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Abstract

Academic performance is a critical component in the constellation of factors influencing student success. The lack of study about factors affecting the academic performance among Bachelor Computer and Mathematical Science students led the researchers to study this topic. The factors that are considered to affect academic performance in this study are time management, quality of sleep, internet addiction, and people surrounding. This study aims to determine whether the factors differed based on the academic performance of students and to examine the association between the factors affecting academic performance and academic performance of students. Academic performance is evaluated in this study by using a Cumulative Grade Point Average (CGPA). The population for this study is Bachelor of Computer and Mathematical Science students in the Faculty of Computer and Mathematical Sciences (FSKM), UiTM Shah Alam, Selangor. The data from this study is primary data. This study used a stratified sampling design that was carried out through a questionnaire. The Social Sciences Statistical Package (SPSS) software was used to analyze the collected data. This study used an independent t-test to evaluate the first objective and binary logistic regression to achieve the second objective. The result from the independent t-test shows that only factor time management differed based on the group of CGPA (not dean list and dean list). Other variables do not have different mean based on CGPA. It can be concluded that the students must manage their time wisely to get a good result in academics.

Keywords: Academic Performance, CGPA, Factors Affecting, Logistic Regression

Introduction

Academic is the most essential pillar that leads to an individual's enhanced quality of life (Esping Andersen, 2005). Academic performance is a critical component in the constellation of factors influencing student success. Additionally, it plays a critical function in education, most notably as a tangible tool for assessing a student's learning process. Psychologists and academics have employed a variety of personality, attitude, cognitive style and ability

measurements to attempt to understand how students differ in their processing, retention, and retrieval of learning material (Tus, 2020). A large number of factors have been investigated in the literature with regard to their impact on student academic success as measured by academic achievement and a previous study revealed that the psychological characteristics of students, sleep quality, social media use, and the people in one's immediate environment are the factors that are most frequently reported (Alyahyan and Dustegor, 2020). The most crucial factors that always are a reason when it comes to the academic performance of students are mostly about their time management (Siddiq et. al,. 2017), quality of sleep (Okano et. al., 2019), internet addiction (Khan et al., 2016), and people's surroundings (Asiegbu, 2018; Albuhairan et. al., 2017).

Siddiq et al (2017) showed that students with a better CGPA often employed a programme plan that reflects a prior study of students at the Male Petroleum Institute (PI) in Abu Dhabi, UAE, showing that time management has a strong correlation with academic achievement. Okano et al (2019) have determined that better academic performance related longer periods of sleep, higher sleep quality and increased sleep regularity. Sajadi et al (2018) also revealed that students have insufficient sleep and tiredness. Given the critical nature of sleep quality and quantity, as well as its effect on academic and non-academic performance, it is recommended that appropriate sleeping arrangements and sleeping facilities be addressed. Ambad et al (2017) have determined the impact of internet addiction on students' academic performance and emotional well-being. While the internet has a plethora of benefits and has been found to increase productivity, it may also be detrimental to children if they develop an addiction to it. It has the potential to result in emotional instability and academic failure. The findings of this study demonstrated that all hypotheses were strongly related, indicating that internet addiction has a favourable relationship with students' emotional instability. The students' emotional instability then manifested itself in subpar academic achievement. Asiegbu (2018) stated that there is a link between parents' poor socioeconomic level and their children's academic achievement. When a child suffers from parental and material deprivation and care as a result of the death of a parent, the child's educational opportunities may be jeopardised, and he may be unable to pay school fees, purchase books, or purchase uniforms. Furthermore, people surrounding are also include bullying in schools. Albuhairan et al (2017) stated that bullying has a statistically significant link with poor academic achievement. To emphasise the vital relationship between low academic achievement and mental health, it is also necessary to emphasise how important it is to build and nurture solid child parent interactions. Li et al (2019) also found that urban kids' academic achievement is more substantially influenced by their families' socioeconomic condition.

The study about factors that can affect students' academic performance has been done by many universities in Malaysia but this study focusing on evaluation the academic performance of Bachelor Computer and Mathematical Science students in the Faculty of Computer and Mathematical Sciences (FSKM), UiTM Shah Alam, Selangor. Towards the most crucial factors that always are a reason when it comes to the academic performance of students are mostly about their time management (Siddiq et. al., 2017), quality of sleep (Okano et. al., 2019), internet addiction (Khan et al., 2016), and people's surroundings (Asiegbu, 2018 and Albuhairan et. al., 2017). Therefore, the objectives of this study are to examine whether factors (time management, quality of sleep, internet addiction and people surrounding) affecting academic performance differed based on the academic performance of Bachelor Computer and Mathematical Science students (not dean list and dean list) and to examine the association between the factors (time management, quality of sleep, internet addiction

and people surrounding) and academic performance of Bachelor Computer and Mathematical Science students.

