vocabulary is something new and different from student's native language. They also have to take into account that teaching English for young learners is different from adults. The teachers have to know the characteristics of his\her learners. They more over need to prepare good techniques and suitable material in order to gain the target of language teaching (Algahtani, 2015). Some respondents believe that as a pedagogical model in EFL, critical literacy plays a positive role in helping students to read beyond the text. However, when teachers focused on implementing critical literacy in the class, one of the participants was afraid that the classroom atmosphere would be dull and uninteresting, a participant who had been teaching for about four years (Gustine, 2018). There was a significant positive relationship between vocabulary knowledge and reading comprehension. (r = .599, p < 0.01), implying that a larger vocabulary enabled students to recall more information from the text they read and also deeper knowledge of words help learners comprehend the text better (Anjomshoa; Zamanian, 2014).

From the results of research and other studies as well as the theories that has been said, it can be concluded that there is a significant direct influence on the vocabulary of State Junior High SchooL students against reading comprehension in the neighborhood of South Jakarta.

3.2.2. Path coefficient  $p_{32}$ , direct influence of grammar against reading comprehension of 0.40 with path coefficient 0,41, and  $t_{count} = 6,04$ . On  $\alpha = 0,01$  retrieved table = 2,63. Because the value of  $t_{count}$  (6,04) > t table (2,63), thus path coefficient very significant, then the direct influence of grammar against reading comprehension is very significant. Previous research results. The result shows that the significant level is 0.000 < 0.005; therefore it can be concluded that there is a significant effect of grammar mastery towards student's reading comprehension. Other words, the students who guided better grammar mastery are better to comprehend reading (Fitriyeni & Widyastuty, 2018). That there were significant effects mastery of grammar against reading comprehension text narrative. This is proven by the acquisition value Sig. 0,027 < 0,05 and t count = 2,287 (Höffler, Bonin, & Parchmann, 2017). There is significant effects mastery of grammar against reading comprehension text narrative. This is proven by the acquisition value of Sig. 0,027 < 0,05 and t count = 2,287(Ramdhan, 2017).

Likewise, in order to increase reading comprehension depends on the learning strategies of teaching grammar. The effect of Story Grammar Strategy in reading comprehension is the students become well in reading; it can be seen from the result of the students' reading after using Story Grammar Strategy (Surbakti et al., 2017). And this result indicates that grammar plays an important role in reading, but that grammar is also positively affected by reading skills, although the route of causal effects, unfortunately, cannot be discerned by such an analysis (Steinlen, 2017). From the results of research and other studies as well as the theories that advanced, it can be concluded that there is a significant direct influence on grammar against reading comprehension of students of State Junior High School in South Jakarta.

Substruktur-2. There is an endogenous variable, namely the results of PISA math test and three variables exogenous influence directly, i.e., vocabulary, grammar, and reading comprehension as well as two exogenous variables that influence indirectly, i.e., vocabulary and grammar.

3.2.3. Path coefficient  $p_{41}$ , direct influence of vocabulary against PISA math test results of 0.43 path coefficient 0,34 and  $t_{count} = 5,70$ . On  $\alpha = 0,01$  retrievedt table = 2,63. Because the value of  $t_{count}$  (5,70) > t table (2,63), then the line very significant coefficient, then there is the direct influence of direct vocabulary against PISA math test Results are highly significant. The results of previous research by Dunston and Tyminski (2013) states that the conceptual approach to mathematics vocabulary with research-based literacy strategies is a worthwhile path to explore and one that can improve students ' mathematics learning. There is a distinction of special academic achievement between students who use the mother tongue (native speaker) with students who use second language (non-native speaker). The differences between second language learners and native speakers should therefore be larger for general academic vocabulary than for specialised academic vocabulary (Haag, Heppt, Stanat, Kuhl, & Pant, 2013). From the results of research and theories are dikemukankan, it can be concluded that there is a significant direct influence on the vocabulary of PISA math test results against the State Juniot High School South Jakarta.

3.2.4. Path coefficient  $p_{42}$ , direct influence of grammar against PISA math test results of 0.27 with with path coefficient 0.33, and  $t_{count} = 5,95$ . On  $\alpha = 0,01$  retrieved table = 2,63. Because the value of  $t_{count}$  (5,95) > t table (2,63), then the path coefficient very significant, then there is the direct influence of grammar against PISA math test results are highly significant. The results of previous research (Ratnengsih, 2016) states that influential syntax components amounted to 20.3% against the ability of mathematic comprehension. Further more Ratnengsih states that the component semantics and syntax together influential amounted to 39.9% against the ability of mathematic comprehension.

