WHETHER SELF-REGULATED LEARNERS ARE ACADEMICALLY HIGH ACHIEVERS AND WILLING TO STUDY HARD? A CASE STUDY OF BUSINESS STUDENTS' STATISTICS SUBJECT IN FACULTY OF BUSINESS, ECONOMICS AND ACCOUNTANCY, UNIVERSITI MALAYSIA SABAH

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ABSTRACT

The purpose of the quasi-experimental study is to demonstrate the fact that whether self-regulated learners are academically high achievers and willing to study hard. The study using mixed-methods approaches. Self-regulated learner is determined by an uninformed structured observation. The data of intention of hardworking were gathered from a self-completion questionnaire. Academic achievement was determined by students' mid-term evaluation results. Kendall-Theil Sen Siegel nonparametric linear regression was employed due to the non-normal data distributions. Statistics environment R version 3.4.2 was used as the tool of calculation. Self-regulation level is the variable that is measured by behavioural observation. It obtained a significant relationship between academic achievement. The data of intention of hardworking was from a self-completion questionnaire. The prediction power of intention of hardworking is weaker compare to self-regulation level. It challenges the shortcomings of self-completion questionnaire as a method for motivation topics. The results suggest, for behavioural science related studies, observation has its priority to be considered as a default method. Non-normal sample distribution, quasi-experimental study and power of generalization are the three key limitations of the study.

Keywords: self-determination theory, self-regulated learning, quasi-experimental, socioeconomic, R statistics, Kendall-Theil Sen Siegel nonparametric linear regression

1.0 Introduction

How students' motivation contributes to academic achievement has been widely studied since 1970s (Linnenbrink & Pintrich, 2002). On the other hand, motivation's a few self-determination elements (acquiring self-esteem, encouragement, ability, competitiveness, social affiliation, goal setting, interest, and approach success and to avoid failure, and so on) made its prediction difficult. Schultheiss and Brunstein (2001) proposed a "Big Three of motivation", 1) need for achievement – personal striving, 2) need for affiliation – association with specific goal dimension, and 3) need for power – social comparison (Bipp & Dam, 2014). The three types of motivation may be influenced by individuals' self-concept, such as achievement goals, intrinsic motivation, competence beliefs, value attribution/control beliefs and interests (Guay, Ratelle, Roy & Litalien, 2010), and one's socioeconomic status of classmates, such as friends' achievement (Bond, Chykina, & Jones, 2017). Thus, motivation correspondingly relates to the degree of one's need of achievement, affiliation and power; it is challenging of finding a definitive

measurement. Consequently, Berger and Karabenick (2011) reported the inconsistency of predicting motivation. Self-regulated learning (SRL), however, can be identified as a sign of self-determination; it presents a highly demand needs and high motivation (Pekrun, Goetz, Titz, & Perry, 2002).

There are a few numbers of studies that investigated the relationship between students motivation and academic achievement (Bond et al., 2017; King & Datu 2017; Dickhauser, Dinger, Janke, Spinath, & Steinmayr, 2016; Bipp & Dam, 2014 Guay et al., 2010). The shared shortcomings of these papers are, however, employs self-report questionnaire that is unable detecting individuals' motivational needs demand level and as well as the definitive achievement. The existing research findings also overlooked the educational institutions' management perspective; it may not be used for guiding universities improving students' learning management process and contribute to socioeconomically quality improving and cost cutting.

The present study is a mixed-methods research, which attempts to measure whether a student is a self-regulated learner by a direct uninformed structured observation; and answering does a self-regulated learner have high academic achievement by comparing self- and not self-regulated learners' mid-term results. The quantitative data from a self-completion questionnaire intends to inspect whether intention of hardworking have positive relationship with academic achievement. The study adds a direct and comprehensive understanding towards to self-determination theory. The uninformed observation avoids common method variance and contributes a straightforward measurement of self-regulated learner. At the practitioner level, the study guides universities to improve students' learning management process and could enhance education quality and saving costs from doing so.

