

Analysis of Structural Equation Model on Attitude toward English Learning in Higher Education Institution

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Abstract— this research aims to analysis and evaluate attitude toward English learning in higher education institution. The data are from a survey by using questionnaire. The 400 samples are the student of higher education institution. The statistics used in this research is SEM or Structural Equation Modeling.

The data analysis of subjects, theories and research related to the study of 20 indicators. And extracted 4 factors to determine the relationships among the elements and 18 indicators, including learning attitude, inspiration, learning support and learning concentration. The research found that the Mean Magnitude of Relative Error (MMRE) of structural equation that affects the modeling efficiency of attitude toward English learning in higher education institution was 4.628%

Keywords- *Structural Equation Model, Learning Attitude, English Subject*

I. INTRODUCTION

Learning is one of the thing that shows the result of education. Not only it enables us to know the knowledge, ability, and skills of learners, but it also represents the value of learning and teaching management of teachers as well as the administration of the executives. Learners with high proficiency can use the effective outcomes for further education. Nevertheless, if learners gain low proficiency, it reflects the bad learning quality of learners along with bad quality of learning management of relevant individuals. Learners receiving either high or low proficiency comes from many factors. There are many scholars and researchers discussing about the attitude analysis toward English learning and learning proficiency [1]. Bloom said that attitude of learning variables, which is the behavior regarding cognitive domain affected 65% of learning, the teacher's quality of teaching affected 25%, and another 10% was other variables that affected only little. Factors affecting learning consisted of 4 factors, which were 1) factor regarding learner; 2) factor regarding learning environment in school; 3) factor regarding general environment and family environment; 4) factor regarding learning and teaching including learning context [2].

Therefore, in order to improve learning and teaching, the attitude toward English learning must be studied to enable teachers to use the information to develop the teaching of English subject and achieve further objectives [3].

In order to use factors or variables that are relevant to learning and create beneficial development, there must be information supporting whether and how those relevant factors are related to learning outcomes. The most common method used to evaluate is factor analysis, which is used among researchers to study the variables that affect learning, because it can explain the relationship and result that factor affects variables. This analysis method helps identifying the factor that affect learning from real experience, and whether it is relevant or conflict to the relationship according to the theory from the study. The result of the analysis is beneficial as way to develop learner's learning.

II. THE OBJECTIVE OF THE STUDY

- 1) To analysis the attitude toward English learning in Higher Education Institution.
- 2) To evaluate the variables of attitude toward English learning in Higher Education Institution.

III. THEORY AND METHODOLOGY

The researchers used the technique to develop the model.

A. Factor Analysis [4]

Factor Analysis is a technique used to extract the factors (component) from a group of indicators that are related to each factor. This will be used instead of a group of indicators. This is a technique that reduces the number of dimensions or manifest variable and considers the suitability of the extracted factors. By checking the statistics Kaiser-Meyer-Olkin: KMO (KMO>0.60) factors obtained will only validate the considered values. Able to explain the variability of all the factors together (total variance explained) with the inverse of each variable with no apparent extraction factor would greatly benefit this approach. If the value of a high percentage (cumulative explained variance) showed that the factors can represent a good indicator, this can be formulated as follows:

$$F_j = w_{j1} + x_1 + w_{j2} + x_2 + \dots + w_{jp} + x_p + e \quad (1)$$

Where: F = factor,
 w = coefficient of variable x
 x = manifest variable
 e = margin of error

B. Structural Equation Modeling

Structural Equation Modeling (SEM) is a technique used to analyze the relationship of factors from the survey (exploratory) with a key and then extract a model of the relationship of various factors, which is the main theory or hypothesis of this study. From the statistics of 1) Chi-square (χ^2) should be a non-significance ($P > 0.05$) 2) Goodness of Fit Index ($GFI > 0.90$) 3) Root Mean Square Error of Approximation ($RMSEA < 0.06$) and 4) Hoelter's N, the value (Hoelter's. $N > 75$) is used to check the adequacy and appropriateness of sample size (case) in SEM [5].

C. Accuracy Evaluation Criterion [6]

Accuracy Evaluation Criterion of a new data set, which must be precisely compatible (model best fit) by applying a set of new data (predicted missing) derived from the estimation of missing data to verify the real data set (actual missing) and then calculate the Magnitude of Relative Error (MRE) according to the formula.

$$MRE = \frac{|actual_i - predicted_i|}{actual_i} \quad (2)$$

The missing data ($i = 1, 2, \dots, n$) must be used for calculating the Mean Magnitude of Relative Error (MMRE). If it is found that the results of MMRE have small values, the results should be precise or very close to the real data as formulated below.

$$MMRE = \frac{1}{n} \sum_{i=1}^{i=n} \frac{|actual_i - predicted_i|}{actual_i} \times 100 \quad (3)$$

IV. RESEARCH METHODOLOGY

The attitude toward English learning in Higher Education Institution consists of process and method as follows:

A. Manifest variable

Using referenced indicators in analyzing the attitude toward English learning in Higher Education Institution is concluded as follows:

TABLE I. THE ATTITUDE ANALYSIS TOWARD ENGLISH LEARNING IN HIGHER EDUCATION INSTITUTION.

