

**PATH ANALYSIS:
PERFORMANCE MODEL OF SENIOR HIGH SCHOOL IN MEDAN CITY,
NORTH SUMATERA PROVINCE – INDONESIA**

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Abstract: *This study aims to know the influence of headmasters' leadership, school culture, and teachers' performance satisfaction on teachers' performance. The method used in this study is Path Analysis. Path Analysis is a technique used to analyze the correlation of cause and effect which happens in multiple regressions if a big variable influenced the variable which depends not only directly but also indirectly or totally. From the Path Analysis based on the questionnaires given to 232 teachers of State Senior High Schools in Medan City, it is known that the headmasters' leadership and school culture have directly positive influence on teachers' performance satisfaction and teachers' performance. The influence of headmaster's leadership (x_1) on teachers' performance (y_1) is 36.7 and on performance (y_2) is 18, 06%. The influence of school culture (x_2) on teachers' performance satisfaction (y_1) is 2, 78 and on performance (y_2) is 7, 84%, while on the teachers' performance satisfaction (y_1) on teachers' performance (y_2) is 6.55%. Based on the indicator analysis, it can be concluded that the indicator of leadership variables influenced much on teachers' performance satisfaction and teachers' performance which means that the distribution of teaching is appropriate with the competency and the job of a leader which is based on the rules. The Indicator of variable school culture influenced much on responsibility, model and discipline while the indicator of job satisfaction variable influences the teachers' performance of the salary/payment and the support of colleagues.*

Keywords - Path Analysis, Headmaster's Leadership, School Culture. Job Satisfaction, Teachers' Performance.

I. INTRODUCTION

In the world of education, a teacher is one of the components which determines much on the increase of the quality of the whole educations, which needs attention because the teachers give influence on creating the process and the result of qualified education. Therefore, one of the efforts to increase the qualified education is supported by qualified teachers and professional. The government published the Constitution Number 14 Year 2005 about teachers and lectures. By publishing the constitution for teachers and lectures has become the government of direct intervening of increasing the quality of teachers' competency as an obligation to have Strata 1 (Bachelor Degree) for teachers and D4 (Diploma 4) for teachers and should have professional certification.

Professional comes from the word profession which means a field of study which needs to be studied diligently by someone. According to Webster (1989) profession means a position or a certain job which needs knowledge and special training taken from intensive academic education (1). Colquit et.all in his book states "Organizational Behavior: Improving Performance and Commitment in the Workplace." According to Colquit that performance is an individual outcome,

which is influenced by individual mechanism, organizational mechanism, group mechanism and individual characteristic [2].

Handoko defines that evaluation of performance or work performance is a process of organization to evaluate the work performance of employees. This activity can influence the decisions taken by personnel and give feedback to the employees about the implementation of their work performance. The benefits of work performance are as following: (1) to push the people or the employees to have positive attitudes or to improve their below standard performance, (2) as an evaluation for management whether the employees have worked well or not, (3) to give a strong basic for deciding a policy about the improvement of an organization [3]. Moreover, Achmad S Rucky, describes that the factors of work performance oriented to an individual are: (1) dedication, (2) honesty, (3) faithfulness, (4) creativity, (5) work motivation, (6) collaboration, (7) work achievement, (8) development, (9) responsibility, (10) work discipline. Moreover, the work measurement should also consider the aspects of efficiency and effectively. Drunker cited by Stoner and Freeman, states that the employees' performance can be evaluated from two sides, they are efficiency and affectivity of work. Efficiency of work tends to finish the work correctly with a relatively short time so that the energy and the cost spent as minimal as possible. Work affectivity tends to finish the work correctly although the energy and the cost are high [4].