From the results of research and theories are dikemukankan, it can be concluded that there is a significant direct influence on grammar against PISA math test results at Sate Junior High School South Jakarta. Thus it is evident that there is a direct positive influence of grammar against PISA math test results against students of Sate Junior High School South Jakarta.

3.2.5. Path coefficient  $p_{43}$ , direct influence reading comprehension math test results of PISA of 0.34 with path coefficient 0.46 and  $t_{count} = 5,79$ . On  $\alpha = 0,01$  retrieved table = 2,63. Because the value of  $t_{count}$  (5,79) > t table (2,63), then the path's are very significant, then there is a direct influence of reading comprehension test results of PISA mathematics very significant. The results of previous research that of Henry, Nistor, & Baltes (2014) states that a standard multiple linear regression analysis was conducted to evaluate how well English proficiency predicted mathematics scores. The output revealed a strong correlation between English proficiency and mathematics scores, r = .692. The model summary highlighted  $R^2 = .479$ , adjusted  $R^2 = .476$ , F(1,175) = 160.8, p < 0.01, indicating statistically strong predictive capability of English proficiency on mathematics scores. Isphording, Piopiunik, & Rodríguez-Planas (2016) states that there is indicate very strong partial correlations between reading and math performance of a magnitude of 0.78, which are robust to different sets of control variables. As argued above, these partial correlations likely reflect both the causal effect of reading performance

on math performance as well as the influence of unobservable factors such as ability and motivation. And Auzar (2013) states that correlation of reading skills with the ability to understand language understanding problem count an story math grade 5 pupils of Primary School (SD 006). These can be seen in table value r = 0.726. Based on the applicable criteria, the value of r that shows the correlation of reading skills with the ability to understand language understanding problem count an story classified strong (0.60-0,799 correlation of reading skills with the ability to understand language understand language understanding problem count an story math grade 5 pupils Primary school. These can be seen in table value r = 0.726. Based on the applicable criteria, the value of r that shows the correlation of reading skills with the ability to understand language understanding problem count an story math grade 5 pupils Primary school. These can be seen in table value r = 0.726. Based on the applicable criteria, the value of r that shows the correlation of reading skills with the ability to understand language understanding problem count an story math grade 5 pupils Primary school. These can be seen in table value r = 0.726. Based on the applicable criteria, the value of r that shows the correlation of reading skills with the ability to understand language understanding problem count a story classified strong (0.60-0,799).

Of research results obtained in this research, it can be concluded that there is a significant direct influence on reading comprehension test results of PISA mathematics students of State Junior High School South Jakarta.

3.2.6. Path coefficient  $X_1$  to  $X_4$  through  $X_3$  ( $p_{41.3}$ ), indirect vocabulary influence against PISA math test results through reading comprehension, the research also proves that the vocabulary in addition to the direct influential 0.43, also shows the influence of indirect against PISA math test results through reading comprehension. Indirect influences of vocabulary through reading comprehension math test results of PISA is of 0.30. The results of calculations using software Lisrel 8.80 (Student Edition) that the coefficients X1 line against X4 through X3 (p 41.3) of 0,49 with  $t_{count} = 4,51$ . On  $\alpha = 0,01$  retrieved t table = 2,63. Because the value of  $t_{count}$  (4,51) > t table (2,63), then the line very significant coefficient.

Thus, the influence of the total vocabulary against PISA math test results, either directly or indirectly is 0.73. This proves that the variation in vocabulary mastery through variations in reading comprehension of indirect effect against PISA math test results of students of State Junior High School South Jakarta.

