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Relationship between the Students' Behavior of Spending Free Time and Learning Outcome at Pathumwan Institute of Technology

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Abstract

The purpose of this study is to investigate the students' behavior in spending free time and its relationship with learning outcome, students' Grade Point Average(GPA), at Pathumwan Institute of Technology in the first semester, academic year 2016. Circular systematic stratified random sampling technique, or sampling plan, is employed for selection process of the sample. The questionaire is designed for attaining information from 136 sample students out of 752 students. Mutiple linear regression is applied and anlyzed to construct model representing the learning outcome. The results found that the free time for reviewing the lesson, attending tutoring class, listening or singing the song, or playing the music instrument are significant to the learning outcome at 0.05 level. Multiple regression analaysis of these significant variables can be fit as

GPA = 2.640539 + 0.017535*REVIEW - 0.04139* SPCSTUDY + 0.011289*SINGSONG.

Keywords: Learning Outcome, Free time, Multiple Linear Regression, Sampling Technique

1. Introduction

For a decade, Thailand government has been invested in the development of the human resource in order to be able to benchmark the international human resource. As seen in several the National Economic and Social Development Plans of Thailand [6] and National Education Act of B.E. 1999 of Thailand [5] have been merged the important topic about the development of human resource, the human resource is a main and crucial factor in development of the country because a quality and educated human resource will lead to the prosperous country. Undeniably, the continuous development of human resource is the pivotal country policy such as investment of providing the scholarship for gifted students, supporting the researchers to create new technology and knowledge, etc. In particular, the development of university and college students is in teenager which will be an adult in the future.

Most university students spend a lot of time for studying in their university and college. Every university and college has divided the various periods depending on the status and condition for studying such as levels of education: bachelor, master, or doctor's degree. In this research, after the students' study

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which is the main duty for the students, the remained students' time for doing the other activities and without studying is called "free time". In general, after studying, some are responsible for the special job, housework, and chore assigned from their parents such as washing dishes, cleaning home, and going to pay the electricity and water fee, etc., or find a part time job. Others do their hobbies such as going to play the sport, playing the music instruments, shopping, etc. Additionally, the important one of the activities spending on free time is reviewing the lesson. Obviously, the free time is a pivotal factor for studying of university student. Several researches have been studied on spending students' free time which affects their learning outcomes. Rong-ek Varnapruse [8] studied learning behavior towards academic achievement in advanced accounting II of Sripatum University's students in the second semester, academic year 2009. The sample is selected from the population, students who studied advanced accounting II group 04, totally 76 students. The research pointed that most students had a good performance of the relationship between learning behavior and the achievement. That is, the number of times in offering the questions and responds during class is positively significant to the achievement. In contrast, the number of chatting during class is negative significant. The author suggests that the teaching frame and plan in the future in order to make the efficient teaching, the teacher should teach students by using two-way communication plan. Siriwan Soachai [9] studied the relationship between students' behavior after class and learning on Intermediate Accounting II in the second semester, academic year 2009 at Sripatum University, totally 124 students sample. This research found that the students' behavior on free time: doing homework ($r = 0.730$) and searching for knowledge on the internet ($r = 0.682$) was positively related to the evaluated score with significant level at 0.05. On the other hand, the behavior not rated to the learning outcome is chatting, watching TV, shopping, playing sport, and helping the parents for doing housework and chore. Kalyaporn Pan-ma-reng Burke [4] studied the relationship between learning behavior and academic achievement of the students enrolled in financial accounting seminar course in the second semester, academic year 2009, with sample 124 students, at Sripatum University. The record of students' behavior is the number of times with on time attending class and the number of times in expression, comments and participation during class. The statistic for data analysis is frequency and percentage, chi-square. The results showed that the number of times with on time attending class and the number of times in expression and comment during class are significantly related to the academic achievement at statistically significant level, 0.01. Besides, finding and searching for additional knowledge is significant to the academic achievement at statistically significant level, 0.01. Aphinant Sirirattanjitt [1] researched about relationship between the leisure time behaviors and achievement of Undergraduate students in Hatyai University by using the Spearman's correlation. The 306 sample students was randomly selected with multi-step random sampling from the population of the first and second year undergraduate 1,574 students in academic year 2013 at Hatyai University. The results indicated that the relationship between the academic achievement and the leisure time is negatively significant at the 0.01 level. Hanin Naziha Hasnor et al. [3] researched the approaches for encouragement of the Malaysian students to be problem-solving and critical thinking skills manpower after student's