Huang (2004) in his research states that there is a correlation between leadership model and teachers' work satisfaction [5].). The correlation between leadership and work satisfaction are supported by some studies such as: by : Fuller et al, 1999 [6] ; Packard & Kauppi, 1999 [7] ; Wilkinson & Wagner, 1993 [8] ; Bare – Oldham, 1999 [9] ; Burrows & Munday, 1996 [10] ; Evans & Johnson , 1990 [11] ; Mathis, 1999 [12] ; McKee, 1990 [13] ; Smith, 2000 [14] ; Whippy, 2000 [15] say that in the education field there are school master leadership models and teachers' work performance. Tang, 2011 [16] and Suryo, 2010 [17] indicate that there is a positive correlation between transformational leadership model and school culture.

Wina Sanjaya (2008) states that in order to be able to optimize the role of teachers as facilitators, therefore, teachers need to comprehend things related to the use of some media and source of learning. From the statement above, it can be concluded that to make teachers as facilitators, teachers must provide source of learning and suitable learning media in every learning activity and not to make the teachers as the only source of learning for their students [18]

The previous study conducted by Shore and Martin cited by Sosa and Sagas by proving that culture has a significant correlation with work satisfaction [19]. Other studies carried out by Williams, Randeau and Francescutti, state that culture related to human resources by taking some samples from physicians working in emergency room of hospital in Canada. The same study has also been done by Silverthorne in Taiwan which shows that organization culture has positive influences on work satisfaction [20].

Based on the above background, there are problem of identification and problem of limitation. Thus, the problem formulations in this study are as following: (1) Does the headmaster's leadership influence directly or positively on teachers' work performance? (2) Does school culture influence directly and positively on teachers' work satisfaction? (3) Is there any influences on the headmaster's leadership directly and positively to teachers' work performance? (4) Does school culture influence directly and positively on teachers' performance? (5) Does the teachers' work satisfaction influence directly and positively on teachers' performance ?

II. LITERATURE REVIEW

2.1. Path Analysis Model

Path Analysis Technique is a technique to analyze the correlation of cause and effect in multiple regressions if its free variable influences the depended variable not only directly but also indirectly. Therefore, it can be summed up that Path Analysis is a direct development in the form of multiple regressions with the aim to give estimation in the level of need (magnitude) and significance correlation of hypothetical cause and effect in a set of variables. The pattern of correlation is shown by using an arrow. The linear arrow shows cause and effect the influence between endogen variable or the mediator with one endogen variable or more. On the other hand, a double endogen variable shows the correlation between pairs of **hexagon** variable. Oxogen variable in a path diagram model is all variables which do not have any arrows towards their directions. Endogen variable is a variable which has an arrow to its direction.

The assumption or basic principle that should be fulfilled in Path Analysis such as: (1) there is a correlation between linearity variable and normal variable; (2) There is no adivity which is called interaction effects. All residual variables do not interact with one of the variables being studied; (3) Interval scale data, means all variables being observed have interval scale data. If the data has not been in the form of scale interval, first of all, it is better to convert the data by using Methode od Successive (MSI); (4) The causal current system is only one recursive which means that there is no upside down causal non recursive direction (reciprocal); (5) All residual variables (unmeasured) do not correlate with one of the variables in the model. (6) Sampling has a probability, so all members of the population have the same chance to be chosen as member of sample. In order to get a maximal result, it is better to use more than 100 samples; (7) Observed variables are measured without any mistakes (valid and reliable instruments). (8) It should have a lower multicollinearity because it has two or more free multicollinearities (eksogen) with high correlation. If it has a correlation among high free variables, there will be a big standard error from beta coefficient (b) which is used to delete the normal variants in doing correlation analysis partially; (9) The analyzed model is specified based on relevant theory and concept, which means that model being studied is developed based on certain theoretical framework which can describe causal correlation among variables; (10) It is true that specification of model is needed to interpret the coefficient path. The specification error happed when the significant caused variable is taken off from the model will reflect covariant together with all model of path coefficient which are not measured and cannot be interpreted precisely in related to direct and indirect influences; and (11) There is a suitable correlation input which means that if it uses a correlation matrix as input so Pearson correlation is used for two variables with interval scale; Pearson correlation is used for two variables with ordinal scale, *tetrachoric* for two dichotomy variables (nominal scale); *polyserial* for one variable interval and other ordinal; and biserial for one interval scale variable and other nominal.

