

Statistical analysis of factors affecting high school students' ethics in Lamphun province (Thailand)

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Abstract

Student's ethics was important to develop the country. To develop student's ethics effectively, you had to have data about it. The research's purposes are to study the ethics of high school students in Lamphun (Thailand), factors that affect students' ethics and to predict the level of high school students' ethics from the effecting factors.

The data were collected by questionnaire from the 495 students of eight high schools in Lamphun and they were analyzed by descriptive statistics, correlation between 2 variables, categorical principal components analysis and ordinal regression to forecast ethic levels.

The result are as follows: percentage of students having middle, low and high ethic levels were 69.3, 15.6 and 15.2, respectively. At 0.05 level of significance, the significant factors of students' ethic based on the correlation between 2 variables were school, sex, grade point average, education level, the class planning, education and occupation of mother, the relationship between father and mother, the person whom staying with, total debt of family, age and family size.

To forecast the ethics level of students, we used the ordinal regression analysis at 0.05 level of significance. The independent variables that predicted ethic level of students correctly were sex, school, grade point average, education level, class planning, education and occupation of mother, the relationship between father and mother, the person whom staying with and total debt of family. The result is 73.13%.

Keywords : Correlation, Catpca Ordinal Regression.

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Introduction

Students are the precious resources of the country, therefore, the societies, schools and teachers believed that are trust if the present students have ethics, they will become the moral and ethic adults in the future. It will be indicate that the country which consists of the moral and ethics students can develop itself well and rapidly in the future. In the other hand, if the societies consist of the immoral and unethical students. There will be the amoral adults in confused societies. They are selfish to carry only about themselves and not about other people. They seek to their profit, have no sympathy, live separate from the others. These problems much relate to the stability of the nation and become the most important obstacles for the country development. It's time to develop the ethic of the societies' members so as to improve the situation of Thai societies today. When the students are also the society members, therefore, everyone should cooperate, support and teach them more about ethics; so that they will change to be the ethical students^[14].

From the events occurred in our societies and the importance of students' ethics in developing country. The students in the high school level, who will come to be the adults, have to prepare the responsibility to societies and also to themselves. It is, therefore, the suitable time to train and develop the students' ethics before it will be too late. The characteristic development of the teenager is important to study for comparison, another way, the better and suitable way in Thai societies to foster the ethics and morality in students relies on their families and school. For that reason it made the researcher interest in studying about the factors which have an influence on the ethics and morality of the students in the high school. We studied the relation of the factors which affected the ethics level and estimated the probability of each students' ethic levels by creating the predicted equation of ordinal regression.

The objective of this research

1. To study the factors that affected the students in the high school level in Lumphun province.
2. To create the equation and use it to predict the ethic level of the students in the high school when we have known the cause of affected the ethic level of the students.

Method of the study

In studying affected factors the ethics, we studied only the students in the high school that are under the Department of Elementary Education, Lumphun Province.

Some definition in this research

Ethics means the good and right of sense and behavior in cooperation with another members in societies and themselves, to co-stay happily.

The student means the students in Grade 10-12 in high schools that are under the Department of Elementary Education, Lumphun Province.

The levels of ethics can be divided into 3 levels as follow:^[14]

1. *Low ethic level* means the scores from the test of ethics that lower than 30th percentiles (P_{30}).
2. *Medium ethic level* means the scores from the test of ethics between 30th-70th, percentiles ($P_{30} - P_{70}$).
3. *High ethic level* means the scores from the test of ethics that higher than 70th percentiles (P_{70}).

Population and samples

The population in this research are 7,807 students in Grade 10-12 in schools that are under the Department of Elementary Education, Lumphun Province. The data were collected by using the questionnaires and randomized by multistage sampling.

In the first step, divide the schools in Lumphun into 2 groups: One has three groups in Muang District (county) and the other has ten groups of outer off Muang District (suburb). We used all of three schools in the first group for the sample but in the second group, we used only five schools. So all samples were 8 high schools.

The second step, sampling each group class levels of each school sample for 1 school of each class level.

The third step, by sampling the students in each class level, had the ratio for all 495 students.

The tool of the study is the questionnaire of 2 parts as follow:

Part 1: the students' general data.

Part 2: the students' ethics test used the questions in Likert Scale, divided into 4 levels, 39 positive attitudes and 27 negative attitudes.