graduation. Deep Approach, Surface Approach, and Strategic are proposed and applied to 223 sample students as supporting of students' studying at the American Programme students of International Education College (INTEC), UiTM Shah Alam. The results show that most students prefer the Deep Approach rather the others. The relationship between Surface Approach and academic achievement are negative direction on each other. The implementation of the research is also applied to the system of teaching and learning of the students. Emine ERATAY and Yasemin AYDOĞAN [2] studied the relationship between leisure time activities and assertiveness levels of students of Abant Izzet Baysal University with collected data from the 2006 sample students. The statistic for data analysis is as Chi Square Test, ANOVA, correlation, and variance analysis. The research reveals that no the relationship among the assertiveness levels, the units of education, and the situation spending leisure time.

Obviously, allocation of the free time affects to students' potential and their learning outcome which is measured as Grade Point Average (GPA). If the university students allocate their free time appropriately, they will be successful and effective in their study and get a high score in the examination. In other words, university students who optimally allocate their free time will attain advantages more than disadvantages. Especially university students, the more the allocation of free time is optimal, the more the physical and mental statuses of university students are developed. This causes the development of country because the student will be an adult who is a crucial human resource of the country in the future.

However, nowadays some teenagers including Thai university students make the problems for Thai society such as fighting of students, drug problem, premature teen pregnancy problem, etc. Critical one of the reasons in making these problems is that the teenagers have free time but they cannot allocate their free time optimally and effectively. Therefore, this paper studies about the relationship between the behaviors of students' spending free time and learning outcome of students at Pathumwan Institute of Technology (PIT). Sampling technique and the equation of the relation as multiple linear regression are also demonstrated. The rest of the paper is organized as follows. In Section 2 is related the scope of the study. Sampling plan, designing of the research, and data analysis are given in Section 3. In section 4, the results will be provided and shown. Finally, conclusions and discussion are explained and discussed in Section 5.

2. Scope of the Study

This study is focused on the relationship between the student behavior in spending free time and the learning outcome at PIT. Independent variables for this study are free time used for the following activities:

1) Studying activities: reviewing the lesson, reading the text book, doing homework and report, surfing the Internet in searching for knowledge, and attending tutoring class, etc.
2) Spending leisure and recreation activities: playing the online games, watching TV, listening or singing the song, playing the musical instruments, reading book or magazine for entertainment, and playing sport and workout, etc.

3) Doing the other activities: helping parents to do housework and chore, going out for joining the parties with friends, shopping, surfing on the Internet for entertainment, and telephoning and online chatting, etc.

Also, dependent variable is the learning outcome which is measured as the GPA.

3. Methodology

3.1 Population and Sample

Population is the students at PIT in the first semester, academic year 2016, totally 752 students as shown in Table 1. In this study, the sample is selected randomly by using stratified random sampling technique [7] which carries out in the subsection 3.2. Each stratum represents the university years: freshman, sophomore, junior, and senior.

Table 1 The number of students classified by the university years

University years	The number of students
Freshman: the first year students	297
Sophomore: the second year students	175
Junior: the third year students	124
Senior: the fourth year students	156
Total	**752**

Source: Registration, Process, and Curriculum Department at PIT (30 December, 2016)

3.2 Sampling Plan : Circular Systematic Stratified Random Sampling Technique

In this study, stratified random sampling is applied to find the optimal number of sample. The stratum is classified as the proportional allocation of the population, the university years of students. The number of sample can be operated as follows.

Let n be the number of the stratified random sampling sample operating through the estimation of Paul S. Levy and Stanley Lemeshow's method [7].

$$n = \frac{N z^2_{1-(\alpha/2)} (\sigma^2_{wx} / \overline{X}^2)}{N\varepsilon^2 + z^2_{1-(\alpha/2)} (\sigma^2_{wx} / \overline{X}^2)}; \qquad \sigma^2_{wx} = \frac{\sum_{h=1}^{L} N_h \sigma^2_{hx}}{N} \tag{1}$$

where

N is a population size,

N_h is a size of h^{th} stratum,

σ_{wx}^2 is a variance among the elements within the same stratum,

σ_{hx}^2 is an individual variances among elements within each stratum,

α is a significant level,

$z_{1-(\alpha/2)}$ is a critical value at the confident interval, $100(1-\alpha)\%$,

ε is an acceptable error,

$\overline{X}$ is a population mean.