This research will assist students in recognizing the problematic factors that affect their academic performance. The findings would assist students to adopt positive habits that would result in improved academic achievement. The study would expose students to several methods of taking notes in class, allowing them to build effective methods that could result in improved academic achievement such as note taking strategies and many others. Furthermore, this research will help university faculty administration better understand the factors that affect students' academic performance. Additionally, this study will help the university's faculty administration better understand the elements affecting students' academic success and will enable them to do additional research into the factors while attempting to make adjustments to improve students' performance. Educators would find the findings beneficial, particularly in carrying out their responsibilities in their teaching methods. This would be accomplished through the study's precise data collection. Further to that, this research provides the nation with such an opportunity to improve educational standards. This research also would assist the ministry of education to create actual development that would be suitable for the intended habits among students in the university.
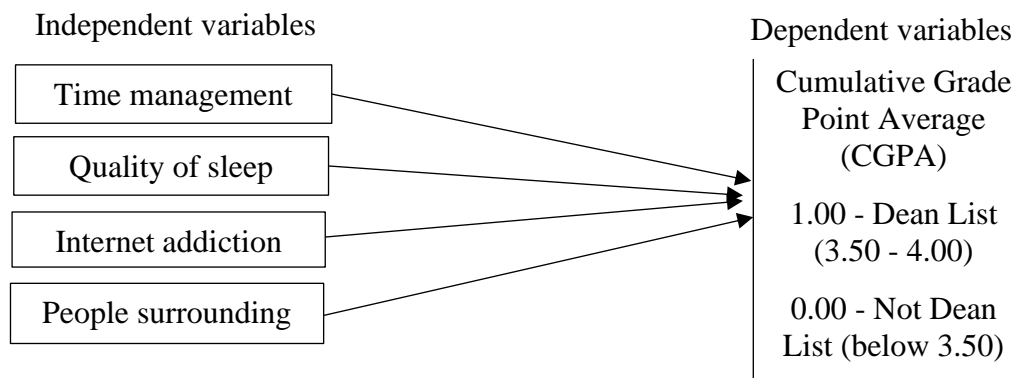
Methodology
Description of Data
Primary data is used in this study by distributing the questionnaires through online survey to the respondents. Questionnaires in this study was adopt and adapt from the previous study as shown in Table 1. The questionnaire is divided into five sections: Section A contains demographic questions, Section B contains time management, Section C has questions regarding sleep quality and Sections D and E contain questions about internet addiction and people surroundings. A Likert Scale measurement is used in this questionnaires. The Likert Scale covers a range of 1 to 5 with 1 denoting strongly disagree, 2 denoting disagree, 3 denoting neutral, 4 denoting agree and 5 denoting extremely agree.

Table 1: Sources of questionaires

Section	Variables	Number of Questions	Source
A	Time management	5	Raley et al. (2016)
B	Quality of Sleep	6	Tangaraju et al. (2013)
C	Internet Addiction	6	Raley et al. (2016) Tangaraju et al. (2013)
D	People surrounding	6	Young, K. (2017)
E	Constant	6	Al-Rakkad et al. (2017)

Based on Figure 1, there are four factors that affect students' academic performance based on recent studies which are time management, quality of sleep, internet addiction and people surroundings. The academic performance of the students was identified by using Cumulative Grade Point Average (CGPA) since John et al (2020) also used CGPA to access academic performance of students.

Figure 1: Theoretical framework

Independent variables

| Time management |
| Quality of sleep |
| Internet addiction |
| People surrounding |

Dependent variables

Cumulative Grade
Point Average
(CGPA)

1.00 - Dean List
(3.50 - 4.00)

0.00 - Not Dean
List (below 3.50)

Independent t-Test

The Box-Jenkins method is associated with ARIMA's general modelling. It was first developed by George E. P. Box (University of Wisconsin, USA) with Gwilym M Jenkins (University of Lancaster, UK) in 1976. Box-Jenkins Analysis focused on the systematic way of identifying, fitting, checking, and using Autoregressive Integrated Moving Average (ARIMA) time series models. It is an ideal approach for mid to long-time series which uses at least 50 observations. The independent samples t-test is likewise well established for comparing means between two independent samples with equal variances (Derrick, 2017). Independent groups t-test is used to measure whether the difference between the means of two separate groups is significant (Navaro, 2013). The independent samples t-test and Welch's test make the assumption that data are randomly sampled from two unrelated populations that are nearly normally distributed. To analyse and interpret the data in this study, SPSS software. This exam was used to compare means of time management, sleep quality, internet addiction, and people's surroundings with groups of the Dean list and those who were not on the Dean list (CGPA). According to Kim et al., (2019) the assumptions for Independent t-test are:

1. The measurement scale. The dependent must be continuous and the independent variable must be categorical.
2. There should be no significant outliers. The outliers can be checked using a box plot.
3. The data must be normally distributed. Q-Q plot used to check the normality.
4. Homogeneity of variance. Homogeneity will be checked using Levene's Test.

Binary Logistic Regression Model

The Binary Logistic Regression model describes the relationship between a categorical dependent variable and a set of predictor factors. This model is used to forecast the likelihood of an event occurring by fitting data to a logistic curve. Binary logistic regression is a sort of regression analysis that can be used to describe issues with two distinct outcomes. Given a collection of independent variables, the model can be used to forecast the possibility of two possible outcomes for a categorical dependent variable with two values (Sanchez-Varela et al., 2021). This is because for evaluating academic performance, Cumulative Grade Point Average (CGPA) is used and has been divided into two categories which are 0 and 1. 0 stands for not dean list and 1 stand for dean list. Binary logistic regression is a statistical technique used in geographical information analysis. Logistic regression is commonly thought of as a modelling tool for conditions with a binary response variable and predictor variables that might be numerical or categorical (including binary). Thus, this method used to test the significant association between the dependent variable which is CGPA and independent variables. The association between academic performance and the factors affecting academic

performance of Bachelor Degree students in FSKM UiTM Shah Alam was modelled using a binary logistic model of the form.

However, before applying the method, there are some assumptions needed to fulfil or to proceed the next process. Based on Senaviratna et al., (2019), the assumptions of binary logistic regression are:

1. The outcome is a binary or dichotomous variables, such as yes vs. no, positive vs. negative, or 1 vs. 0.

2. Outliers in the data should be avoided. This assumption can be checked using a boxplot.

3. The predictors should not have high intercorrelations (multicollinearity). The multicollinearity follows:

- If VIF value < 10, there is no multicollinearity problem.
- If Tolerance value > 0.1, there is no multicollinearity problem.

Results and Discussions

Table 2 shows the reliability test of pilot study. The reliability was tested on 4 variables which are time management, quality of sleep, internet addiction and people surrounding. The Cronbach's alpha summarize in the table below. The value of Cronbach's Alpha for time management is 0.805, quality of sleep is 0.830, internet addiction is 0.587 and people surrounding is 0.520. Pilot study have been conducted 10% from total sample which is 36 respondents. Since all of the values are greater than 0.5, therefore it is acceptable (Perry et al., 2004).

Table 2: Reliability test of pilot study

Independent variables	Cronbach's Alpha
Section B (Time management)	0.805
Section C (Quality of Sleep)	0.830
Section C (Internet Addiction)	0.587
Section D (People Surrounding)	0.520

Table 3 shows the significance value (p-value) for time management is 0.001 which is less that significance level, $\alpha(0.05)$, then we reject H_0. Therefore, the two population mean for time management based on CGPA are not equal. For the quality of sleep, since p-value (0.065) more than α (0.05), we failed to reject H0. Therefore, the population means of quality of sleep based on CGPA are equal. Same goes to the variable internet addiction, since p-value (0.820) is greater than α (0.05), we failed to reject H_0. Therefore, the population means of internet addiction based on CGPA are equal. Last, for variable people surrounding, since the p-value (0.204) more than α (0.05), we failed to reject H_0. Therefore, the population means of people surrounding based on CGPA also equal. Thus, from the conclusion, it shown that variable time management has a significant difference based on CGPA (dean list and not dean list) since p-values are less than α (0.05). Other variables which are quality of sleep, internet addiction and people surrounding do not have significant difference based on the group of CGPA, dean list and not dean list since all p-value is greater than significance level.