Influenced model of double causal is a model used one endogen variable and some eksogen variables which is written with y function $y = f(x_1, x_2)$ atau $y = f(x_1, x_2, \dots x_k)$.

Path coefficient is standard regression coefficient or it is called "beta" which shows direct influence from one eksogen variable towards endogen variable. To count path coefficient is used equal metrics, that is :

$$\begin{pmatrix} 1 & r_{x_1 x_2} & \cdots & r_{x_1 x_k} \\ r_{x_1 x_2} & 1 & \cdots & r_{x_2 x_k} \\ \vdots & \vdots & \ddots & \vdots \\ r_{x_k x_1} & r_{x_k x_2} & \cdots & 1 \end{pmatrix} \begin{pmatrix} \rho_{y x_1} \\ \rho_{y x_2} \\ \vdots \\ \rho_{y x_k} \end{pmatrix} = \begin{pmatrix} r_{x_1 y} \\ r_{x_2 y} \\ \vdots \\ r_{x_k y} \end{pmatrix}$$

By ρ_{yx} means path coefficient x_i towards y , r_{xixj} is correlation coefficient between eksogen variable x_j , and r_{yx} , are correlation coefficient between endogen variable y and eksogen variable x_i . The formula of counting the correlation coefficient is as follows :

$$r_{x_i x_j} = \frac{n \sum_{h=1}^n X_{ih} X_{jh} - \sum_{h=1}^n X_{ih} \sum_{h=1}^n X_{jh}}{\sqrt{\left(n \sum_{h=1}^n X_{ih}^2 - \left(\sum_{h=1}^n X_{ih} \right)^2 \right) \left(n \sum_{h=1}^n X_{jh}^2 - \left(\sum_{h=1}^n X_{jh} \right)^2 \right)}}; i \neq j = 1, 2, 3 \dots k$$

ρ is a symbol from path coefficient between eksogen variable and endogen variable, while β is a symbol from path coefficient between endogen variable and eksogen variable which have input in SPSS Program.

2.2. Coefficient Determination and Residual Coefficient

Determination Coefficient in linear regression is always defined as how far the eksogen variable is able to finish variants from other variables. Determination Coefficient is symbolized R^2 , as a big influence together with eksogen variable towards endogen variable which can be described by path equal model. The R^2 score of equal path is approaching to 100% shows that more varieties of eksogen variables towards endogen variables which can be explained from equal path. The formula of determination coefficient by using matrix is as follows :

$$R^2 = \begin{pmatrix} \rho_{yx_1} & \rho_{yx_2} & \cdots & \rho_{yx_k} \end{pmatrix} \begin{pmatrix} r_{x_1 y} \\ r_{x_2 y} \\ \vdots \\ r_{x_k y} \end{pmatrix}$$

Where R^2 = determination coefficient, ρ_{yx} = path coefficient x_i towards y , and r_{xy} = correlation coefficient between endogen variable y and eksogen variable x_i . Residue coefficient γ_{yx} is the big influence out of other models which are not studied. The formula of residue coefficient score is:

$$\gamma_{yx} = 1 - R^2$$

2.3. Significant Testing of Path Coefficient

To test the significant of path coefficient is used t_{value} statistic with the formula as follows

$$t_{\text{hitung}} = \frac{\rho_{ji}}{\sqrt{\frac{[1 - R_{j(x_1, x_2, x_3, \dots, x_k)}^2] D^{ii}}{n - k - 1}}} = \frac{\rho_{ji}}{sb_i}$$

Where ρ_{ji} = path coefficient x_i ke x_j , $R_{j(x_1, x_2, x_3, \dots, x_k)}^2$ = determination coefficient x_j data $x_1, x_2, x_3 \dots x_k$, k = more free variables, D^{ii} = the elements taken from row to- i and row to- i from main diagonal of inverse matrix sb_i = standard error

2.4. The Testing of Model Fit (*model fit*)

The testing of fit model is needed to determine whether proposed hypothetic model is fit or consistent to the empirical data. The testing of fit model was carried out by comparing theoretical theoretic correlation metrics with empirical correlation metrics. If both of the metrics are identical, so the proposed hypothetic model can be accepted perfectly. The calculation of fit model manually done as follows :

- a. To formulate the hypothesis.