The method of collecting and analysis

The questionnaires were distributed to the sample schools by the researcher, and the academic teachers assigned to students. After the students had finished replying, the questionnaires were returned to the researcher. Later on, the researcher checked and analyzed score by using descriptive statistics, to compare the ethic level of the students according to general data or the personal variables. We used the relation between 2 variables and categorical principal components analysis, to find the affected factors their ethic levels by ordinal regression.

The variables in analysis

- ETHIC : The ethic levels which is the ordinal data
1 = low level, 2 = medium level 3 = high level
- STA : The parents' relation,
1 = live together, 2 = separated
- STAY : The person to live with
1 = father-mother, 2 = father, 3 = mother, 4 = other relatives
- M.OCC : The mother's occupation
1 = merchant, 2 = hired,
3 = government officer/state enterprise employee,
4 = farmer, 5 = own business
- F.OCC : The father's occupation
1 = merchant, 2 = hired,
3 = government officer/state enterprise employee,
4 = farmer, 5 = own business
- CLASS : The class planning
1 = Science-Math, 2 = others
- SEX : The sex of being
1 = male, 2 = female
- SCHOOL : The sample schools
1 = Maeta Wittayakhom, 2 = Umong Wittayakhom,
3 = Jakhmkanatho, 4 = Pasang,
5 = Takhumgnern Wittayakharn,
6 = Patal Banthi Pittayakhom,
7 = Theerakharn Banhong,
8 = Sounboonyopatham school
- YEAR : The education level
1 = Grade 10, 2 = Grade 11, 3 = Grade 12
- N_FR : The number of class members

- N_F : The quantity of family members
 N_B : The ordered child
 N : The number of children in their own parents
 M_IN : The mother's incomes
 F_IN : The father's incomes
 T_EX : The whole expenses in their family
 F_YEAR : The father education
 M_YEAR : The the mother education
 GPA : The grade point average
 AGE : The age
 CRE : The family's whole debts
 IN : The money getting from their parents
 EX : The students' expenses per day

Result and discussion

1 Descriptive statistics for general data of the high school students

Table 1
General data of this research

| Variable | Value Label | Count | Percentage |
|---------------------|------------------------------------|-------|------------|
| The Staying | Father-Mother | 357 | 72.1 |
| | Father | 42 | 8.5 |
| | Mother | 62 | 12.5 |
| | Relatives | 34 | 6.9 |
| Ethic level | Low | 77 | 15.6 |
| | Medium | 343 | 69.3 |
| | High | 75 | 15.2 |
| Education | Grade 10 | 161 | 32.5 |
| | Grade 11 | 166 | 33.5 |
| | Grade 12 | 168 | 33.9 |
| Mother's Occupation | Merchant | 76 | 15.4 |
| | Hired | 192 | 38.8 |
| | Govt. officer/ State enterprise | 67 | 13.5 |
| | Farmer | 124 | 25.1 |
| | Own business | 36 | 7.3 |
| Sex | Male | 246 | 49.7 |
| | Female | 249 | 50.3 |

(Table 1 Contd.)

| Variable | Value Label | Count | Percentage |
|---------------------------|-----------------------------------|-------|------------|
| Class planning | Science-Math | 245 | 49.5 |
| | Arts | 250 | 50.5 |
| Relation of Father-mother | Live together | 385 | 77.8 |
| | Separated | 110 | 22.2 |
| School | Maeia | 45 | 9.1 |
| | Umong | 45 | 9.1 |
| | Jakham | 90 | 18.2 |
| | Pasang | 60 | 12.1 |
| | Takhumgnern | 60 | 12.1 |
| | Patal | 45 | 9.1 |
| | Theerakharn | 60 | 12.1 |
| | Saunboon | 90 | 18.2 |
| Father's Occupation | Merchant | 89 | 18.0 |
| | Hired | 195 | 39.4 |
| | Govt. office/ State enterprise | 36 | 7.3 |
| | Farmer | 141 | 28.5 |
| | Own business | 34 | 6.9 |

From samples collecting in 8 schools: Maeta Wittayakhom, Umong and Patal Banthi Pittayakhom of 9.1%. Jakhamkanathorn and Sounboonyopatham 18.2%, Takhumngern Wittayakhom, Pasang and Theerakharn Banhong 12.1%. We found that 50.3% of the students were female which close to the male 49.7% and most of them were in Arts planning 50.5% which closed to the Science-Math planning 49.5%. They were studying in Grade 10, 11 and 12, the percentage levels are 32.5%, 33.5% and 33.9%, respectively. As for the father occupation, most of them took hired occupation, 39.4%. The second rate were farmers 28.5% and the least of occupation was the own business 6.9%. The most of mother occupation were hired 38.8%. The second rate was the farmers 25.1% and the least was own business, 7.3%. The relation of the parents were as follows: lived together 77.8%, the students who lived with their parents 72.1% had the medium ethic level 63.3%, the second rate was the low level 15.6% and the least of them were in the high level, that was 15.2%.

