Research Article

THE EFFECTS OF INTELLIGENCE QUOTIENT AND CRITICAL THINKING ABILITY ON STUDENTS' SPEAKING SKILLS

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Abstract: This research aims to know the effect of intelligence quotient and critical thinking ability on students' speaking skills. The research methodology is quantitative research design using a survey with multi-correlation technique using samples from several populations and a test used for data collection. The number of the samples is two classes from two government colleges in Bogor, West Java. The result of the research shows that; 1). There is a significant effect of intelligence quotient and critical thinking ability towards students' speaking skills at Government College in Bogor that was proven by the value of Sig. $0.000 < 0.05$ and Fobserved = 130.848. Both independent variables had given 84.8% to the students' speaking skills; 2). There is a significant effect of intelligence quotient towards students' speaking skills at Government College in Bogor that was proven by the value of Sig. $0.000 < 0.05$ and Tobserved = 4.884; 3). There is a significant effect of the critical thinking ability towards students' speaking skills at Government College in Bogor that was proven by the value of Sig. $0.000 < 0.05$ and Tobserved = 4.382.

Keywords: Intelligence Quotient; Critical Thinking; Speaking Skill

Introduction

English is getting more critical in the communication world. It is used as a medium for communication among people worldwide in both spoken and written forms. Realizing the importance of the English language, the Indonesian government considers that English is one of the compulsory subjects to teach. English is the first foreign language in Indonesia. It is taught at all school levels in Indonesia, including elementary school, junior high school, senior high school, even college.

Speaking is one of the four basic skills in learning a foreign language besides listening, reading, and writing in education. It has been taught to students from elementary school to the undergraduate program. Therefore, it is an essential skill to be learned by students in learning English. Speaking is a device to communicate with other people. It is an activity conducted by a person to communicate with others to express ideas, feelings, and opinions. It is also used for sharing information, negotiating, solving problems, maintaining social relations and friendships. Speaking is an ability that requires increasing communicative competence, pronunciation, intonation, grammar, and vocabulary.

The result of the observation that the researcher conducted showed that speaking is also the most frustrating for college students. The students sometimes face many problems in learning English, especially in speaking. The preliminary observation revealed that: (1) the students, sometimes, know what they want to say but they are shy to speak, (2) the students have low motivation in learning English, (3) the students are less confident because of their low motivation, (4) the students are afraid of making a mistake, (5) many students who want to speak to other usually face some troubles such as cannot produce their ideas, argument or feeling communicative, and (6) they sometimes can understand what other say but cannot be able to communicate it.

Every student has a different perception of speaking. Not all students perceive speaking as the same feeling. Many students judge that speaking is a complex subject to learn. Many factors affect

students in learning speaking. Moreover, learning how to speak means something different because it deals not only with the efforts of the students to understand the patterns of speaking and the psychological problems inside themselves. Some psychological factors influence students in learning speaking. It refers to intelligence and language aptitude. Therefore, some factors influence how successful a person is to get a reasonable competence in speaking, such as motivation, interest, environment, or intelligence.

According to Facione (2007), intelligence, cognitive abilities, and skills can be the core of critical thinking, including interpretation, analysis, evaluation, reasoning, interpretation, and self-regulation. According to Arum and Roska (2011), "99% of teachers believe that developing critical thinking skills is a very important or indispensable goal for university education". In practice, language is our most fundamental tool in this process. Language allows us to articulate what we judge to be true or false, and it allows us to share and communicate those judgments to others. Ultimately, an excellent critical thinker must develop an acute grasp of the language to make clear and precise claims about the truth and assess how well or poorly they function in the logic of an argument. Thus, intelligence and critical thinking may affect students' speaking skills.

Based on the explanation above, this study aims to determine, analyze and test the truth of the following: (a) the effect of intelligence quotient and critical thinking ability jointly towards students' speaking skill; (b) the effect of intelligence quotient towards students' speaking skill; (c) the effect critical thinking ability towards students' speaking skill.

Method

This study uses a correlational survey method. The survey method collects information from a sample by asking through a questionnaire, interview, or test so that later it describes it as an aspect of the population (Sugiyono, 2016). The implication of applying the survey research model can be proven through a Weschler scale test regarding Intelligence Quotient and Likert Scale test regarding critical thinking ability and the speaking test in delivering the opinion, which is assessed by rubrics scoring. This research was conducted in Bogor with 500 students at two government colleges as research subjects. Samples were taken the same, namely 50 students.

