Analysis of the Effect Emotional Intelligence on Understanding Level in Programming Algorithm Learning

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Abstract

The course Algorithms and Programming in the Informatics Engineering study program is given in the first and second semesters, as this course is a scientific course that serves as a basis for advanced programming courses in higher semesters. It is often the case that intelligent graduates obtain good academic grades during their studies and become outstanding students, but when working in their field of expertise, their performance is not as good as graduates who had lower academic grades. Success is not only determined by intellectual intelligence (IQ), but also by other types of intelligence. Intellectual intelligence or cognitive intelligence is one type of intelligence, while non-intellectual intelligence includes other types of intelligence outside of cognitive intelligence. One of this non-intellectual intelligence is emotional intelligence. Intellectual intelligence and non-intellectual intelligence play equally important roles in supporting individual success. This research discusses the analysis of the effect of emotional intelligence on the level of understanding of algorithms and programming using the linear regression method implemented with an application. The sample taken is students of the Informatics Engineering study program in the third and fourth semesters. With the results of the influence of emotional intelligence on the understanding of Algorithms and Programming, it can provide a solution to improve students' understanding of the Algorithms and Programming course and other computer courses in the scientific field of the Informatics Engineering study program. The application is created using the Python programming language.

Keywords: Analysis, Emotional Intelligence, EQ, IQ

1. Introduction

Algorithm and Programming is a basic course on computer programming given to students in the early semesters. This course provides a basic understanding and skills in making computer programs. Following the department, namely the Informatics Engineering Study Program, there are various courses on computer programming. It often happens that students lack the skills and subject orientation expertise in implementing the knowledge they have acquired. It often happens that intelligent scholars who in lectures get good academic grades and become excellent students, but when they work according to the field of knowledge they gain, their expertise is not that good compared to scholars whose academic grades were below theirs. Many alumni of the Informatics Engineering Study Program work not by the expertise gained during lectures, one of the reasons is the lack of understanding and mastery of computer programming courses.

Therefore, it is necessary to analyze students' constraints in understanding computer programming courses. Intellectual intelligence (IQ) can lead someone to success, but also other intelligence. Intellective or intellectual intelligence is also called cognitive intelligence, while non-intellective or non-intellectual intelligence includes intelligence outside of cognitive intelligence. One of the non-intellectual intelligences is emotional intelligence. Intellectual intelligence and non-intellectual intelligence play equally important roles in supporting individual success. This study, discusses the analysis of the influence of emotional intelligence on the level of understanding of algorithms and programming using the linear regression method which is implemented with an application, the samples taken are students of the Informatics Engineering Study Program semesters 3 and 4. The indicators used in the analysis are grades in Algorithms and Programming courses 1, and Algorithm and Programming 2 for IQ indicators.

For emotional intelligence, five domains are used, namely intrapersonal (ability to recognize one's own emotions, interpersonal domain (ability to empathize), adjustment domain (problem-solving ability, reality test and flexible attitude), stress management domain and general mood domain. The results of the designed application are in the form of the results of an analysis of the influence of emotional intelligence on understanding Algorithms and Programming, which is expected to provide solutions in increasing student

understanding of Algorithms and Programming courses and other computer courses that are by the knowledge of the Informatics Engineering Study Program. Applications made using the Python programming.

2. Method

In this study several stages of the procedure must be carried out, namely:

a. Data collection: questionnaire about emotional intelligence (EQ) and data on Algorithm and Programming I, Algorithm and Programming II (IQ) values.

b. System analysis: analyzing quantitative data on IQ and EQ scores and then calculating the effect of EQ on IQ using the linear regression method.

c. System design: designing applications/software used to analyze the influence of emotional intelligence on understanding algorithms and programming with the linear regression method, process design, database and the appearance of the application to be made.

d. System implementation: creating computer programs for application analysis of the influence of emotional intelligence on understanding algorithms and programming by applying the linear regression method.

e. System testing: application/software testing that has been made, by checking whether the application is running according to design or not, by displaying the value of the analysis of the effect of EQ on IQ.