The study informs two core hypotheses:

H1: the self-regulated learners have higher academic achievement.
H2: intention of hardworking has a positive significant relationship towards to academic achievement.

2.0 Methods

2.1. Participants and procedure

Participants were Business programmes' Bachelor students from Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah (UMS), who were enrolled in Semester 1/2017-2018 statistics for business and economics. Students were not informed about the research. They were only told to answer three sets of online questionnaires, and the data will be used for their final exam. With every set of questionnaire has been answered, one incentive mark will be added to their final marks. The questionnaires were uploaded to UMS learning management system (LMS) (http://smart2.ums.edu.my/).

2.1.1. Qualitative data measures and its collection procedure

Qualitative data were collected via observing the way of students answering set I and II questionnaires. Set III questionnaire was employed for detecting outliers.

Questionnaire set I (Figure 1) was uploaded online on 16 September 2017 (during the first week of a 14 weeks semester) with a clear introduction of "all 4 questions need to be answered for getting one bonus mark for the final mark" and deadline of submission was 18 September 2017. If a student has failed to complete set I questionnaire indicates that he or she was lack of focus on getting better results.

Figure 1: Set I questionnaire

Set II questionnaire (Figure 2) was uploaded on 27 September 2017 (during the second week of a 14 weeks semester). The deadline for submission was 28 September 2017. If a student missed answering set I and II questionnaire, it may because of late registration of the course, late enrolment to the LMS, did not check LMS regularly, and/or lack of motivation of doing this course.

Figure 2: Set II questionnaire

Set III questionnaire (Figure 3) is their online mid-term evaluation. Students were informed on 8 September 2017 (During mid-term break that is after the fifth week of a 14 weeks semester) that their online mid-term evaluation would be from 16 to 21 October 2017. Students absented from completion of the online mid-term evaluation were considered outliers.

Figure 3: Set III Questionnaire

16 October - 20 October

Mid-semester break

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Questionnair III

For those who participated mid-term evaluation, one bonus mark will be awarded to your final marks.

This is a BIG help, please be pleased.

✅ Mid-term evaluation 16 Oct 2017 (announcement made on 8 Sep 2017)

The mid-term evaluation covers the contents of the week one to the week four lectures (Chapter 1, 2, 3 and 4).

You have 60 minutes to answer 20 questions. Some of the questions require calculation.

Every attempt the questions and answers shuffle automatically. Please do not waste your time to copy from each other.

You can attempt the questions during **16 Oct 2017 (Mon), 10:00 to 21 Oct 2017 23:59** (You are suggested to start your attempt before 21 Oct 2017 22:59).

Only one attempt allowed for each student.

A random assignment has been done to categorize qualitative behavioural data into three groups, formed a variable namely "level of self-regulation (1=absent or contributed missing values in set I and II questionnaires, 2= absent or contributed missing values in set I or II questionnaire, 3=completed set I and II questionnaires)."

2.1.2. Quantitative data collection procedure

The quantitative data were collected by distributing set II and set III questionnaire (as a self-completion questionnaire). In set II questionnaire, the question "I planned study hard for this semester." was asked. The standardized choices of answers were categorized into 5 points likert scale (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree).

Set III questionnaire which is students mid-term evaluation marks were sorted into nine groups (1=11-20, 2=21-30 … 8= 81-90, 9=91-100), which indicates students' academic achievement.

2.2. Analyses

Two hypotheses were tested independently by Kendall-Theil Sen Siegel nonparametric linear regression. Regression one tested "level of self-regulation" -> "academic achievement"; and regression two tested "intention of hardworking" -> "academic achievement". Hmisc package was employed for descriptive analysis; and mblm package was for hypotheses testing. Sample size for regression one is 536 and regression two's sample size is 464.

3.0 Results

Shapiro-Wilk test of normality's p value (Table 1 & 2) for the four variables in both datasets are less than $2.2*10^{-16}$; it rejected the null-hypothesis; means the data are not from a normally distributed population. Therefore, Kendall-Theil Sen Siegel nonparametric linear regression was employed for the hypotheses tests.