The variables tested in this study are (1) The dependent variable is students speaking skill (Y), obtained from the speaking test results, namely delivering opinion. (2) The independent variable Intelligence Quotient (X1) was obtained from the psychology test conducted by the college when the students did the selection tests. (3) Critical thinking ability variable (X2), which is obtained from the Likert scale test totaling 25 items given to students

The author uses a survey-based data collection method. Data was obtained using data collected in a test on critical thinking ability and speaking skills. The data collection technique will go through the following stages.
1. Students' IQ Score from each college's archives.
2. Likert scale test about critical thinking as many as 25 items.
3. The results of speaking skills in the form of delivering opinion speech.
4. Assessment of all tests and analysis of the results of the three variables used by the author.

Testing the effect of intelligence quotient and critical thinking ability towards students' speaking skill is done by proposing and testing three hypotheses as mentioned in the Introduction, namely: (a) the effect of intelligence quotient and critical thinking ability jointly towards students' speaking skill; (b) the effect of intelligence quotient towards students' speaking skill; (c) the effect critical thinking ability towards students' speaking skill.

Before the test was given to 50 respondents as the research sample, all items in the test were checked for validity and reliability by testing 50 respondents. Testing the validity and reliability of the speaking skill (Y) is done once declared valid with a value of r observed > r table (0.361) and a reliability of 0.73. Testing the validity and reliability of the critical thinking ability (X2) was carried out with the final result of 25 items declared valid with a value of r count> r table (0.361) and a reliability of 0.78.

After fulfilling the validity and reliability requirements of each test, after that normality requirement are met with the Kolmogorov-Smirnov test, multicollinearity testing is seen from the

results of the tolerance value or variance inflation factor (VIF), heteroscedasticity testing is seen with a scatterplot image, error normality testing to state data is normally distributed by looking at the Z value (Kolmogorov-Smirnov z), and the Sig. is more than 0.05; linear testing of multiple regression lines the effect of each variable X1, variable X2 over Y which is indicated by the value of derivation from linearity at the F and Sig. and testing with n hypotheses indicated by the value in the Anova table seen from the value of F, t count and Sig. Furthermore, the data were analyzed using regression analysis techniques with the help of the SPSS 22.0 application program.

Results and Discussion
Results

In this study, there are two independent variables, namely the Intelligence Quotient (X1) and critical thinking ability (X2) towards Students' Speaking Skill (Y) as the dependent variable. Many factors affect students' speaking skills, but what is discussed in this study is the effect of intelligence quotient and critical thinking ability. Data description analysis was performed to determine the range of data, mean, median, mode, and standard deviation.

Table 1. Description of Research Data

No	Statistics Measurement	Intelligence Quotient	Critical Thinking Ability	Students' Speaking Skill
1	Mean	114,74	71,90	82,44
2	Median	115,50	72,00	83,00
3	Mode	109	73	76
4	Std. Deviation	5,333	9,054	6,872
5	Minimum	106	56	68
6	Maximum	125	89	96

Table 1 shows that this study's score data on intelligence quotient, critical thinking ability, and students' speaking skills are classified as high. In contrast, the scores above the average are more than those below the average. Overall, the data is presented in the following histogram and polygon.
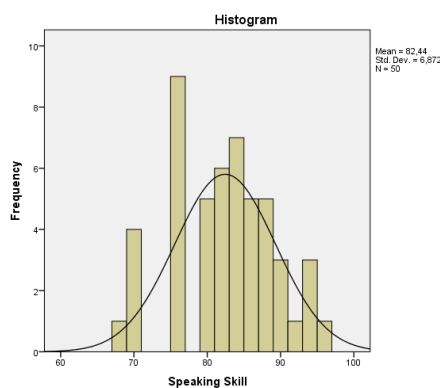