$H_0 : R = R(\theta)$ If theoretical correlation matrix = empirical correlation matrix.

$H_1 : R \neq R(\theta)$ if theoretical correlation matrix \neq empirical correlation matrix.

- b. To determine Q score

$$Q = \frac{1 - R_m^2}{1 - R_e^2}$$

Dimana :

Where:

R_m^2 = determination coefficient of theoretical model (proposed) , R_e^2 = determination coefficient of empiric model (after there is no significant path coefficient

$$R_m^2 = 1 - (1 - R_m^2)(1 - R_m^2) \dots (1 - R_m^2)$$

$$R_e^2 = 1 - (1 - R_e^2)(1 - R_e^2) \dots (1 - R_e^2)$$

$$R_m^2 = R_e^2 \text{ (if there is no significant path coefficient)}$$

III. RESEARCH METHODOLOGY

3.1. THE SCOPE OF STUDY

This study was carried out in some schools in Medan City. The subjects of this study are teachers and high school teachers in Medan City. The total number of Senior High School in Medan City is 21. The total samples of this study are 232 teachers from 21 State Senior High Schools. The method used in this study is survey method by path analysis approach. Kusnendi (2008) states that path analysis approach which has been analyzed before, has cause and effect with its aim to know the influence of direct effect and indirect effect, a set of cause variables towards effect variables. Along with this, therefore, the issue or the problems of this study in the form of path analysis with the questions are as following (1) how is the influence of variable x_1, x_2, \dots, x_k towards Y variable (cause variable) ? And (2) How far is the influence of direct and indirect, total and the influence of cause variable of x_1, x_2, \dots, x_k towards Y variable (cause variable). Furthermore, Kusnendi (2008) states that there are 2 things of they are: (1) Path Analysis is data analysis method of dependency

multivariants with its aim to know the direct and indirect influence of a set of eksogen variables towards endogen variables which can be observed directly [21].

The direct and direct influences mean a very precious model to be tested through path analysis, the model which has been justified with strong theoretical and empirical justification and formulated as well with the multiple regression equality. All variables that can be observed directly means that those variables in the model can be happened as manifest variable, and (2) empirically, there are 2 things should be fulfilled in applying path analysis. First, the model of measurement used for collecting the variable data of the study fulfill path criteria congeneric measurement model. It means that the variable being studied is undemendionally, valid and reliable that can be measured and covered as composite from its indicator. Second, correlation matrix or covariance matrix among studied variables which are produced by samples data are positive definite matrix, that is, matrix with determinant coefficient which is bigger than nil. This contains that among cause variables in sample data has multicollinearity problem. Variable used to form performance model, they are: x_1 = variable of headmasters' leadership, x_2 = variable of school culture, y_1 = work satisfaction; and y_2 = variable of teachers' performance.

3.2. Technique Analysis

In this study, the path analysis of problem solution is carried out by simple correlation approach. Generally, there are six steps of counting and examining the path coefficient by simple correlation approach, such as:

1. To formulate hypothesis
2. To form correlation matrix
3. To count path coefficient(ρ_{ij}) with the following steps
 - Step 1 : to formulate hypothesis and structural equality
 - Step 2 : to make correlation matrix among eksogen variables
 - Step 3 : to determine matrix inverse of eksogen variables
 - Step 4 : to determine double determination coefficient
4. To determine double determination coefficients (structure)
5. To examine the significant of path coefficient
6. Examination of Model Fit

