

# The Relationship Between New Student Selection Tests and Learning Achievement at the Vocational Program

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## ABSTRACT

The new student admission selection test is the basis for determining the acceptance of prospective students in higher education. The selection test for new admissions generally consists of a basic ability test (TKD) and a test of academic ability and potential (TKPA). This study aims to analyze the effect of the results of the new student admissions selection test on the learning achievement. This research is quantitative research. The data analyzed were the results of the selection test for new student admissions and the score of the Vocation program in Universitas Negeri Surabaya student academic achievement index. The results of this study are as follows: (1) Simultaneously the results of the new student selection test affect the learning achievement, (2) Partially each variable that has a significant effect on student learning achievement is the geometric value and logical reasoning, and (3) Student learning achievement can be explained by a model of 9.2% and 91.8% explained by other variables outside the model.

**Keywords:** Selection Test, Learning Achievement, Vocational Program.

## 1. INTRODUCTION

The test is an assessment which is the process of gathering information and processing information about a matter and then returning it to the person concerned to find out its strengths and weaknesses. The new student acceptance test is included in the type of selection test. A selection test is a type of test that aims to select or select prospective participants who meet the requirements to enter and participate in a program. This selection test contains questions from material that measure the abilities or competencies of prospective test participants, according to the standards determined by the program to be followed [1].

College entrance tests in America are in the form of SAT (Scholastic Assessment Test) and ACT (American College Test). The results of this test can be a measure of student achievement. The SAT assesses students' mathematical and verbal abilities in their first year of study. The ACT assesses the readiness of high school graduates to attend lectures in four study areas, namely English, Mathematics, Reading, and Scientific Reasoning [2].

Including the SAT as a requirement is important in predicting student success in college [3]. Furthermore, the college entrance selection test depends

on the type of program. In addition to the main admissions tests used in the US namely the SAT and ACT which are used for college admissions, there are several selection tests for specific programs. The Graduate Record Examinations (GRE), used to test admissions to graduate schools. The Medical College Admission Test (MCAT) is used to test the admissions selection of medical students. The Law School Admission Test (LSAT) for the law school entrance test. Graduate Management Admission Test (GMAT), which is used for admission to business schools. Another required test is the English test [4].

The test commonly used to get into college is the aptitude test. Traditionally, the application of aptitude testing has to some extent depended on whether talent has been rated as stable over time or whether it can be modified. The original purpose of the college admissions test was to identify students who are best able to thrive by studying at a college that matches their talents and interests [5].

The written test which is a selection test for new student admissions becomes the basis for determining the acceptance of prospective students in higher education. This test serves to screen prospective new students who are eligible to enter college. The selection test for new students generally consists of a basic ability test (TKD)

and a test of academic ability and potential (TKPA). TKD is divided into two, namely TKD Saintek and TKD Soshum. The Science and Technology TKD tested the materials for Mathematics, Biology, Chemistry, and Physics, while the Soshum TKD tested the Sociology, History, Geography, and Economics materials. TKPA tested Basic Mathematics, Indonesian, English, Verbal, Numerical, and Figural materials [6].

Computer-based written tests with multiple-choice (objective) have the advantage of being easier and faster in the assessment process. One of the applications used in computer-based tests is the CAT application. This CAT application has advantages from media aspects, design aspects, and evaluation aspects. The CAT application is also superior in the display aspect, namely the presentation of questions in CAT, and the ease of getting test results [7].

The SPMB college entrance test also uses a written test consisting of TKD and TKPA tests. This test is structured in such a way as to be able to filter and predict the abilities of prospective students. College entrance tests must be structured and are unidimensional to measure abilities [8]. The measured abilities must be following the standards and evenly distributed to the abilities being measured so that there is no tendency for high tendencies to be only in certain abilities and weak in other abilities.

A well-written test must be able to measure the potential and predict the performance of participants well when they are allowed to complete a program. One way to determine a well-written test is to analyze student achievement after doing lectures [9]. This written test must also be able to measure the potential of the test taker. Tests that measure potential seek to identify how well individuals understand and use information from a variety of sources to support their goals [10].

In one study, it was stated that best practice is recommended in setting test items in measuring student learning outcomes while indicating policy directions to assist educators and researchers in the field of educational evaluation.[11].

Based on the description above, the college entrance written test is a test used to measure the ability of prospective students to attend lectures. This written test becomes the standard or reference for the acceptance of prospective students in higher education. A good test result describes the ability and readiness of prospective students to enter a study program at a university and be able to complete the program properly and on time. This test can be done on a computer-based and print-based basis.

