

Machine learning approach for lecture's performance based on supervision and job satisfaction

Anda Yanny*, Anggiat Hatuaon Sihite, Sumiaty Adelina Hutabarat, Henry Kristian Siburian, Ikhsan Parinduri, Siti Nurhabibah Hutagalung

STMIK Budidarma Medan, Indonesia

*andayanny31@gmail.com

Abstract. The objectives of the research were to discover the correlation of supervision, performance and job satisfaction. Population consisted of 74 correspondents were taken as the sample through cluster random sampling technique. The results of research concluded, there was significantly positive correlation between supervision and job satisfaction as shown by coefficient correlation 3.74. Job satisfaction provided by the institution made Lecturers feel dissatisfied. Job satisfaction is reviewed in terms of income, respect, comfort in teaching. Partially positive and significant supervision of the performance of lecturers at the College of Computer Information Management in Medan Budi Darma. Partially positive and significant satisfaction towards the performance of lecturers of the Computer Information Management College in Medan Budi Darma.

1. Introduction

Professional lectures are produced through the Education and Training Institute under the regulation of the Ministry of Education which is responsible to conduct education and training. STMIK Budi Darma is Education and Training Institute under the regulation of the Ministry of Education and Yayasan Budi Darma having the responsibility to prepare professional personnel in lecture and education. In this study, we use the linear model on the scikit-learn [1] package by linear regression of performance procedure as supervision factor and job satisfaction as a broad and flexible as the act to increase the knowledge by using machine learning approach [2]–[4]. From the data obtained, the minimum level of supervision of lecture is caused by several things such as lack of preparation, lack of supervision of procedures, lack of clear satisfaction, lack of focus, lack of confidence. This study aims to find out how the level of performance of supervision and job satisfaction lecture's become very important variables to study.

2. Methods

This research was conducted at Sekolah Tinggi Manajemen dan Ilmu Komputer (STMIK) Budi Darma Medan. The population in this study was all cadets of lectures STMIK Budi Darma Medan, which totaled 76 people. The characteristic of correlational research is that the study does not require a large number of samples. According to [5], 50 to 100 research samples are sufficient. If the researcher will generalize the results of his research, then he must succeed in taking a sample that was truly representative. From the total population, the sample of the study was 50 people taken using the cluster random sampling technique.

The research method is conducted with machine learning techniques by using a regression model[6], [7] to determine the coefficients between Supervision(X1), Job Satisfaction (X2) as independent variables and performance (Y) as a dependent variable (Y). The regression model will measure data provided to find correlations between factors in data to find out what most affects the bottom line. Correlational research is a study that is intended to determine whether there is a correlation between two or several variables. With correlation machine learning techniques, the author can find out the correlation of variation in a variable with other variations. The result of the correlation is expressed in the form of a correlation coefficient[8]–[10]. Furthermore, correlation techniques are used to determine the correlation of each independent variable to the dependent variable and the correlation of the independent variable together with the dependent variable[11]. In a descriptive study, the correlation coefficient explains the extent to which two or more variables are correlated, whereas in the research generalizing the hypothesis the correlation coefficient shows the level of significance of whether or not the hypothesis is proven[4], [12].

3. Result and Discussions

The results of this study are accordance and represented of the calculation of simple regression analysis on the first hypothesis proposed to the variable of supervision (X1) and performance variable (Y) were indicated by the regression line equation $\hat{Y} = 3,741 + 0,200 X1 + 0,587 X2$. These results indicated that an increase in one supervision score in the theory of supervision procedures led to an increase of 0.200 and 0,587 satisfaction score in performance at constant 3,741. In other words, each score of supervision and satisfaction increases by 1, then the average score of the performance will increase by 3,741.

Table 1. Score of Supervision, Satisfaction and Performance

Variable	Supervision score	Satisfaction score	Performance Score
count	70	70	70
Mean	21.442857	17.214286	17.214286
Std	5.484195	4.536144	4.536144
Min	13	11	11
25%	18	14	14
50%	20	16	16
75%	24	18	18
Max	33	28	28

In table 1, shown the score of the supervision, satisfaction and performance of the data by using regression linear in machine learning technique