Figure 1. Histograms and Polygons Variable Speaking Skill
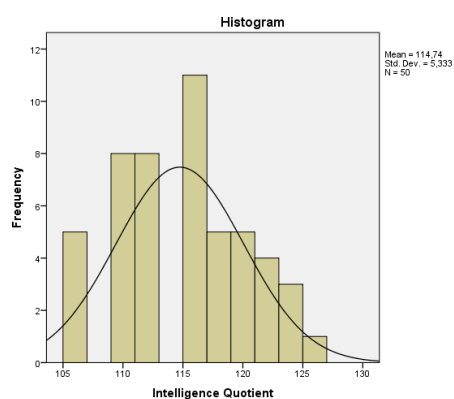
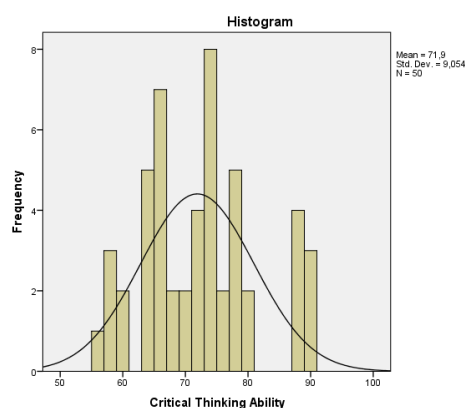Figure 2. Histograms and Polygons Variable Intelligence Quotient

Figure 3. Histogram dan Polygon Variable Critical Thinking Ability

From the histogram and frequency polygons in Figure 1, Figure 2, and Figure 3, it can be concluded that the intelligence quotient, critical thinking ability, and speaking skill of Government College in Bogor has a normal distribution.

Testing Requirements Analysis

1) Classic Assumption Test

Classically, a data normality test (hypothesis) is required whether all the variables in the study follow a normal distribution (Abdullah, 2014).

Table 2. Data Normality Test Results

	Intelligence Quotient	Critical Thinking Ability	Students' Speaking Skill
Kolmogorov-Smirnov Z	0,119	0,103	0,106
Asymp. Sig. (2-tailed)	0,074	0,200	0,200

Table 2 shows that the data normality test (hypothesis) states that the data distribution in this regression analysis follows the normal distribution. All Asymp values indicate this. Sig (2-tailed) for the speaking skill variable was 0.2, the intelligence quotient variable was 0.2, and the critical thinking ability variable was 0.074. The Sig. value for all variables shows that it is more significant than 0.05, so that H0 is accepted; in other words, the data from the sample of the dependent variable and the two independent variables in this study are normally distributed.

2) Multicollinearity Test

The multicollinearity test results in Table 3 shows that the tolerance value is $0{,}301 > 0{,}1$ and the VIF value is $3{,}320 < 10$. It can be concluded that there is no multicollinearity in this double regression analysis.

Table 3. Multicollinearity Test Results

Variable	Collinearity Statistics	
	Tolerance	VIF
Intelligence Quotient	,301	3,320
Critical Thinking Ability	,301	3,320

3) Heteroscedasticity Test

The figure below shows the dots spread randomly and do not form a clear pattern, and are spread above or below the 0 points on the Y-axis. It showed no heteroscedasticity in the regression model, so it can be used to further analysis.
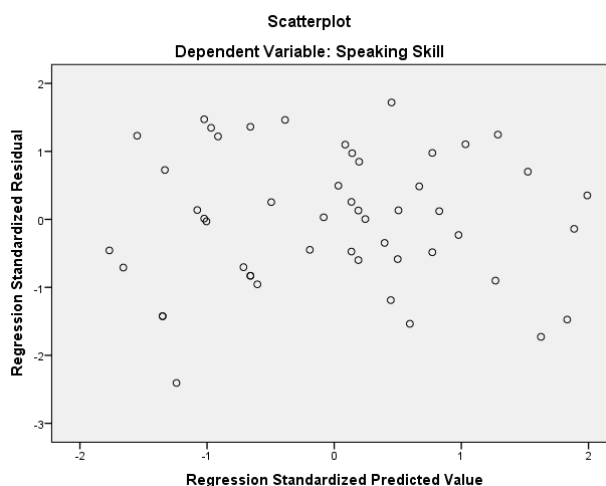

Figure 4. Scatterplot Heteroscedasticity Test

4) Error Normality Test

Table 4 shows that the hypothesis test, which states the residual distribution in this regression analysis, follows the normal distribution. This is indicated by the value of $Z = 0.080$ and Sig. $= 0.200 > 0.05$. This means that the assumptions or requirements of the regression analysis are met.