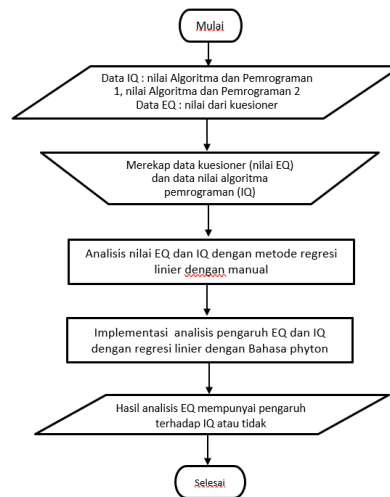f. The diagram the description of the research methods carried out is shown in Figure 1.

Figure 1. Research Stages

2.1 Data Collection

Data collection techniques used in this study are;

a. Questionnaire conducting a questionnaire survey given to students of Class 2019 and 2020 to obtain EQ data for each respondent.

b. Observation, apart from providing a survey in the form of a questionnaire, the researcher also collected data on the grades of Programming Algorithm I and Programming Algorithm II courses from the Academic section of STITEK Bontang.

c. Library Studies, with references from books and journals

2.3 Measuring scale

The Measurement Scale is divided into 2 parts, namely:

a. Emotional intelligence measurement scale

This scale is used to measure the level of emotional intelligence of respondents. In this study, only five alternative answers were used, namely: "Very suitable" (SS), "Suitable" (S), "Undecided" (RR) "Not appropriate" (TS), "Very inappropriate" (STS). Alternative answers along with scores with favorable and favorable statements are listed in Table 1:

Table 1. Emotional Intelligence Score

Alternative Answer	Favorable	Unfavorable
very suitable	5	1
in accordance	4	2
doubtful	3	3
it is not in accordance	2	4

with		
very inappropriate	1	5

b. Scale for measuring grades in Algorithm and Programming courses
This scale is used to measure the level of understanding of the algorithm and programming of respondents. Each alternative answer filled in by the respondent will be measured according to the score in Table 2

Table 2. Computer Programming Understanding Score

Mark	Score	Unfavorable
A	4	1
B	3	2
C	2	3
E	0	5

Source: Bontang STITEK Academic Guide (2018)

c. Criteria for emotional intelligence

Table 3. Criteria for Emotional Intelligence

Skor EQ	EQ Criteria
160-200	Very Good
132-159	Good
112=131	Enough
92-111	Not Enough
<92	Bad

Source: processed data (2022)

Total EQ score of all perfect components:
= total statements (favorable and unfavorable) *maximum score
=50*5
=250

2.4 Research Variable
Research variables consist of:
a. Dependent Variable
The dependent variable is the Level of Understanding of Accounting (Y). The level of understanding of accounting comes from the grades of student accounting courses. (Appendix 1)
b. Independent Variables
The independent variable is the value score from the emotional intelligence (EQ) questionnaire:
c. This study will test whether the independent variable consisting of answers to questions about emotional intelligence will affect the dependent variable (Y).

2.5 Data Analysis Techniques
To answer the problem formulation above, researchers will collect data through questionnaires that have been answered by respondents to be analyzed using the following steps:
a. Collect questionnaires that have been filled in by respondents.
b. Calculate the total course score for each respondent.
Total score per respondent (Y)
Total Y = score Y1 + Y2
Note: Y1 = Algorithm I course and Y2 = Algorithm II course
Calculate the total emotional intelligence score for each respondent.
Total score per respondent
X = statement score 1 + statement score 2 + …… + statement score 50
Note: X = total score of emotional intelligence
Validity and Reliability Test
The validity test is to determine the extent to which a measuring instrument can measure the data needed in research. A validity test is done by

$$rxy = \frac{N\left(\sum xy\right) - \left(\sum x \sum y\right)}{\sqrt{\left[N\sum x^2 - \left(\sum x^2\right)\right]\left[N\sum y^2 - \left(\sum y^2\right)\right]}}$$

where

rxy : Product moment correlation coefficient
x : Question score for each respondent
y : Total score of emotional intelligence
N : Number of samples (respondents)

Criteria for Testing Validity Test:
r count > critical r (0.3) = a valid research instrument
r count < critical r (0.3) = invalid research instrument