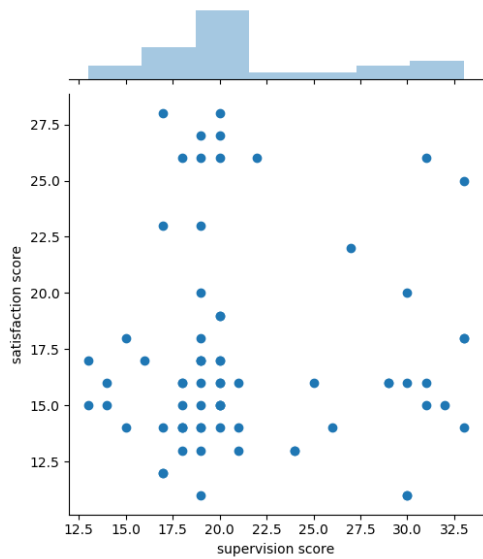


Figure 1. Correlation supervision to satisfaction

The result of correlation between supervision and the job satisfaction was shown in fig.1 by the product moment correlation coefficient of supervision score = 0.000000000000000106 and the coefficient of satisfaction obtained by the value of score = 0,5 as shown in Table 2. It can be said that the correlation between supervision and satisfaction was significant. This finding concluded that H_0 was rejected and H_1 accepted. Therefore, the test of the second hypothesis concluded that "there was a significant positive correlation between supervision and the satisfaction".

By applying linear regression, we can take multiple Y and predict the corresponding Y value in Fig 2. This is to minimize the vertical distance between all the data points and our line.

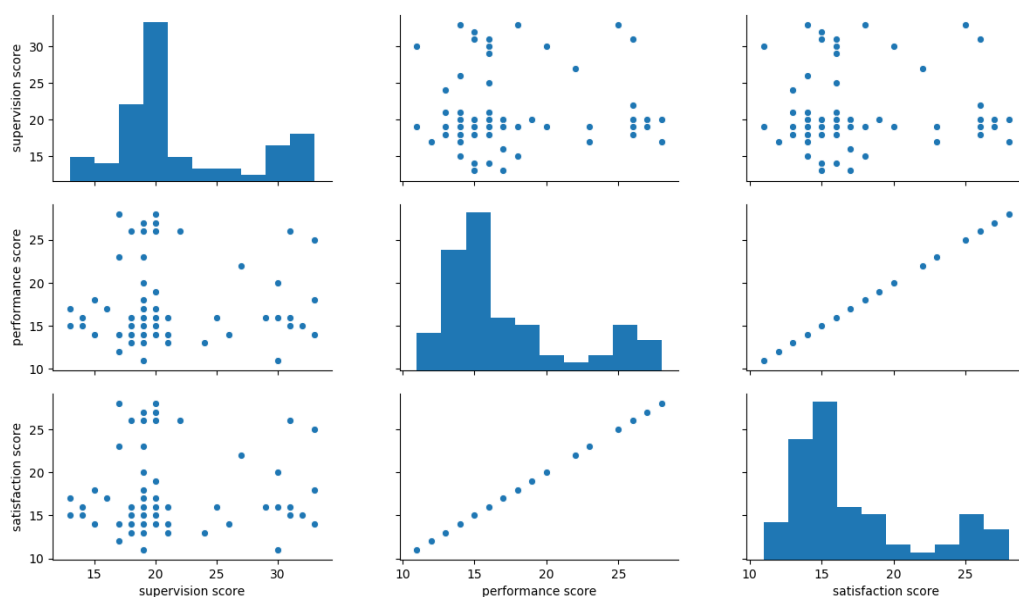


Figure 2. Correlation between Supervision, Job Satisfaction and Performance

The result predictive of performance can show in figure 3.

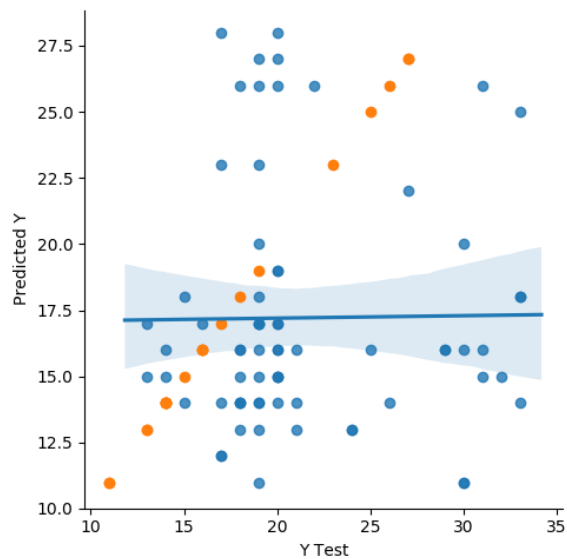


Figure 3. Correlation predicted performance (Y)

The coefficient index in this study can show in fig 4. For instance if the regression coefficient of Y Test and Predictive Y, it would indicate that Y Test will increase by 0.5 if predictive Y increase by 1 unit. A similar interpretation can be given for the regression coefficient of Y Test on predictive Y.