The result of this written test is to get a standard score as an illustration of the ability of prospective students to complete their lectures. This written test applies to all study programs, where each study program has its

characteristics. The hope is that the results of the written test are good, showing good student abilities in carrying out their lectures which are shown by good learning achievements, but there are different conditions in the field. So it becomes a problem that needs to be solved. Learning outcomes are the output of the learning process. Learning is an activity carried out by students in achieving learning objectives. While learning outcomes are the abilities that students get after receiving their learning experience [12].

Learning outcomes are changes in the behavior of students from not knowing to know and from not understanding to understanding [13]. Changes in knowledge and skills will occur after the learning process. Human behavior consists of several aspects. Learning outcomes will appear in changes in these aspects, namely knowledge, understanding, habits, skills, appreciation, emotional, social relations, physical, character, and attitude. Learning outcomes will be seen from changes in one or more of these aspects [13].

Learning outcomes can be known if the learning outcomes test is carried out. Learning outcomes test is a process to collect information, make considerations regarding the information, and make decisions based on the considerations that have been made [14]. The teaching and learning process requires a selection to determine the extent to which students have achieved the learning objectives. Learning outcomes can be measured using a variety of instruments depending on what will be measured.

Learning outcomes have an important role in the teaching and learning process. Assessment of learning outcomes can provide information to what extent the success of students in learning. Furthermore, from this information educators can improve and rearrange further learning activities, both for the whole class and individually.

Learning achievement is the result of learning activities accompanied by changes achieved by students expressed in symbols, numbers, letters, or sentences as a measure of the level of success of students with predetermined standards [15]. Learning achievement is the result obtained in the form of impressions that result in changes in students as a result of learning activities. Learning achievement is the learning result achieved by students which can be expressed by numbers. Learning achievement can measure the extent to which learning objectives are achieved. This learning achievement is usually recorded in official documents of educational institutions [16].

Two factors influence learning achievement, namely internal factors, and external factors. Internal factors include physiological factors (health and body condition) and psychological factors (interests, talents,

intelligence, emotions, fatigue, and ways of learning). External factors include the family environment, school, community, and nature [15]. Factors that affect learning achievement from internal factors in the form of student learning motivation, while external factors in the form of learning facilities, learning environment, teaching model [16]. Factors that affect learning achievement include teaching quality, learning independence, family environment, work ethic, learning concentration, and support [17].

Learning achievement can be influenced by the interests and talents of a person. Interests and aptitudes can be assessed from self-selection tests such as TPA tests, Psychotests, and so on, therefore, in college admissions selection, these tests are often used. The study program entrance selection test has a fairly good predictive power, so the college entrance selection test can be used to get qualified student candidates [18].

Based on the description above, it can be concluded that learning outcomes are the result of the teaching and learning process which is indicated by positive changes from students. Learning outcomes that are stated in writing in official institutional documents as a measure of the level of success against learning objectives are referred to as learning achievements.

Learning outcomes during lectures can be shown by learning achievement in the form of an achievement index (IP). There are two types of IP, namely semester IP (IPS) and cumulative IP (GPA). Social Studies is an achievement index obtained during one semester of lectures. GPA is the cumulative achievement index of all semesters that have been passed by students. Maximum GPA is 4.00 with all course grades getting "A".

The results of previous studies have shown that overall ranking when high school is a good predictor of predicting academic success in college perguruan [19]. However, it is only optimal to see the average achievement index of new students. Another study states that there is a linear relationship between general intelligence (g), aptitude tests (SAT, ACT, PSAT), and college GPA, but the effect is very small [20]. [21] Further stated that SAT-M (math) scores were positively correlated with mathematical ability and STEM scores (science, technology, engineering, and math) and negatively correlated with verbal abilities and social science scores (such as English, arts, history, and mathematics). foreign language), and vice versa on the SAT-V (verbal) subtest. Thus, certain types of tests will affect certain abilities as well.

Universitas Negeri Surabaya (Unesa) is one of the public universities in Surabaya. One of the selected paths that can be taken by prospective students who want to study in the Unesa undergraduate program is the New Student Admissions Selection (SPMB). SPMB is an independent selection organized by Unesa for Bachelor,

Applied and Transferred, and Postgraduate programs. This SPMB uses a written test that can be both computer-based and paper-based. Written tests for entry into vocational programs have so far been equated with non-vocational programs, namely TKD and TKPA mostly without skills tests. This written test should serve as a standard measure and get an idea of the ability of prospective students to complete their lectures. Because the learning process, evaluation method, and expected output are different between vocational and non-vocational programs, is the written test model for the selection of new students still relevant?

Based on the description of the background above, a study is needed to analyze the relationship between the results of the selection test for new admissions and student learning outcomes for the Unesa vocational program.