The reliability test is to prove the consistency and stability of the measurement instrument (Sekaran, 2006: 244), as contained in equation 2.

$$r_{11} = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right)$$

Where :

r11 = instrument reliability
k = number of questions
σ_t^2 = total variance
$\sum \sigma_b^2$ = Number of grain variances

To check the reliability of a questionnaire using a range between several values, for example, 0-10 or 0-100 or form a scale of 1-3, 1-5 or 1-7 and so on using Cronbach's Alpha formula.
Table 5. reliability level based on the alpha value

Table 4. reliability level based on alpha value

Alpha	Reability Level	Client
0.00-0.20	Not Enough	X Windows
>0.20-040	Somewhat realistic	Windows NT
>040-0.60	Enough	Windows NT
>0.60-0.0	Reliable	
>0.80-1.00	Very Reliable	

2.3 Hypothesis Testing
a. Determine the hypothesis
   Ho1: Emotional intelligence has no significant effect on understanding algorithms and programming.
   Ha1: Emotional intelligence has a significant effect on the understanding of accounting.
b. Determining the Level of Significance (α)
   In this study, the Level of Significance was determined at 5% with a 2-sided test. This test was carried out because the purpose of the study was to determine the effect of the independent variables, not to compare.
c. Determine the Hypothesis Testing Criteria
   The criteria for testing the hypothesis are as follows:
      If significance > alpha = then Ho is accepted
      If the significance < alpha = then Ho is rejected
d. Make decisions
   Decision-making based on the results of the linear regression test by comparing the significance with alpha.
      If significance > alpha = then Ho is accepted
      If the significance < alpha = then Ho is rejected
e. Draw a conclusion
   Based on the data analysis above, the conclusions that can be drawn are:
   1) If Ho1 is accepted, then emotional intelligence does not significantly influence the understanding of programming algorithms for Informatics Engineering students at the Bontang College of Technology.

2) If Ho1 is rejected, then emotional intelligence significantly influences the understanding of programming algorithms for Informatics Engineering students at the Bontang College of Technology.

3. Result and Discussion

The results are written based on a logical order to form a story. It shows facts / data instead of discussing the results. Tables and Figures can be used but not repeating the same data in the same image, table, and text. To further clarify the description, subtitles can be used. Discussion is the basic explanation, relationship and generalization shown by the results. The description answers the research questions. If there are dubious results, then show them objectively.

3.1 Characteristics of Respondents
The Informatics Engineering Study Program is one of the Bontang STITEK Study Programs. In the Informatics Engineering Study Program, each batch consists of three classes with around 25-30 students in each class, so the number of students who have taken Programming Algorithms I and II, Database, PBO I and PBO II courses is 375. The sample obtained was 48 students (240-course scores) but the data that could be processed were 45 students (225-course scores)

3.2. Validity Test Results
Based on the r table, the minimum Pearson Correlation value is 0.338 because it uses 45 respondents (N) with a limit of 0.05. From the calculation results, the average value of the Pearson correlations for each item is above 0.338. So of the 50 items in the questionnaire about emotional intelligence, 45 items are valid and 5 items are invalid because the Pearson correlation value is less than 0.338.

3.3. Reliability Test Results
The reliability statistics table shows the results of the analysis of the reliability test with Cronbach's Alpha = 0.8882 of 45 variable items. The reliability value of 0.8882 is a very reliable value. So this questionnaire is said to be consistent (reliable).

3.4 Normality Test
In the normality test, a p-plot image is produced where there are points that always follow and approach the diagonal line so that it can be concluded that the regression model meets the normality assumption.

3.4 Linear Regression Analysis
The results of data processing for manual linear regression analysis can be seen in table 6 below:

Table 5. Results of Linear Regression Analysis

	Coefficients	Standard Error	t Stat	P-value
Intercept	13,02505289	3,191635929	4,080995822	0,000190896
Emotional intelligence	0,026983676	0,018020782	1,497364383	0,14160366

Based on Table 5.1, the test results obtained regarding intercept values or constants, namely P-Value β_0 = 0.000191, then using a significance level of 5% (alpha), the existing samples conclude that there is a significant effect between intercept values on IQ (because the P value -Value β_0 < alpha). And P-Value β_1 = 0.0141604 then using a significance level of 5% (alpha), the existing sample concludes that there is a significant effect between EQ on IQ (because the value of P-Value β_1 <alpha).