L is count of strata

By setting the 95% confident interval and $\varepsilon = 0.1$, if $\alpha = 0.05$ then $z_{1-(\alpha/2)} = z_{0.975} = 1.96$. So as to evaluate σ_{wx}^2, the pilot survey is operated with the 10 sample sizes of each stratum. The attained results show that $N = 752$, $\overline{X} = 96.385$, $\sigma_{wx}^2 = 4025.882$. The sample size carried out by Equation (1) is $n \approx 136$. Also, each stratum size can be carried out by Equation (2), which is proportional allocation [7] as follows:

$$n_h = \left(\frac{N_h \sigma_{hx}}{\sum_{h=1}^{L} N_h \sigma_{hx}} \right) (n) \qquad (2)$$

where

N is a population size,

n is a sample size,

N_h is a size of h^{th} stratum,

n_h is the number of observations of h^{th} stratum,

h is a stratum with $h = 1$: freshman, $h = 2$: sophomore, $h = 3$: junior, $h = 4$:senior.

L is count of strata

The sample size of each stratum are as follows:

For freshman, $n_1 \approx 59$, For sophomore, $n_2 \approx 31$,

For junior, $n_3 \approx 14$, For senior, $n_4 \approx 32$.

Circular systematic random sampling is applied to sample for each stratum as the following steps.

1) Sort the students' identification number of each stratum.

2) Define the sampling interval, $l = \frac{N_h}{n_h}$,

For freshman, $l \approx 5$, For sophomore, $l \approx 6$,

For junior, $l \approx 9$, For senior, $l \approx 5$.

3) Select the random number by drawing the label to be a random start (R) for each stratum.

4) Circular systematic random sampling is applied to random the sample size of each stratum at positions $R, R+l, R+2l, \ldots$ until the sample size of each stratum completes.

3.3 Statistic for Data Analysis and Study Method

In this subsection, statistic for data analysis consists of frequency, mean, standard deviation, correlation coefficient as in Equation (3), multiple linear regression analysis as in Equation (4), and multicollinearity among independent variables testing as in Equation (8).

$$r = \frac{n\sum_{i=1}^{n} X_i Y_i - (\sum_{i=1}^{n} X_i)(\sum_{i=1}^{n} Y_i)}{\sqrt{[n\sum_{i}^{n} X_i^2 - (\sum_{i=1}^{n} X_i)^2] - [n\sum_{i=1}^{n} Y_i^2 - (\sum_{i=1}^{n} Y_i)^2]}} \quad (3)$$

where

r is the correlation coefficient,

n is the number of observations for each sample,

X is the independent variable,

Y is the dependent variable.

Hypothesis testing for the correlation coefficient:

$H_0 : \rho = 0$ (X and Y does not have the linear relationship)

$H_1 : \rho \neq 0$ (X and Y have the linear relationship)

Testing statistic:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Reject the null hypothesis if $p-value <$ significant level (α)

Form of the multiple linear regression with k independent variables

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_k X_{ik} + e_i \,,\ i = 1, 2, \ldots, n \quad (4)$$

where Y_i is the dependent variable,

$X_{i1}, X_{i2}, \ldots, X_{ik}$ are the independent variable,

$\beta_0, \beta_1, \beta_2, \ldots, \beta_k$ are the parameter,

e_i is the error term of the i^{th} observation,

Equation (4) can be written in the matrix form as

$$Y = X\beta + E \quad (5)$$

The estimate equation for multiple linear regression with k independent variables as

$$\hat{Y} = b_0 + b_1 X_1 + b_2 X_2 + ... + b_k X_k$$

and the estimate parameter of coefficient as $b = (X'X)^{-1} X'Y$ (6)

Hypothesis testing for significance of the estimate coefficient parameters as

$H_0 : \beta_0 = \beta_1 = \beta_2 = ... = \beta_k = 0$

H_1 : At least β_i does not equal 0 , $i = 1, 2, ..., k$

Testing statistic: $F = \frac{MSR}{MSE}$ (7)

where MSR is mean square regression and MSE is mean square error.