2 Analysis the relation between 2 variables (M. J. Norusis, 2000)

Hypothesis in the test are:

H_0 : The two variables are independent.

H_1 : The two variables are dependent.

It would be accepted H_0 if $\text{Sig}(\chi^2) > \alpha$, and
 it would be rejected H_0 if $\text{Sig}(\chi^2) \leq \alpha$.

(1) The Chi-Square test

The statistics Chi-square for testing the relation between the 2 variables in nominal or ordinal scales. From contingency table of the two variables which R levels in the row and C levels in the column, the formula as:

Let

f_{ij} = Sum of cell weights for cases in cell (i, j)

$$c_j = \sum_{i=1}^R f_{ij}, \text{ the } j\text{th column subtotal}$$

$$r_i = \sum_{j=1}^C f_{ij}, \text{ the } i\text{th row subtotal}$$

$$W = \sum_{j=1}^C c_j = \sum_{i=1}^R r_i, \text{ the grand total}$$

Expected Count

$$E_{ij} = \frac{r_i r_j}{W}$$

Pearson's Chi-Square (χ_p^2)

$$\chi_p^2 = \sum_{ij} \frac{(f_{ij} - E_{ij})^2}{E_{ij}}$$

The degrees of freedom are $(R - 1)(C - 1)$, when

f_{ij} = the frequency from observation in the row i and in the column j

E_{ij} = the expected frequency in the row i and in the column j

(2) Cramer's V (V)

To find correlation coefficient and test of the relation in case of the two variables are the nominal scale with $R \times C$ contingency table, the formula as:

$$V = \left(\frac{\chi_p^2}{W(q - 1)} \right)^{\frac{1}{2}} .$$

Where $q = \min\{R, C\}$.

(3) Eta

To find correlation coefficient of 2 variables and test of the relation between the continuous variable and variable in nominal or ordinal scale, the formula as:

Asymmetric η with the variable Y as dependent is

$$\eta_y = \sqrt{1 - \frac{S_{yw}}{S(Y)}}$$

$$\text{where } S_{yw} = \sum_{i,j} y_j^2 f_{ij} - \sum_{i=1}^R \frac{1}{r_i} \left(\sum_{j=1}^C Y_j f_{ij} \right)^2$$

From analysis the relation between the variables affected ethics was as the following table.

Table 2
Correlation coefficient and testing hypothesis between ethic level and the variables

| | AGE | SEX | YEAR | GPA | N | N.B | IN | EX | F.OCC | M.OCC | STA |
|-------|----------------------|----------------------|----------------------|----------------------|-------------------|-------------------|-------------------|----------------------|----------------------|----------------------|----------------------|
| ETHIC | .215 ₁ ** | .121 ₂ ** | .221 ₂ ** | .661 ₁ ** | .101 ₁ | .046 ₁ | .152 ₁ | .063 ₁ | .141 ₂ | .224 ₁ ** | .332 ₂ ** |
| | STAY | N.F | M.YEAR | F.YEAR | M.IN | F.IN | T.EX | CRE | SCHOOL | CLASS | N.FR |
| | .342 ₂ ** | .331 ₁ ** | .225 ₁ ** | .115 ₁ | .016 ₁ | .125 ₁ | .103 ₁ | .268 ₁ ** | .215 ₂ ** | .132 ₂ ** | .121 ₁ |

** Significance at $\alpha = 0.05$, 1: Eta, 2: Cramer's V

From the Table 2, it was the test of relation between the variables affected the ethic level. At the level of significance 0.05 we found that sex (SEX), school, class planning (CLASS), GPA (GPA), mother occupation (M_OCC), mother education (M_YEAR), the family whole debts (CRE), the parents' relation (STA), the staying with (STAY), the age (AGE) and the students education (YEAR) influenced the ethics level. For the father occupation (F_OCC), the number of children in their own parents (N), the ordered child (N.B), the money getting from their parents (IN), the expenses per day of the students (EX), the education of father (F_YEAR), the number of family members (N.F), the father's incomes (F_IN), the mother's incomes (M_IN), the whole expenses in their family (T_EX) and the number of class members (N_FR) had no effect to the ethics of students (ETHIC).