Indicator	Description
A1	English language enables students to communicate with foreigners.
A2	English language makes student's daily life become more comfortable.
A3	English language enables students to search information from the internet.
A4	It is necessary for students to use English language in searching information from the internet.
A5	Learning English language enables students to work in good company in the future.
A6	Learning English language helps improving student's life.
A7	English language is the subject that students are interested in.
A8	English activity that teachers provide in the classroom is beneficial to students.
A9	Students feel comfortable to study English language.
A10	Students would like to do the activity assigned by teachers.
A11	Students feel fun when learning English language.
A12	Students like learning English language.
A13	Students are interested in learning English language.
A14	Students feel good when learning English language.
A15	Students do the assigned activity willingly.
A16	Students must finish group work assigned by teachers.
A17	Students finish English work assigned by teachers by the due date.
A18	Students will adjust or improve incorrect English work.
A19	When understanding the English context in the classroom, students will search for additional information.
A20	Students will search for additional English information to improve knowledge.

Rating scale: 1 = Very Low, 2 = Low, 3 = Moderate, 4 = More, 5 = Most)

B. Updating data to standard values

From the generated questionnaire, some questions have different data units, such as some variables have quantitative data. Some variables are qualitative data, Likert score, and some variables are 0-5, which may give rise to an error in the modeling. Therefore, the researcher must update the data to be the same unit, ie to update the data to standard values by using standardized techniques. For example, the Eff indicator is converted to a standard value, ZEff.

C. The Factor Analysis of Experimental Group

The experimental group focused on the factor analysis method by principal component analysis to provide a measure that is relevant to the factors in the same way as rotation varimax to reduce the number of points. This should measure the weight of each factor to as low as possible. Results from the analysis of new factors with KMO were 0.949, and new factors from extraction consisting of four main factors F1 F2 F3 and F4 are shown in Table II.

TABLE II. RESULTS OF MAIN FACTORS AND VARIABLES

Factor	Factors Name	Variable of Factor
F1	Learning attitude	ZA1, ZA2, ZA3, ZA5, ZA6, ZA15
F2	Inspiration	ZA13, ZA14, ZA16, ZA17, A18
F3	Learning Support	ZA7, ZA8, ZA9, ZA10, ZA11
F4	Learning Concentration	ZA12, ZA19, ZA20

From Table II. the researcher set the value of indicator in each factor by setting the name of variable, attitude analysis toward English learning in Higher Education Institution, which were F1, F2, F3, and F4.

D. Modeling of structural equations

The results from the factor analysis will be used to generate the model of the initial structural equation as shown in Fig. 1. The prototype model is then analyzed for its significance, relevance, and ability to explain relationships and distribution (Covariance) by the method of maximum likelihood as shown in Figure 1. Equation.

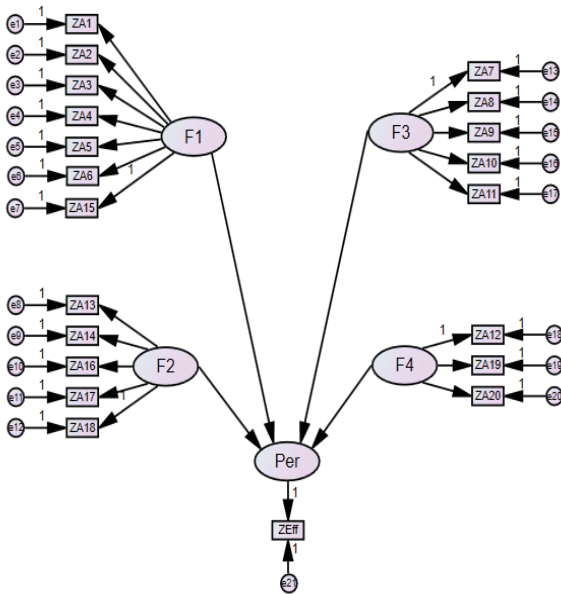


Figure 1. Model of initial structural equation

In Figure 1, the researcher determines the Attitude Analysis toward English Learning in Higher Education Institution. Percentage variables used for information service are F1, F2, F3 and F4.

V. RESULT

Analysis of Structural Equation Model on Attitude toward English Learning in Higher Education Institution. The research results are summarized as follows.

1) Analysis of Structural Equation Model on Attitude toward English Learning in Higher Education Institution.

The results from the improvement of the equation model from the sample of student in Higher Education Institution. The results are as follows.

TABLE III. STATISTICS FOR MODEL VALIDATION

Model	Statistic value	Default
CMIN-P	P > 0.05	0.332
CMIN/DF	CMIN/DF < 3	1.048
GFI	GFI > 0.90	0.965
RMSEA	RMSEA < 0.08	0.011

Table III. Summarizes the model that has met by the model, which is consistent with the empirical data when the statistics are compared against the criteria in Table III.