Table 4. Error Normality Test

Kolmogorov-Smirnov Z	0,080
Asymp. Sig. (2-tailed)	0,200

A. Regression Line Linearity Testing

Based on Table 5, the calculation results were obtained for Deviation from Linearity with Fo = 0,964 and Sig. $= 0.484 > 0.05$. This means that the intelligence quotient variable with the students' speaking skills has a linear relationship. Based on table 6, the Deviation results from Linearity are also obtained with Fo = 1,685 and Sig. $= 0.104 > 0.05$. This means that the variable of critical thinking ability and students' speaking skills has a linear relationship.

Table 5. Regression Line Linearity Testing Result Variable X1, X2 Against Y

	Sum of	df	Mean	F	Sig

			Square		Square		
Speaking Skill * Intelligence Quotient	Deviation Linearity	from	90,293	9	10,033	0,964	0,484
Speaking Skill * Critical Thinking Ability	Deviation Linearity	from	230,364	15	15,358	1,685	0,104

B.   Research Hypothesis Testing

The results of hypothesis testing for this study are presented in Table 6, Table 7, Table 8, and Table 9.

Table 6. Multiple Correlation Coefficient of Variables X1 and X2 against Y

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,921	0,848	0,841	2,738

Table 7. Correlation Coefficient Zero-Order, Partial, and Part Variable X1, Variable X2 against Y

Variabel Independents	Zero-order	Correlations Partials	Part
Intelligence Quotient	0,886	0,580	0,278
Critical Thinking Ability	0,878	0,539	0,249

Table 8. Results of the calculation of the significance test of the variable regression coefficients X1 and X2 against Y

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1961,956	2	980,978	130,848	0,000

Table 9. Results of the calculation of the multiple regression equation for the variables X1 and X2 against Y

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-17,243	11,055		-1,560	0,126
Intelligence Quotient	0,653	0,134	0,506	4,884	0,000
Critical Thinking Ability	0,345	0,079	0,454	4,382	0,000

Discussion

The Effect of Intelligence Quotient (X1) and Critical Thinking Ability (X2) jointly towards Students' Speaking Skill (Y)

From Table 8, it can be stated that there is a significant effect of intelligence quotient and critical thinking ability jointly towards students' speaking skills. The Sig proves this. 0.000 < 0.05 and Fobserved = 130.848. Meanwhile, from table 9. it can be stated that the multiple regression line equation can be expressed by Ŷ = -17.243 + 0.653 X1 + 0,345 X2. It means that intelligence quotient and critical thinking ability contributes 2.465 by Xl and 0.315 by X2 towards students' speaking skill. From Table

6. It can also be explained that the intelligence quotient and critical thinking ability contribute 84.8% (R Square = 0,848) towards students' speaking skills; the remaining 15.2% was influenced by other variables outside this regression equation or the variables not studied.

After testing the linearity of the regression line using SPSS 22.0, it was found that the regression line was linear. From testing, the significance of the regression coefficient is significant, which means that it is true that there is a positive influence on the independent variables X1 (intelligence quotient) and X2 (critical thinking ability) jointly towards the dependent variable Y (students' speaking skill).

Some psychological factors affect students' speaking skills. This refers to the intelligence and a set of more specific language learning abilities called 'language aptitude.' Therefore, sets of factors affect how successful a person is to get a good competence in speaking. One of them is the intelligence quotient.

Intelligence can also be the core of critical thinking. Students' ability in critical thinking also affects their language skills, especially speaking. Speaking is one of the productive skills which needs critical thinking, including interpretation, analysis, evaluation, reasoning, interpretation, and self-regulation. With a good intelligence quotient and critical thinking ability, students can process what is in their minds and produce it into speech clearly and fluently.