Reject the null hypothesis if $p - value <$ significant level (α)

Multicollinearity statistic, Variance Inflation Factors (VIF), for testing of being linearly independent among independent variables is defined as

$$VIF_i = \frac{1}{1 - R_i^2} \quad (8)$$

where R_i^2 is the coefficient of multiple determination obtained from regressing X_i on the other independent variables. The independent variable is not linearly independent if VIF is more than 5.

Next, the steps of study method are briefed in the flowchart on Figure 1 and details are as follows:

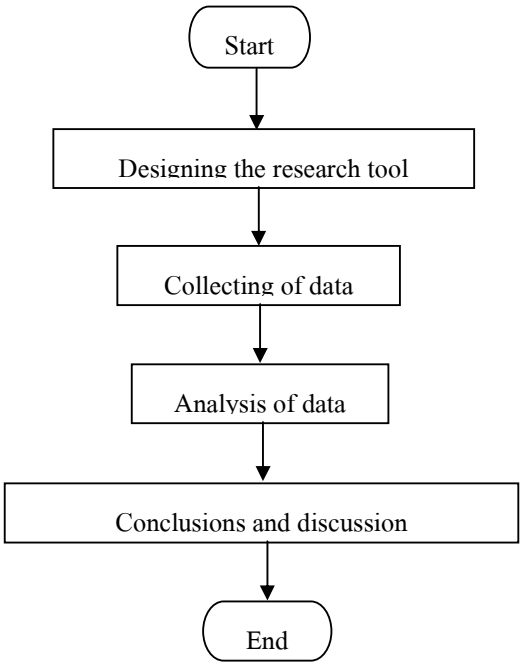

Figure 1 Flow chart of the study method

1) Designing the questionnaire as the research tool which consists of two parts: general information of respondents and information about how long respondents spent a free time in their activities. The activities are considered in three main aspects: learning activities, leisure and recreation activities, and other activities.

2) Collecting and analyzing data which gather through the sample designed by the sampling frame and the concept of sampling plan in subsection 3.2 and analyze data using Pearson correlation coefficient and multiple linear regression in order to study the relationship between students' learning outcome and the spending free time for their activities.

3) Conclusions and discussion about the results from the outputs of analysis data.

4. Results

4.1 Variables of the Study

The variables of this study are as follows:

GENDER is the gender of respondents,

GPA is the grade point average,

REVIEW is the free time for reviewing the lesson (hours a week),

READT is the free time for reading text book (hours a week),

HOMEWORK is the free time for doing homework and report (hours a week),

NETKNOW is the free time in searching the Internet for attaining knowledge (hours a week),

SPCSTUDY is the free time for attending tutoring class (hours a week),

GAMES is the free time for playing online games (hours a week),

TV is the free time for watching TV (hours a week),

SINGSONG is the free time for listening or singing the song, or playing the music instrument (hours a week),

MAXGAZIN is the free time for entertainment reading (hours a week),

SPORT is the free time for playing sport and workout (hours a week),

DOWORK is the free time for helping the parents to do housework and chore (hours a week),

DANCE is the free time for going out for joining the parties with friends (hours a week),

NETENTER is the free time for surfing on the Internet for entertainment (hours a week),

TELEPHON is the free time for telephoning and online chatting (hours a week).

4.2 General Information about the Respondents

The general information about the respondents is as follows:

From the study, the gender of the respondents can be categorized as in Table 2.

The sample has 136 students. There are male 114 students (83.82%), female 22 students (16.18%).

Table 2 The percentage of students at PIT categorized by gender

Gender	Number of students	Percentage
Male	114	83.8200
Female	22	16.1800
Total	**136**	**100**

Learning outcome which is measured as GPA is shown as in Table 3. From the study 136 sample students, it is found that the students have the average of GPA at 2.75. The maximum GPA is 4.00 and the minimum is 1.08.