3. Relation between trend of affecting variables by Categorical Principal Components Analysis (CATPCA)

Categorical Principal Components Analysis is a technique of statistics analysis which show the figure of the relation between variables and the factors. According to their component loading by those variables can be any scale and the figure can show in many dimensions by showing the variable line. If the lines in the figure make a narrow angle, it means that those variables relate to the same direction. If they make the right angle, it shows that those variables do not relate, however, if they make the angle 180 degree, it shows that those variables have the relation in the opposite direction. This technique is the most useful when a large number of variables prohibits effective interpretation of the relationships between objects (subjects and units). By reducing the dimensionality, we interpret a few components rather than a large number of variables.

Relation between trendy of affecting variables as Table 3 and Figure 1.

Table 3
Model summary

| Dimension | Cronbach's Alpha | Variance accounted for |
|-----------|-------------------|------------------------|
| | | Total (Eigenvalue) |
| 1 | .964 | 12.852 |
| 2 | .875 | 6.146 |
| Total | .990 ^a | 18.998 |

^a Total Cronbach's Alpha is based on the total Eigenvalue

Alpha (Conbach) is a model of interval consistency, based on the average inter-item correlation. From Table 3, the correlation between the variables in Figure 1 are 0.990.

The eigen values can be used as a indication of how many dimensions are needed. From Table 3, Dimension 1 can explain the variation of these variables better than Dimension 2 or other dimensions, because the eigen value is more. A third dimension probably would not add much more information.

From the Figure 1, it can be explained that the more line's angle is narrow, the more variables has high relation. If we divide the variables in Figure 1 into 3 groups: 1, 2, and 3. The variables which had most the relation to the ethic level (ETHIC) was the variable in group 2 as follows: sex (SEX), the parents' relation (STA), father occupation (F.OCC), school

(SCHOOL), education level (YEAR), the person to stay with (STAY). These variables related to ethic level in the same direction. The variables that had no relation to the ethic level was the money getting from their parents (IN), father education (F_YEAR), age (AGE), the ordered child (N.B), the number of class members (N_FR) and the number of members in their family (N_F), because that line made the right angle with the ethics.

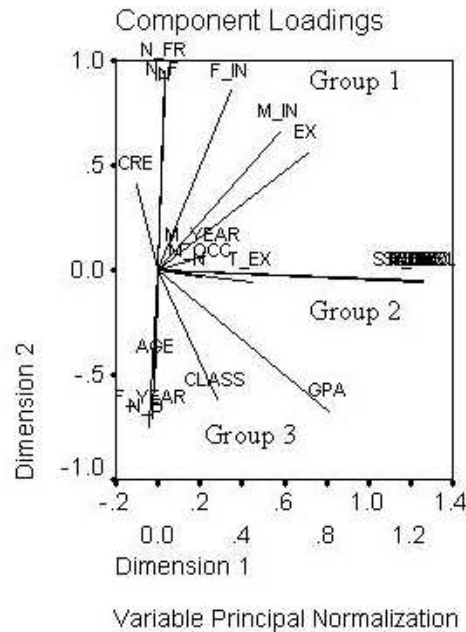


Figure 1

The relation of variables from Categorical Principal Components Analysis

4. To predict the ethic level by using ordinal regression

Hypothesis $H_0 : \beta_1 = \beta_2 = \dots = \beta_k = 0$

$H_1 : \text{At least } \beta_j \text{ are not } 0; j = 1, 2, \dots, k$

As $\text{link}(Y = j) = \theta_j - [\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k]$.

From the Complementary log-log equation

$$\text{link}(Y = j) = \ln[-\ln(1 - (Y = j))].$$

Therefore

$$\ln[-\ln(1 - (Y = j))] = \theta_j - [\beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k];$$

$$j = 1, 2, \dots, J$$

and

$$\ln[-\ln(1 - (Y = J))] = 0.$$

Let

- θ_j is the constant of equation at $Y = j$;
- $\beta_1, \beta_2, \dots, \beta_k$ are the regression coefficient.
- x_1, x_2, \dots, x_k are the independent variables.
- k is the number of independent variables.