The Effect of Intelligence Quotient (X1) towards Students' Speaking Skill (Y)

From table 9, it can be stated that there is a significant effect of intelligence quotient towards students' speaking skills. This is proven by the Sig. 0.000 < 0.05 and Tobserved = 4.884. The formula can calculate the contribution of intelligence quotient variable towards students' speaking skills:

$PC = \beta_{X1Y}$ x Zero-order(r_{X1Y}) X 100%
$PC = 0.506$ x 0.886 x 100%
$PC = 44.83\%$

From the calculation above, it can be concluded that the intelligence quotient contributes 44.83% towards students' speaking skills. By testing the hypothesis obtained that the Sig. = 0.000 < 0.05 Tobserved = 4.884, then H0 is rejected, which means that there is a significant effect of the independent variable X1 (intelligence quotient) towards the dependent variable Y (students' speaking skill).

Intelligence plays a significant role in determining the success or failure of a person to learn something. Intelligent students are generally more able to learn than less intelligent students. Students' intelligence can usually be measured using specific tools, while the measurement results are expressed by numbers that indicate the comparison of intelligence, known as the Intelligence Quotient (IQ). By understanding the IQ level of each student, a teacher can accurately estimate the actions that must be given to students.

It means that intelligence has an enormous contribution to students' speaking skills. Hence, most students whose good Intelligence Quotient will have good speaking scores also. Intelligence quotient affects students' speaking skills because intelligence quotient is the ability to think and use knowledge to solve problems in every condition. The ability to think in problem-solving proves an effect of intelligence quotient towards students' speaking skills because producing speech while speaking will be more developed for students with good intelligence quotient.

The Effect of Critical Thinking Ability (X2) towards Students' Speaking Skill (Y)

From Table 9, it can be stated that there is a significant effect of critical thinking ability on students' speaking skills. This is proven by the Sig. 0.000 < 0.05 and Tobserved = 4.382. The formula can state the contribution of the critical thinking ability towards students' speaking skills:

$PC = \beta_{X2Y}$ x Zero-order(r_{X2Y}) X 100%
$PC = 0.454$ x 0.878 x 100%
$PC = 39.86\%$

From the calculation above, it can be concluded that critical thinking ability contributes 39.86% towards students' speaking skills. By testing the hypothesis obtained that the Sig. = 0.000 < 0.05 and Tobserved = 4.382, then H0 is rejected, which means that there is a significant effect of the independent variable X2 (critical thinking ability) on the dependent variable Y (students' speaking skill).

Speaking activities cannot be separated from thinking. There is a process of thinking or reasoning while speaking. Critical thinking is an activity of processing data that includes the brain, physical, and psychological performance. This often goes unnoticed. All activities or work are carried out through critical thinking, especially speaking and expressing opinions.

Critical thinking encourages students to be more critical to process what they receive in their brains and produce the critical point to be spoken. With good critical thinking ability, students become more confident in speaking, especially in delivering the opinion, because they have processed what they will talk about. Critical thinking is the ability to reason in an organized way. Critical thinking makes it possible to exploit the potential in seeing problems, solving problems, creating, and self-realizing. Then, critical thinking is needed in every society regardless of the work they are doing. This means that the results of the thinking process can be conveyed through speaking. Therefore, students' critical thinking ability can also be seen from the speech they produce. Therefore, students' critical thinking ability also affects the condition of their speaking ability.

Conclusions

The study aims to determine the effect of intelligence quotient and critical thinking partially or jointly on students' speaking skills at Government College in Bogor, and the following conclusions are obtained.

a) Intelligence quotient and critical thinking ability have a significant effect on students' speaking skills at Government College in Bogor. This is proven by the Sig. $0.000 < 0.05$ and Fobserved = 130.848.

b) There is a significant effect of intelligence quotient towards students' speaking skills at Government College in Bogor. This is proven by the Sig. $0.000 < 0.05$ and Tobserved = 4.884.

c) Critical thinking ability has a significant effect on students' speaking skills at Government College in Bogor. This is proven by the Sig. $0.000 < 0.05$ and Tobserved = 4.382.

The study results indicate that students' speaking skill is affected by intelligence quotient and critical thinking ability. Therefore, the students can improve their intelligence and critical thinking to help them improve their speaking skills by doing exercise continually. English teachers should apply or develop intelligence quotient and critical thinking tests as a pre-test to improve students' speaking skills. In addition, the researcher found that intelligence quotient and critical thinking are not easy to improve, so both teacher and students should find an excellent way to improve it and then to speak lesson will be great.

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