## 2. METHODS

This research is descriptive quantitative research with an ex post facto research approach. The population in this study were all students of the Unesa vocational program. The technique used in determining the sample of this study is non-probability sampling with saturated sampling. The data analyzed is the document of the results of the new student admissions selection test and the academic achievement index value of vocational program students. Data collection using literature and documentation methods.

The analysis was carried out by conducting a regression analysis between the components of the selection test for new student admissions and the cumulative achievement index of Unesa students. This analysis is directed to determine the effect of TKD and TKPA scores on student GPA. Basic ability test scores (TKD) are translated into general knowledge (X1), Indonesian (X2), Mathematics (X3), and English (X4) scores. Academic ability test scores (TKPA) are described with the values of Series (X5), Arithmetic (X6), Algebra (X7), Geometrics (X8), Logical Reasoning (X9), and Analytical Reasoning (X10). Figure 1 is data analysis model.

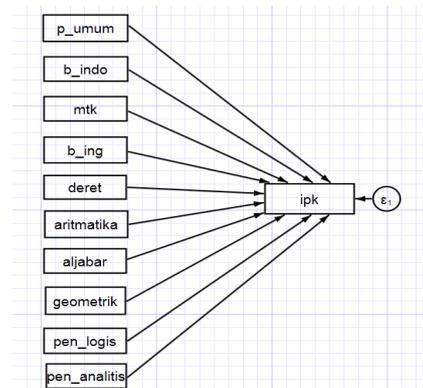


Figure 1 Data analysis model.

### 3. RESULTS AND DISCUSSIONS

Based on the results of data analysis and documentation, it can be generated as follows.

Descriptive analysis of the data using the STATA program and the input data of ten independent variables and one dependent variable can be seen in the STATA output in Figure 2. The results of the descriptive analysis show the average value, standard deviation, minimum value, and maximum value.

Variable	Obs	Mean	Std. Dev.
p_umum	376	4.390957	1.948353
b_indo	376	4.890957	1.824667
mtk	376	3.125	1.78671
b_ing	376	2.875	1.656603
deret	376	7.880319	1.867343
aritmatika	376	7.75266	2.005324
aljabar	376	7.010638	1.919693
geometrik	376	3.890957	2.317774
pen_logis	376	9.566489	1.98819
pen_analitis	376	6.398936	2.780964
ipk	376	3.361729	.3254977

Figure 2 Results of descriptive analysis.

Based on Figure 2, it is found that the highest average score in the selection test for new admissions is on the type of logical reasoning test with an average value of 9.56, then the mathematical series test score is 7.88. The lowest average score is on the English test score of 2.875. The average GPA value as a student learning achievement is 3.36.

The results of the multiple linear regression model with ML estimation and multiple regression coefficient outputs can be seen in Table 2.

ipk	Coef.	Std. Err.
p_umum	-.0031277	.0087303
b_indo	.0026211	.0091852
mtk	.0097041	.009582
b_ing	.0148091	.0098984
deret	-.0130844	.0091449
aritmatika	.0012004	.0090905
aljabar	.0019857	.008662
geometrik	.0192264	.0078646
pen_logis	.0392409	.0087325
pen_analitis	-.009878	.0063889
_cons	2.982624	.1204046

Figure 3 Regression analysis results.

Of the 10 independent variables analyzed, there are 7 variables with positive coefficients, namely Indonesian, mathematics, English, arithmetic, algebra, geometric, and logical reasoning. There are three variables with negative coefficients, namely general knowledge, series, and analytical reasoning.

Based on these results, a regression equation can be arranged.

$$y = b_0 + b_1.x_1 + b_2.x_2 + b_3.x_3 + b_4.x_4 + b_5.x_5 + b_6.x_6 + b_7.x_7 + b_8.x_8 + b_9.x_9 + b_{10}.x_{10} + \epsilon$$

$$y = 2.98 - 0.0031.x_1 + 0.0026.x_2 + 0.0097.x_3 + 0.015.x_4 - 0.013.x_5 + 0.0012.x_6 + 0.0019.x_7 + 0.019.x_8 + 0.039.x_9 - 0.0099.x_{10} + \epsilon$$

The evaluation of the model can be seen in Figure 4, namely from the significant level of the model.

Source	SS	df	MS	Number of obs	=	376
Model	3.65369925	10	.365369925	F(10, 365)	=	3.70
Residual	36.0770771	365	.098841307	Prob > F	=	0.0001
				R-squared	=	0.0920
				Adj R-squared	=	0.0671
Total	39.7307763	375	.105948737	Root MSE	=	.31439

Figure 4 The significance level of the model.

The level of significance indicates the ability of the model to be generalized or not. The level of significance can also determine whether the hypothesis is accepted or rejected. The hypotheses in this study were arranged in the form of sentences and statistics. The hypothesis in the form of a sentence is as follows.