Prediction of Y is from finding the probability as follow:

Let $P(Y = j)$ is the probability of Y in level j .

$$P(Y = j) = 1 - e^{-e^{\text{link}(Y=j)}}$$

$$\text{Negelkerke } R^2 = \left[\frac{1 - \left[\frac{L(0)}{L(B)} \right]^{\frac{2}{N}}}{1 - [L(0)]^{\frac{2}{N}}} \right].$$

Let

- $L(0)$ is the likelihood for the constant model.
- $L(B)$ is the likelihood for the model of independent variables.
- N is total number of the observations.

Negelkerke R^2 is the proportion or percentage which is the measure of how well a regression model fits which is similarity to the R^2 in multiple linear regression analysis or that is to say that percentage of the variation can be explained by Complementary log-log.

$$\text{Wald}_k = \left[\frac{\beta_k}{SE} \right]^2 \sim \chi_1^2.$$

For $\beta_1, \beta_2, \dots, \beta_k$ are the regression coefficient

SE is the standard error.

At the level of significance α .

We reject the hypothesis H_0 , if $\text{Sig}(\chi^2) < \alpha$.

To find the probability for each level of ethics by using the complementary log-log equation. At the level of significance 0.05, we found that the factors which affected to the ethic level were grade point average (GPA), mother education (M_YEAR), the family's whole, debts (CRE), education level (YEAR), sex (SEX), school (SCHOOL), class planning (CLASS), mother occupation (M_OCC), the parents' relation (STA), the person to stay with (STAY). Therefore, the new equation was created by using the variable which had the statistics significance and could get regression coefficient as showing in Table 4.

Table 4
The ordinal regression coefficient which effected to the ethic level

| Constant Value | θ_i | SE | Wald | Sig. |
|------------------------|--------------|-------|--------|---------|
| θ_1 (ETHIC = 1) | 2.176 | 0.796 | 7.481 | 0.006** |
| θ_2 (ETHIC = 2) | 5.590 | 0.842 | 44.028 | 0.000** |
| Independent variables | β_i | SE | Wald | Sig. |
| GPA | 0.766 | 0.131 | 35.255 | 0.000** |
| M_YEAR | 0.05389 | 0.124 | 5.153 | 0.023** |
| CRE | -0.000001804 | 0.000 | 6.128 | 0.013** |
| YEAR = 1 | 0.06962 | 0.157 | 0.196 | 0.658 |
| YEAR = 2 | 0.305 | 0.159 | 3.671 | 0.055* |
| SEX = 1 | 0.270 | 0.144 | 3.512 | 0.061* |
| SCHOOL = 1 | 0.274 | 0.277 | 21.109 | 0.000** |
| SCHOOL = 2 | 0.809 | 0.284 | 8.106 | 0.004** |
| SCHOOL = 3 | 0.923 | 0.225 | 16.770 | 0.000** |
| SCHOOL = 4 | 0.984 | 0.267 | 13.558 | 0.000** |
| SCHOOL = 5 | 0.288 | 0.275 | 21.947 | 0.000** |
| SCHOOL = 6 | 0.812 | 0.312 | 33.760 | 0.000** |
| SCHOOL = 7 | 0.212 | 0.112 | 23.660 | 0.000** |
| CLASS = 1 | 0.708 | 0.137 | 26.681 | 0.000** |
| M_OCC = 1 | 0.941 | 0.311 | 9.169 | 0.002** |
| M_OCC = 2 | 0.506 | 0.287 | 3.107 | 0.078* |
| M_OCC = 3 | 0.367 | 0.325 | 1.277 | 0.259 |
| M_OCC = 4 | 1.071 | 0.298 | 12.898 | 0.000** |
| STA = 1 | 1.883 | 0.679 | 7.692 | 0.006** |
| STAY = 1 | 2.658 | 0.332 | 64.069 | 0.000** |
| STAY = 2 | -0.870 | 0.656 | 1.761 | 0.184 |
| STAY = 3 | -0.583 | 0.642 | 0.824 | 0.364 |

* Significance at $\alpha = 0.10$, ** Significance at $\alpha = 0.05$

From Table 4, it could be explained that the positive variables related to the ethics namely: the grade point average (GPA), the mother's education (M.YEAR), education level (YEAR), sex (SEX), school (SCHOOL), class planning (CLASS), mother's occupation (M.OCC), the parents' relation (STA) and the person to stay with (STAY = 1). The variables which had the negative relation to the ethics were the family's whole debts (CRE) and the person to stay with (STAY = 2 and 3).