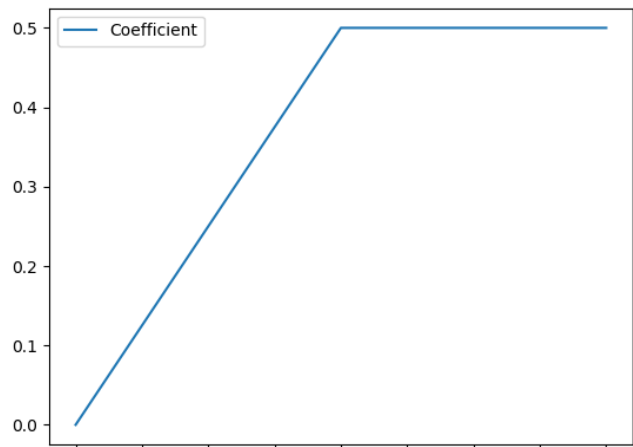


Figure 4. Coefficient Index

The coefficient of Y test in the line of regression of Y is called the regression coefficient of Y test on Predictive Y in fig.4. It represents change in the value of dependent variable (Y Test) corresponding to unit change in the value of independent variable predictive Y. The result of correlation predictor variable are often correlated with each other in Table 1. The coefficient for drills is negative, implies that adding a practice drills will reduce its value. This is because the predictor variable are correlated mastery theory tend to have more practice drills. Having

correlated predictors can make it difficult to interpret the sign and value of regression coefficient.

Table 2. Regression Coefficient

Score	Coefficient
Supervision Score	0.000000000000000106
Performance Score	0.5
Satisfaction Score	0.5

4. Conclusions

Based on the results obtained in the study, Supervision in the case of the main task of Higher Education is very low, can be seen from the Lecturers who carry out the overall main task of Higher Education there are very few in number. All lecturers only carry out teaching without any desire to improve service and research, besides the number of studies produced in the last three years has increased very slowly. Job satisfaction provided by the institution made Lecturers feel dissatisfied. Job satisfaction is reviewed in terms of income, respect, comfort in teaching. Partially positive and significant supervision of the performance of lecturers at the College of Computer Information Management in Medan Budi Darma. Partially positive and significant satisfaction towards the performance of lecturers of the Computer Information Management College in Medan Budi Darma. Separately Simultaneous or simultaneously positive and significant supervision and satisfaction on the performance of Lecturers at the College of Computer Information Management Budi Darma.

Acknowledgments

The authors are grateful to College of Computer Information Management Budi Darma Medan.

Reference

- [1] F. Pedregosa *et al.*, "Scikit-learn: Machine Learning in Python Gaël Varoquaux Bertrand Thirion Vincent Dubourg Alexandre Passos PEDREGOSA, VAROQUAUX, GRAMFORT ET AL. Matthieu Perrot," *J. Mach. Learn. Res.*, vol. 12, pp. 2825–2830, 2011.
- [2] A. C. Müller and S. Guido, *Introduction to Machine Learning with Python and Scikit-Learn*. 2015.
- [3] W. Richert and L. P. Coelho, *Book: Building Machine Learning Systems with Python*. 2013.
- [4] D. A. Pal and D. P. Prakash, *Practical Time Series Analysis*. 2017.
- [5] D. A. L. C. J. C. K. Sorensen, *Introduction to Research in Education*, vol. 6, no. 2. 010, 2006 Wadsworth, Cengage Learning, 1393.
- [6] H. Bensusan and A. Kalousis, "Estimating the Predictive Accuracy of a Classifier," *Princ. Data Min.*, pp. 79–92, 2007.
- [7] T. Doan and J. Kalita, "Selecting Machine Learning Algorithms Using Regression Models," *Proc. - 15th IEEE Int. Conf. Data Min. Work. ICDMW 2015*, pp. 1498–1505, 2016.
- [8] Z. Hu, Y. Bao, and T. Xiong, "Regression with Memetic Algorithms," vol. 2013, 2013.

- [9] D. C. Sansom, T. Downs, and T. K. Saha, "Support vector machine based electricity price forecasting for electricity markets utilising projected assessment of system adequacy data," *Sixth Int. Power Eng. Conf.*, vol. 2, no. November, pp. 783–788, 2003.
- [10] Y. Fu, Z. Li, H. Zhang, and P. Xu, "Using Support Vector Machine to Predict Next Day Electricity Load of Public Buildings with Sub-metering Devices," *Procedia Eng.*, vol. 121, pp. 1016–1022, 2015.
- [11] A. Ira, A. Simbolon, and M. Pujiastuti, "Machine Learning for Handoffs Classification Based on Effective Communication History," vol. 3, no. 2, pp. 265–267, 2019.
- [12] J. Brownler, "Basics of Linear Algebra for Machine Learning," p. 212, 2018.