Ho = Variables x1, x2, x3, x4, x5, x6, x7, x8, x9, and x10 simultaneously have no effect on y

Ha = Variables x1, x2, x3, x4, x5, x6, x7, x8, x9, and x10 simultaneously affect y

The hypothesis in statistical form is as follows.

Ho =  $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10}$

= 0

Ha =  $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10}$

= 0

Based on Table 3 obtained Prob > F = 0.0001 < 0.05 then Reject Ho, accept Ha, means that the model has a significant effect, namely with a value below the error level of 5% or 0.05, which is 0.0001. Meaning variables x1, x2, x3, x4, x5, x6, x7, x8, x9, and x10 simultaneously affect y or it can be concluded that the test scores of new student selection simultaneously affect the learning achievement of Unesa students.

These results indicate that learning achievement can be influenced by the interests and talents of a person. Interests and aptitudes can be assessed from self-selection tests such as the TPA test, Psychotest, and so on, therefore, in college entrance selection, they often use these tests. These results are in line with [18] which states that the study program entrance selection test has a fairly good predictive power so that the college entrance selection test can be used to get qualified student candidates.

[10] Also explained that the written test for the selection of new students must be able to measure the potential of the test takers. Tests that measure potential seek to identify how well individuals understand and use information from various types of sources to support the goal of being able to carry out lectures well and get satisfactory learning achievements.

Based on the results of the regression analysis, it was found that the variable with the largest coefficient value is x9 which is logical reasoning, x8 is geometric, x4 is English, and x5 is series. To be able to increase the GPA or learning achievement, the value of these variables must be increased.

Based on the results of the analysis, it was found that the regression model stated that the independent variable had a significant effect on the dependent variable, but the model was only able to explain the learning achievement variable of 9.2% and 91.8% explained other variables outside the model.

$$R\text{-squared} = 0.092 = 9.2\%$$

(GPA can be explained by the model by 9.2% and 91.8% explained by other variables outside the model).

In addition to overall, the results of the analysis can also determine the effect and significance of each variable which can be seen in Figure 5.

ipk	Coeff.	Std. Err.	t	P> t
p_umum	-.0031277	.0087303	-0.36	0.720
b_indo	.0026211	.0091852	0.29	0.776
mtk	.0097041	.009582	1.01	0.312
b_ing	.0148091	.0098984	1.50	0.135
deret	-.0130844	.0091449	-1.43	0.153
aritmatika	.0012004	.0090905	0.13	0.895
aljabar	.0019857	.008662	0.23	0.819
geometrik	.0192264	.0078646	2.44	0.015
pen_logis	.0392409	.0087325	4.49	0.000
pen_analitis	-.009878	.0063889	-1.55	0.123
_cons	2.982624	.1204046	24.77	0.000

Figure 5 The level of significance of each variable.

Based on the significant value of  $P > |t|$  each variable free on the dependent variable shows that only x8 (Geometric) and x9 (Logical Reasoning) variables have  $P > |t|$  values. less than 0.05 or 5%. So from the partial value of each variable that has a significant effect on learning achievement is the variable geometric value and logical reasoning value. Other variables P value  $> |t|$  more than 5% or 0.05.

Based on the results of the analysis, to compose the selection test, a single unit must be made and everything is interconnected and influences each other. The test must assess something in the same direction and participants with the appropriate specialization.

These results are supported by the research of [8] which states that the college entrance test must be compiled and is a single unit (unidimensional) to measure

ability. The measured abilities must be following the standards and evenly distributed to the abilities being measured so that there is no tendency for high tendencies to be only in certain abilities and weak in other abilities. Furthermore, [9] stated that a well-written test should be able to measure potential and predict participants' performance well when they are allowed to complete a program. One way to determine a well-written test is to analyze student achievement after doing lectures.

## 4. CONCLUSIONS

### 4.1. Conclusions

Based on the results of research and discussion, it can be concluded as follows. (1) Simultaneously the results of the new student selection test affect the learning achievement of Unesa students, (2) Partially each variable that has a significant effect on student achievement is geometric values and logical reasoning, and (3) student learning achievement can be explained by the model of 9.2% and 91.8% explained by other variables outside the model.

### 4.2. Suggestions

Based on the conclusion above, the following can be suggested. (1) For institutions to obtain a selection test that can determine the ability of prospective students in lectures, it is necessary to arrange tests that are following the characteristics of each study program (2) For prospective students to take the test to enter a study program according to their talents and abilities. ability to get maximum learning achievement (3) For the next researcher to research by analyzing the results of the new student selection test according to each study program, so that they get better results.

## ACKNOWLEDGMENT

Thank you to the Universitas Negeri Surabaya, which provided funding for this research.

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