At the level of significance 0.05, the grade point average is the positive factors which related to the ethics; that was the capable students usually had higher ethics than the incapable students. As the same way, the students whose mother graduated in high education, usually got higher ethics than those who had the mother of low education because the mothers who graduated in higher level, could teach their children about ethics well. The students in higher grade got higher ethics level than the students in lower grade. Like the students who studied in Science-Math planning had the higher ethics level than the students who studied in Arts planning. Then the girl students got the higher ethics than the boys students and the students who lived with their fathers-mothers would have related to the ethic level.

At the level of significance 0.05, the negative factor that related to the ethics was the whole debts of their family. The students whose parents were in much debts in the family would have the lower ethics than the students whose parents had small whole debts or were not in debt.

From ordinal regression to predict the ethic level, could get the equation as follow:

$$\begin{aligned} \text{link}(\text{Ethic} = 1) = & 2.176 - [0.766\text{GPA} + 0.05389\text{M.YEAR} \\ & - 0.000001804\text{CRE} + 0.06962(\text{YEAR} = 1) \\ & + 0.305(\text{YEAR} = 2)] + 0.270(\text{SEX} = 1) \\ & + .274(\text{SCHOOL} = 1) + 0.809(\text{SCHOOL} = 2) \\ & + 0.923(\text{SCHOOL} = 3) + 0.984(\text{SCHOOL} = 4) \\ & + 0.288(\text{SCHOOL} = 5) + 0.812(\text{SCHOOL} = 6) \\ & + 0.212(\text{SCHOOL} = 7) + 0.708(\text{CLASS} = 1) \\ & + 0.941(\text{M.OCC} = 1) + 0.506(\text{M.OCC} = 2) \\ & + 0.367(\text{M.OCC} = 3) + 1.071(\text{M.OCC} = 4) \end{aligned}$$

$$\begin{aligned}
 &+ 1.883(\text{STA} = 1) + 2.658(\text{STAY} = 1) \\
 &- 0.870(\text{STAY} = 2) - 0.583(\text{STAY} = 3) \quad (1)
 \end{aligned}$$

$$\begin{aligned}
 \text{link}(\text{Ethic} = 2) = & 5.590 - [0.766\text{GPA} + 0.05389\text{M.YEAR} \\
 &- 0.000001804\text{CRE} + 0.06962(\text{YEAR} = 1) \\
 &+ 0.305(\text{YEAR} = 2)] + 0.270(\text{SEX} = 1) \\
 &+ .274(\text{SCHOOL} = 1) + 0.809(\text{SCHOOL} = 2) \\
 &+ 0.923(\text{SCHOOL} = 3) + 0.984(\text{SCHOOL} = 4) \\
 &+ 0.288(\text{SCHOOL} = 5) + 0.812(\text{SCHOOL} = 6) \\
 &+ 0.212(\text{SCHOOL} = 7) + 0.708(\text{CLASS} = 1) \\
 &+ 0.941(\text{M.OCC} = 1) + 0.506(\text{M.OCC} = 2) \\
 &+ 0.367(\text{M.OCC} = 3) + 1.071(\text{M.OCC} = 4) \\
 &+ 1.883(\text{STA} = 1) + 2.658(\text{STAY} = 1) \\
 &- 0.870(\text{STAY} = 2) - 0.583(\text{STAY} = 3) \quad (2)
 \end{aligned}$$

$$\text{link}(\text{Ethic} = 3) = 0 \quad (3)$$

For

Ethic = 1. Low ethic level

Ethic = 2. Medium ethic level

Ethic = 3. High ethic level

From the equation (1), (2) and (3), find the probability of each ethic level of the students as follow:

$$p(\text{Ethic} = 1) = 1 - e^{-e^{\text{link}(\text{Ethic}=1)}}$$

$$p(\text{Ethic} = 2) = 1 - e^{-e^{\text{link}(\text{Ethic}=2)}}$$

$$p(\text{Ethic} = 3) = 1 - [p(\text{Ethic} = 1) + p(\text{Ethic} = 2)]$$

Table 5
Test for the goodness of fit

| | Chi-square | Df | Sig |
|---------|------------|-----|------|
| Pearson | 2415.116 | 896 | .152 |

At the level of significance 0.05.