2) Model of structural equation to measure the Attitude Analysis toward English Learning in Higher Education Institution.

The researcher has improved the hypothesis model to obtain the appropriate model and passed the model validation criterion as shown in Figure 2.

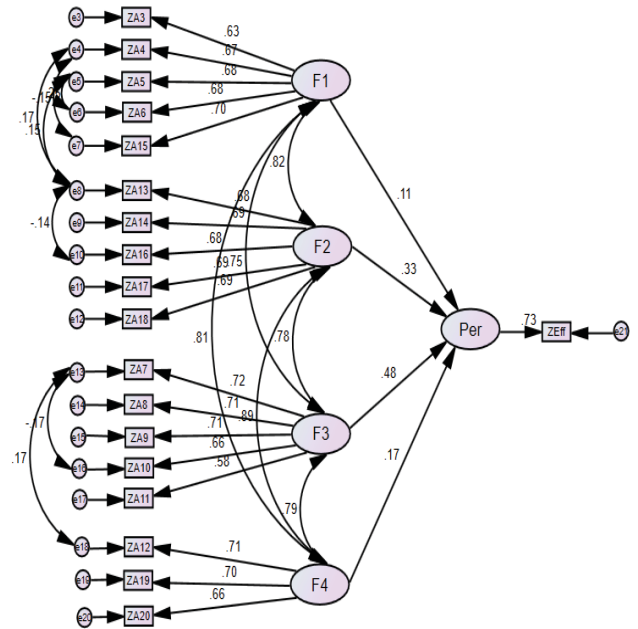


Figure 2. Structural equation model to measure the attitude analysis toward English learning in higher education institution.

Based on the model of structural equation developed from the questionnaire, there are 4 factors that affect the use of Attitude Analysis toward English Learning in Higher Education Institution, which are F1 Learning attitude, F2 Inspiration, F3 Learning Support and F4 Learning Concentration. Analyzed models show size and direction of influences at various factors. Percentage is the percentage of using attitude analysis toward English learning in higher education institution showing below.

$$Z_{Eff} = 0.73 \times Per \tag{4}$$

$$Per = 0.11 \times F1 + 0.33 \times F2 + 0.48 \times F3 + 0.17 \times F4 \tag{5}$$

$$F1 = 0.63 \times F3 + 0.67 \times F4 + 0.68 \times F5 + 0.68 \times F6 + 0.70 \times F15 \tag{6}$$

$$F2 = 0.68 \times F13 + 0.69 \times F14 + 0.68 \times F16 + 0.69 \times F17 + 0.69 \times F18 \tag{7}$$

$$F3 = 0.72 \times F7 + 0.71 \times F8 + 0.71 \times F9 + 0.66 \times F10 + 0.58 \times F11 \tag{8}$$

$$F4 = 0.71 \times F12 + 0.70 \times F19 + 0.66 \times F20 \tag{9}$$

3) Accuracy Estimation

After evaluating the attitude toward English learning in higher education institution. The researcher used this equation to estimate the performance variables of the sample of 30 samples, which used the independent variable to calculate the value of the Z_{Eff} variable. The Z conversion was done in the form of x

The calculated value is estimated by the attitude toward English learning in higher education institution, then compare the attitude toward English learning in higher education institution using the questionnaire to calculate the MRE of the 30 samples. Then, the MMRE (Average absolute MRE 100%) was calculated into percentage of average model error estimates. The results are shown in Table IV.

Table IV. Results of the MMRE calculation of the samples the attitude toward English learning in higher education institution.

Measurement	Model
MMRE	4.628%

Table IV. Results of Performance Testing of attitude toward English learning in higher education institution. It is found that the attitude toward English learning in higher education institution. Using the structural equation technique, the average relative error (MMRE) was 4.628%

VI. SUMMARIZE AND DISCUSSION

The research found that the measurement of the attitude toward English learning in higher education institution had four factors, F1, F2, F3 and F4. The researcher has named new factors to cover and understand. F1 Learning attitude, F2 Inspiration, F3 Learning Support and F4 Learning Concentration. From the performance measure of the attitude toward English learning in higher education institution, learning attitude (F1) = +0.11. The variables related to English language enables students to search information from the internet, it is necessary for students to use English language in searching information from the internet, learning English language enables students to work in good company in the future, learning English language helps improving student's life and students do the assigned activity willingly. Inspiration (F2) = +0.33. The variables related to students are interested in learning English language, students feel good when learning English language, students must finish group work assigned by teachers, students finish English work assigned by teachers by the due date and students will adjust or improve incorrect English work. Learning support (F3) = +0.48. The variables related to English language is the subject that students are interested in, English activity that teachers provide in the classroom is beneficial to students, students feel comfortable to study English language, students would like to do the activity assigned by teachers and students feel fun when learning English language. Learning concentration (F4) = +0.17. The variables related to students like learning English language, when understanding the English context in the classroom, students will search for additional information and students will search for additional English information to improve knowledge.

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