Table 3: Result of independent sample t-test

Independent variables	P-value
Time management	0.001
Quality of Sleep	0.065
Internet Addiction	0.820
People Surrounding	0.204

The outcome is a binary or dichotomous variable (Senaviratna et al., 2019) since academic performance evaluated based on CGPA and the CGPA of Bachelor Computer and Mathematical Science students divide into 0 as not dean list and 1 as dean list. Based on the Table 4 shows the binary logistic regression analysis, p-value for time management is 0.002, p-value for quality of sleep is 0.310, p-value for internet addiction is 0.069 and p-value for people surrounding is 0.302. Since p-value for time management (0.002) less than significance level (0.05), we reject H0. Meanwhile, since p-value for quality of sleep (0.310), internet addiction (0.069) and people surrounding (0.302) greater than significance level (0.05), we failed to reject H_0. Therefore, it can be concluded that there is an association between variable time management and CGPA while variable quality of sleep, internet addiction and people surrounding do not have any association with the group of CGPA (dean list and not dean list). Thus, the equation for this research as in Equation (1).

$$P = \log\left(\frac{\pi(x)}{1-\pi(x)}\right) = -2.268 + 0.671X_1 \qquad (1)$$

$$\text{where } \pi(x) = \frac{\exp(-2.368+0.671X_1)}{1+\exp(-2.368+0.671X_1)}$$

Table 4: Result of binary logistic regression

	Variables	B	P-value
Step 1[a]	Time management	.671	.002
	Quality of Sleep	.170	.310
	Internet Addiction	-.566	.069
	People surrounding	.220	.302
	Constant	-2.268	.020

Conclusion

This study was carried out to explore the factors that affect the students' academic performance. This research was conducted on Bachelor Degree students in Faculty of Computer Science and Mathematics UiTM Shah Alam. First objective which is to examine whether all the factors affecting academic performance (time management, quality of sleep, internet addiction and people surrounding) differed based on the academic performance of Bachelor Computer and Mathematical Science students (not dean list and dean list) where Independent T-test is used as the statistical analysis method. This method is used since the independent variable (time management, quality of sleep, internet addiction and people surrounding) are continuous and dependent variable (CGPA) is categorical. The result shows

that only variable time management has a significant different based on the CGPA since the p-value (0.001) less than α (0.05) while for the quality of sleep, internet addiction and people surroundings have no significant different based on CGPA since p-value (0.065, 0.820 and 0.204 respectively) are greater than α (0.05).

Next, binary logistic regression is used as the second method to analyse last objective which is to examine the association between the factors affecting academic performance (time management, quality of sleep, internet addiction and people surrounding) and academic performance of Bachelor Computer and Mathematical Science students. Since the dependent variable which is CGPA is dichotomous variable therefore binary logistic regression is used. Based on the results obtained, only variable time management has an association with CGPA since the p-value (0.002) less than α (0.05). Meanwhile, for the variable's quality of sleep, internet addiction and people surroundings do not have association with CGPA since all p-values which are 0.310, 0.069 and 0.302 respectively are greater than α (0.05).

Research Contribution

The result shows that only factor time management differed based on the group of CGPA (not dean list and dean list). Other variables do not have different mean based on CGPA. It can be concluded that the students must manage their time wisely to get a good result in academics. This research will assist students in recognizing the problematic factors that affect their examination results. Besides that, the findings would assist students to adopt positive habits that would result in improved academic achievement. The study would expose students to several methods of taking notes in class, allowing them to build effective methods that could result in improved academic achievement such as note taking strategies and many others. Furthermore, this research will help university faculty administration better understand the factors that affect students' academic performance. Additionally, this study will help the university's faculty administration better understand the elements affecting students' academic success and will enable them to do additional research into the factors while attempting to make adjustments to improve students' performance. Educators would find the findings beneficial, particularly in carrying out their responsibilities in their teaching methods. This would be accomplished through the study's precise data collection. Further to that, this research provides the nation with such an opportunity to improve educational standards. This research also would assist the ministry of education to create actual development that would be suitable for the intended habits among students in the university.

Suggestion for Further Research

Based on the most crucial factors that have been identified in this study, please suggest the new direction, new objectives, and new method for this similar study in the future. Adding this section adds value to the article by building upon the findings of this research and addressing the limitations and unanswered aspects of this study.

Since the limitation of this study is focusing on only Computer and Mathematical Sciences Bachelor degree students, therefore adding more sample from different faculties and level of education such as Diploma and Postgraduate students are suggested to be conducted as well. For the result, more research with a broader range of individuals would be beneficial in determining of these findings.

Besides, future researchers can vary platforms for obtaining respondents such as WhatsApp or messaging since this study only use e-mail to approach the respondents. Furthermore, future researcher can expanding their research in finding the other factors that affect

students' performance other than time management, quality of sleep, internet addiction and people surrounding.

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