From the goodness of fit, we found that

The Sig (Chi-square of Pearson) > 0.05, it showed that the goodness of model was fit.

The result of ethic level classification of the students as the Table 6.

Table 6
Count and percentage of the classification result of the ethic level

| Ethic level | | The ethic level prediction value | | | Total |
|-------------|------------|----------------------------------|--------|-------|--------|
| | | Low | Medium | High | |
| Low | Count | 32 | 44 | 1 | 77 |
| | Percentage | 41.6% | 57.1% | 1.3% | 100.0% |
| High | Count | 14 | 311 | 18 | 343 |
| | Percentage | 4.1% | 90.7% | 5.2% | 100.0% |
| Medium | Count | 0 | 56 | 19 | 75 |
| | Percentage | 0.00% | 74.7% | 25.3% | 100.0% |
| Total | Count | 46 | 411 | 38 | 495 |
| | Percentage | 9.3% | 83.0% | 7.7% | 100.0% |

The percentage of corrected classification result = $(32 + 311 + 19) / 495 \times 100 = 73.13\%$.

When using the ordinal regression by complementary log-log, could predict as there were 77 students who had the low ethic level. It's the corrected classification for 32 students or 41.6%. As for 343 students were at the medium level, corrected classification for 311 students or 90.7% and from 75 students of high ethic level, the corrected classification was 19 students or 25.2%. Therefore the total of corrected classification was 73.13% or it can suppose that, from 100 students who was predicted the ethic level by using the ordinal regression, 73 students were classified correctly.

Conclusion

For correlation between variables at the level of significance 0.05, we found that the factors affected the students' ethics were sex, school, class planning, grade point average, mother's occupation, mother's education, the education level, the whole debts of family, the relation of their fathers-mothers, the staying with their fathers-mothers and age. These factors influenced the ethics of students.

For Categorical Principal Components Analysis (CATPCA), the variables that are related to ethics in the positive direction are sex, the parents' relation, father occupation, school, education level and the person to stay with. The capable students usually had higher ethic level than the incapable students. The students in Grade 12 got higher ethic level than the students in Grade 10 and 11. The students who studied in Science-Math planning had the higher ethic level than the students who studied in Arts planning. Therefore, school, especially teachers, should particularly train and look after the incapable students, the students in Arts planning, and the students in lower grade, in order that those students will be better and more ethical in the future. By the schools where had many low ethic students should more study about the policy of teaching ethics. The girl students had higher ethic level than the boy students, because of the skeleton and the different hormones.

For ordinal regression, at the level of significance 0.05, the variables that affected ethic level are grade point average, mother education, the family's whole debts, education level, sex, school, class planning, mother occupation, the parents' relation and the person to stay with.

From the researcher's observation, we found that the parents who spent time to take care of children closely affect to the ethics. The students who lived with their fathers-mothers got the higher ethic level than the students who didn't live with their fathers-mothers. Giving love, warmth and closeness, lead the children to get more ethics. As for the school, it also affected the students. The school whose small size and calm, the students had the higher ethics than the students from the big size school and near the civilization. For that reason, the teachers in small size school can take care and closely look after the students better than the big size school. Furthermore the small and calm school where is far from the civilization don't have stirring thing and no place to swarm.

The suggestion from the research

1. The father, mother parents and teachers should realize that ones who are capable brains, and high I.Q., smart in school, in work, get the good position in different firms. There is nothing to guarantee that they will achieve in their job. Someone may fail in the promotion because of their problems about the low moral ethics and be selfishness.
2. In Thai education's system, the most of teachers keep on teaching. The students were desired to be able to think, to manage and to solve

the problem or to develop only their I.Q. Therefore, the parents and teachers must cooperate in development the ethics of students.

3. The father, mother, parents and teachers should be the good sample for their children and students. Find the way to develop the ethics by teaching students about the suitable morality. Lead them to know how to get and give love including teach them to know how to obey by discipline.
4. For the factors which the study didn't cover, they are expected to more study. So should study many factors expected that affected the students' ethics.
5. This research studied from 495 student samples and particularly studied the high school students of Lumphun province. If there were more sample than this or studied from many provinces, it may get more perfect result.
6. It should study the same way like this with the students in other schools, it can know more about the students' ethics, in order to assign the ways in promotion the ethics.

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