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Table 1: Descriptive data for H1

					n=536
Self Regulation Level	Frequency	Relative Frequency	Mid-term result	Frequency	Relative Frequency
1	30	6%	1	2	0%
2	161	30%	2	7	1%
3	345	64%	3	21	4%
			4	24	4%
mean	2.59		5	39	7%
median	3		6	77	14%
Shapiro-Wilk test	0.6544	P<2.2*10^-16	7	111	21%
			8	147	27%
			9	108	20%
			mean	7	
			median	7	
			Shapiro-Wilk test	0.88854	P<2.2*10^-16

Table 2: Descriptive data for H2

					n=464
Intention of hardworking	Frequency	Relative Frequency	Mid-term result	Frequency	Relative Frequency
1	14	3%	1	2	0%
2	2	0%	2	5	1%
3	19	4%	3	18	4%
4	153	33%	4	22	5%
5	276	59%	5	31	7%
			6	64	14%
mean	4.45		7	94	20%
median	5		8	125	27%
Shapiro-Wilk test	0.63372	P<2.2*10^-16	9	103	22%
			mean	7.06	
			median	7	
			Shapiro-Wilk test	0.88307	P<2.2*10^-16

Kendall-Theil Sen Siegel nonparametric linear regression is truly nonparametric linear regression approach. It is applied when there is one independent and one dependent variable. The approach uses median sloping lines that are computed between each and every of the two points in a dataset. The result values (Table 3) under "Estimate" determine the fit line. MAD indicates the median absolute deviation. Residual standard error shows the quality of the regression fit. The degree of freedom for H1 dataset is 534, thus the percentage error is 37.2%. Moreover, H2 dataset's degree of freedom is 462, and its percentage error is 24.75%. The both intercept (less than $2*10^{-16}$) and slope (equal to $1.04*10^{-11}$) p-values in H1 model are very close 0, that indicates that null hypothesis can be rejected, which means there is a relationship between self-regulation level and academic achievement. The intercept p value in H2 model is smaller than $2*10^{-16}$, which is significant to conclude that by measuring intention of hardworking may predict academic achievement. H2 model's slope p value, on the other hand, is 0.0784, which exhibits that academic achievement may not predict intention of hardworking.

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Table 3: Hypothesis test

	Coefficient-Estimate Median	MAD	Residual Standard Error	Percentage Error	Degree of Freedom	Coefficient – P (0.05 confidence interval)	Decision
H1	5.0	2.965	1.86	1.86/5.0=0.372	534	Intercept P: <2*10^-16 Slope P: 1.04*10^-11	Accepted
H2	8.0	4.448	1.98	1.98/8.0=0.2475	462	Intercept P: <2*10^-16 Slope P: 0.0784	Intention of hardworking has a relationship towards academic achievement; Academic achievement may not predict intention of hardworking.

4.0 Discussion

The results suggest that self-regulation level has a strong relationship towards to academic achievement. Intention of hardworking has relationship to academic achievement, however, highly academic achievers are not necessarily had high intention of hardworking. That was supported by the recent studies (Bond et al., 2017; King & Datu 2017; Dickhauser et al., 2016; Bipp & Dam, 2014 Guay et al., 2010).

Comparing the results from H1 and 2, the qualitative data that was collected by an observation seemed more accurate than the data collected from self-completion questionnaire. It reveals that data collection method may be the cause of Berger and Karabenick (2011) reported inconsistency on measuring motivation. Consequently, the present study suggests observation should has its priority to be considered for data collection method for motivation topics.

The study suggest university management, can consider provide less leniency towards to late course registration. Using environment change forcing students become self-regulated. This may lead to improve students' academic achievement and meanwhile help university's cost cutting.

The study is not without limitations. Non-normal sample distribution was obtained. Therefore non-parametric regression analysis was employed. Due to the level of random assignment, the study was designed as a quasi-experimental study, thus the results may not reflect the causality of self-regulation level and academic achievement. Hence, the sampling method for the study is convenience sampling; the result shows a very limited power of generalization.

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