IV. THE RESULT OF THE STUDY

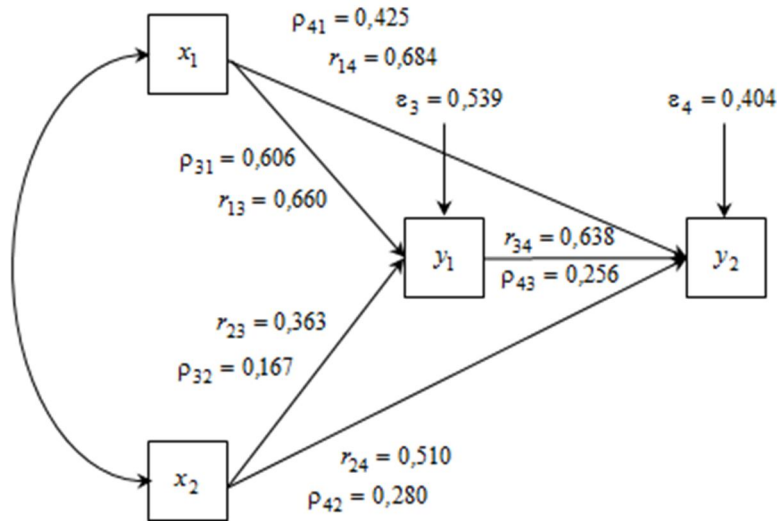
Based on the technique analysis, it is obtained from the result of hypothesis examination, as it is shown from table 4.1 below.

Table 4 .1. Recapitulation Examination Result of Hypothesis Study

Towards	ρ_{ij}	sb_i	t_{hitung}	t_{tabel}	Resume
x_1 towards y_1	0,606	0,051	11,882	1,645	Sig
x_2 towards y_1	0,167	0,051	3,274	1,645	Sig
x_1 towards y_2	0,425	0,056	7,589	1,645	Sig

x_2 towards y_2	0,280	0,045	6,222	1,645	Sig
y_1 towards y_2	0,256	0,057	4,491	1,645	Sig

Based on the result of tested hypothesis, empirical causal model between x_1 , x_2 and y_1 with y_2 can :



Picture 1: Diagram of Path Model y_1 and y_2 .

Therefore, structural equality on the result of tested hypothesis, i.e :

$$\hat{y}_1 = (0,606) x_1 + (0,167) x_2 + 0,539 \text{ dan } \hat{y}_2 = (0,425) x_1 + (0,280) x_2 + (0,256) x_3 + 0,404$$

Based on the result of analysis on model of Equality Structural Study between free variables (x_1 , x_2 , and y_1) with depended variables (y_2), the following is the summary of direct effect and indirect effect on Table 4.2, as follows :

Effect of Exogenous to Endogenous Variables

Table 4.2. Path Coefficient, Direct, Indirect and Total Contribution

Effect of Exogenous to Endogenous Variables	Coefficient	Contribution		Total Contribution
		Direct	Indirect	
x_1 towards y_1	0,606	0,606	-	-
x_2 towards y_1	0,167	0,167	-	-
x_1 , and x_2 towards y_1	-	-	-	0,461
x_1 towards y_2	0,425	0,425	0,155	-
x_2 towards y_2	0,280	0,280	0,042	-
y_1 towards y_2	0,256	0,256	-	-
x_1 , x_2 dan y_1 towards y_2	-	-	-	0,596

V. CONCLUSION

Based on the result of teachers' performance model analysis and the test of *goodness of fit*, his study entitled "The Model of Teachers' Performance of State Senior High School" result in two structural equalities that can be accepted as the result of eksogen variables towards endogen variables. The result of this study gives a of information which can be concluded as: First, that the headmasters' leadership influences directly, positively, and significantly towards the teachers' work performance. Second, school culture influences directly, positively and significantly towards the teachers' work performance satisfaction. Third, the headmasters' leadership influences directly, positively and significantly towards the teachers' work performance. Fourth, School culture influences directly, positively, and significantly towards the teachers' work performance. Fifth, the satisfaction of teachers' work performance influences directly, positively, and significantly towards work performance. Therefore, theoretical model developed in this study is tested empirically in the model of High School in Medan city. This means that the model of teachers' work performance with leadership variables of headmasters' leadership, variable of school culture and variable of teachers' satisfaction of teacher work performance that can be accepted as model of work performance.

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