The results of the regression analysis using Python obtained results as shown in Figure 2 below:


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Persamaan regresi linearnya adalah : y = 0.0270x + 13.0251
Nilai R adalah 0.2226 dan R^2 adalah 0.0496
Text(0, 0.5, 'Pemahaman Mata Kuliah Pemrograman Komputer')
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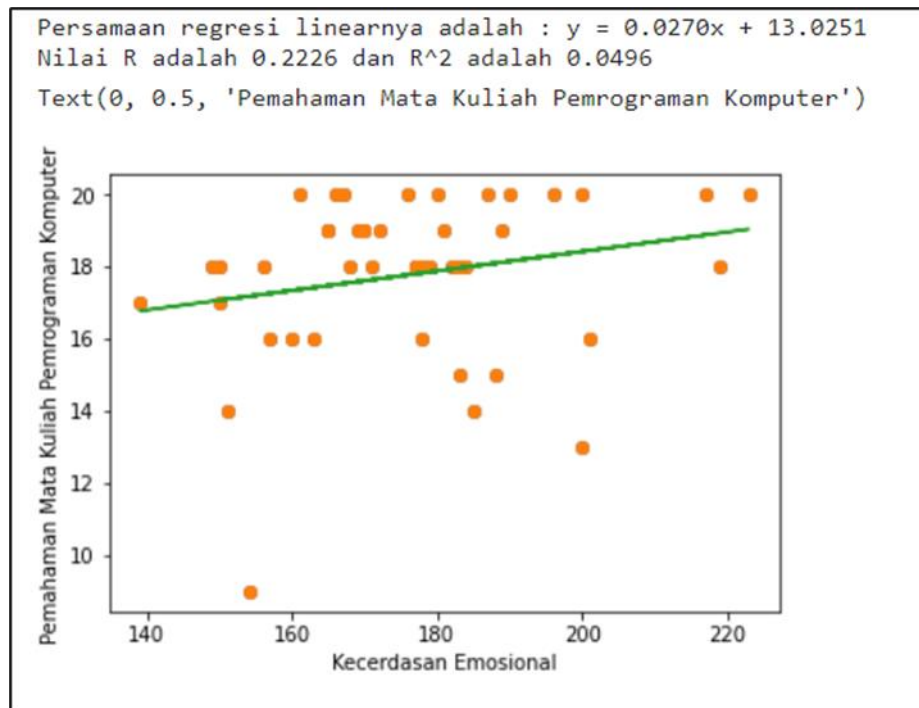
Figure 2. Graph of the relationship between EQ and IQ in the Algorithm Course and programming

Based on Figure 3, it can be seen that the existing points always follow and approach the diagonal line, so it can be concluded that the regression model meets the normality assumption. From Figure 3, information is obtained that the regression coefficient for emotional intelligence on understanding computer programming is 0.0270. So, from the calculation results can be described as follows.
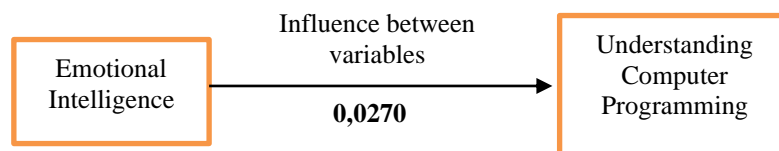

Figure 3. Image of the influence of the inter variables

So that the regression equation that explains the effect of emotional intelligence on understanding computer programming courses is $Y = 0.0270X + 13.0251$.

4. Conclusion

Based on the tests that have been carried out, there is a value of P-Value $\beta1 = 0.0141604$ less than 5 per cent, which provides evidence that there is no relationship between EQ intelligence and one's understanding in Algorithm courses. A deeper study is needed regarding the relationship between EQ and one's level of understanding of an object being studied, because the EQ variable related to emotional stress does not affect the level of IQ, but has more effect on the level of performance.

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