Table 3 The GPA of students at PIT

Minimum	Maximum	Average	Standard Deviation
1.08	4.00	2.75	0.68

4.3 Linear Relationship between the Students' Behavior of Spending Free Time and Learning Outcome

At significant level, $\alpha = 0.05$, the three independent variables: REVIEW, SPCSTUDY, and SINGSONG, shown above in Section 4.1 are significant but the others are not significant. Also, such the three independent variables for the model are selected in avoiding multicollinearity problem of independent variables. That is, VIF is less than 5 indicating non-multicollinearity statistic shown in Table 7. Thus, the linear relationship between the behavior of spending free time and learning outcome of PIT students is shown as in Table 4.

Table 4 The correlation between free time spending behavior and learning outcome

Behavior of spending free time	Correlation	t Stat	p-value	Relationship
REVIEW	0.862	1.862344652	0.029472829*	Positive
SPCSTUDY	-0.583	-2.744548562	0.035985501*	Negative
SINGSONG	0.751	2.269371267	0.041056081*	Positive

* Significance at the 0.05 level

4.4 Analysis of Linear Relationship between the Students' Behavior of Spending Free Time and Learning Outcome

To study the factors affecting and relating to spending free time of students, the multiple linear regression is conducted in this research. It is a tool for studying the factors of independent variables

whether it affects into dependent variables or not. The results for analysis of variance (ANOVA) and significant of the coefficients of multiple linear regression are provided for construction the multiple linear regression model based on the data sampled from students at PIT.

Table 5 Fitted multiple linear regression model summary

Regression Statistics	
Multiple R	0.257198
R Square	0.821510
Adjusted R Square	0.685310
Standard Error	0.667961
Observations	136

Table 5 shows the r^2, which provides the percentages of independent variables how much it can account for dependent variables. In this study, $r^2 = 82.151\%$.

Table 6 ANOVA for fitted multiple linear regression model

Source of Variation	df	SS	MS	F	p-value
Regression	3	5.025257	1.675086	3.754346	0.012189172*
Residual	132	70.94141	0.446172		
Total	135	75.96667			

* Significance at the 0.05 level

Table 6 gives information whether model can be fitted by data. As seen the p-value, 0.012189172 < significance at 0.05 level, the overall model is significant. That is to say, the null hypothesis can be rejected, which means the coefficients of the model are not zero together.

Table 7 Coefficients and VIF values of fitted multiple linear regression

Independent Variables	Coefficient	Standard Error	p-value	VIF
Intercept	2.640539	0.082541	3.61E-71*	-
REVIEW	0.017535	0.009415	0.034400*	4.432014
SPCSTUDY	-0.04139	0.015081	0.006757*	3.511350
SINGSONG	0.011289	0.004974	0.024590*	1.349157

* Significance at the 0.05 level and Dependent variable: GPA

Based on Table 7, the multiple linear regression model can be fitted as

GPA = 2.640539 + 0.017535*REVIEW - 0.04139* SPCSTUDY + 0.011289*SINGSONG

5. Conclusions and Discussion

Studying about the relationship between students' spending free time and learning outcome is crucial for developing academic institute such as PIT. The studying results can be an institute's policy for encouragement of students to be successful in planning of their study and spending of their life for balancing between studying and spending free time. Based on the Tables 3 and 7, it found that GPA has significantly linear relationship with the free time for reviewing the lesson, and for listening or singing the song, and playing the music instrument, and for attending tutoring class. These independent variables can be accounted for the dependent variables approximately 82.151%. On the contrary, GPA has no the relationship with the free time for reading text book, for doing homework and report, searching the Internet for attaining knowledge, and playing sport and workout. Furthermore, spending free time for attending tutoring class is negative correlation with learning outcome due to the context in tuition not possibly related to the examination test. The suggestion from this study is that students should do homework and report by themselves. Perhaps, it does not affect to the GPA because they copy the homework from their friends and the report from the Internet. This does not lead to students' actual knowledge and skills from learning. For searching the knowledge on the internet, students may search for surface knowledge not deep knowledge and sometimes attained knowledge may not relate to their studying subjects. The lecturer should recommend students doing homework and report by themselves and assign the work related to the class lesson and examination in order that students will be able to solve the problem in assignment and search information on the internet corresponding the lesson and test. These approaches encourage students for getting a high score of examination.

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