3.2.7. Path coefficient  $X_2$  to  $X_4$  through  $X_3$  ( $p_{42.3}$ ), the influence of indirect grammar against PISA math test results through reading comprehension, grammar in addition to the direct effect (0.27) is also an indirect effect against PISA math test results through reading comprehension. Indirect influences of grammar through reading comprehension math test results of PISA is 0.41, calculation result using software Lisrel 8.80 (Student Edition) that the coefficient of X2 to X4 against the line through  $X_3$  ( $p_{42.3}$ ) is 0,41 with  $t_{count} = 4,47$ . On  $\alpha = 0,01$ retrievedt table = 2,63. Because the value of  $t_{count}$  (4,47) > t table (2,63) then the line very significant coefficients. Thus, the influence of a total grammar against PISA math test results, either directly or indirectly is 0.68. This proves that the variation of the results of the PISA math test derives directly from the grammatical variations through the variation of reading comprehension of students of State Junior High School South Jakarta. The final structural model of the influence of betwen variabel the results of hypothesis testing as seen in Figure 2 below. Basically the success of the competition of PISA for students where English is a second language, especially in the field of mathematics influenced by language skills of English laguage. The relationship between language factors and mathematics achievement is not clearly understood, although it is obviously reasonable to assume that a mastery of mathematical concepts presupposes some facility with the language used to express, characterize, and apply those concepts (Cuevas, 2014).

Thus, the influence of the total grammar against PISA math test results, either directly or indirectly is 0.68. This proves that the variation in vocabulary mastery through variations in reading comprehension of indirect effect against PISA math test results of students of State Junior High School South Jakarta. The complete data about The coefficient of the variable path and great influence of endogenous variables against exogenous, as seen at figure 2.



Figure 2. The coefficient of the variable path and great influence of endogenous variables against exogenous. Description:

path coefficient direct influence: 0,53; 0,41; 0,34; 0,33; dan 0,46path coefficient indirect influence (ind): 0,33 dan 0,34Huge direct influence: (0,43); (0,40); (0,34); (0,41); dan (0,34)Huge direct influence (ind): (0,30) dan (0,27)

## 4. Conclusion

In fact the Indonesian students mostly have a weakness in English language subjects and subjects of mathematics, this is due to weak learning motivation and learning interest of students towards the second lesson is that, on the other hand is weak competence of a teacher who taught English and mathematics. So the Indonesian students in the PISA who take the test, getting in trouble in answering math questions having constraints on language comprehension. Based on the results of hypothesis testing and discussion of the results of research on Junior High School South Jakarta state that there is a significant direct influence on vocabulary mastery against the reading comprehension, it shows us that the more vocabulary in Ahold students will be the better understanding of the students in the math questions in English, and there is a significant direct influence on vocabulary mastery against the answers of the students on the mathematics of PISA, it shows us that the more vocabulary in Ahold students will be getting better results on the students answer math problems of PISA. There is also a significant direct influence on grammar against reading comprehension it tells us that the better grammar in Ahold students will be the better understanding of the problems in English, then there is a there is a significant direct influence on grammar answers results against students in the math of PISA, it tells us that the better grammar in Ahold students will be getting better results on student answers math problem of PISA. There is a significant direct influence on reading comprehension of students ' answers on the results of the math of PISA; it shows us that reading comprehension of the higher influence on the improvement of students ' answers on the question of the results PISA mathematics. On the other hand there is influence significant indirect vocabulary mastery against the results of the student's answers on a math problem PISA via reading comprehension, with terms that would be more effective in improving students ' answers on the question of the results PISA mathematics, If it is done by increasing the understanding of the vocabulary, in order to improve memabca understanding of a text in English, then it will result in total towards understanding question-a math problem that will have an impact on the results of the math test Pisa., and there is a significant indirect influence on mastery of grammar against a student answers results on PISA math through reading comprehension, with terms that would be more effective in improving students ' answers on the question of the results PISA mathematics, if done by increasing understanding of grammar, in order to improve the reading comprehension of an English text, then it will result in total towards understanding question-a math problem that will have an impact on PISA math test results. Thus it can be concluded that the results of the PISA math test is affected by variations by variable understanding vocabulary, grammar, and reading comprehension both directly and indirectly.

Some of the implications of this research are that the results of PISA students of Indonesia in the future, if mastery English students are not upgraded will remain below the average of the world will be even below the

average of the countries of Asia. For it is necessary to increase comptence and qualifying language teachers English in all levels of the school, then it takes creativity and ability of teachers to understand the learning situation of students so that the atmosphere inside the plan, organize, deliver, and evaluating the learning of vocabulary, grammar, and reading comprehension prepared more mature, so that it can increase the good results of the academic evaluation as well as for academic competition sort of PISA.

As a suggestion for areas of schooling, to shape and get used much earlier in the English-speaking students, by making the school rules with form of English day. Then English lessons at school should start from the elementary school to the number of hours of instruction in the curriculum of English subjects in junior high and high school diambah, and need to increase the means of laboratory English needs to be improved for support the means of creating an environment of learning, and the use of English in schools.

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