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Effect of Social Media on the Academic Performance of College Students

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ABSTRACT

Social media networking has become vital to modern communication, with broad adoption across diverse demographics. This study investigates the effects of social media on academic performance of selected Nigeria college students. A random sample of 1,692 students was analyzed using a multinomial logit model to predict students' performance based on age, marital status, monthly social media budget, stipend, and daily study time on social media. Findings indicate these variables were statistically significant. Achieving a 2.40–3.49 CGPA strongly correlated with age, marital status, budget, and study time, with p-values of 0.018, 0.000, 0.000, and 0.000 respectively. Similarly, a 1.50–2.39 CGPA correlated with stipend, marital status, and study time, showing strong statistical significance.

Keywords: cumulative grade average points, multinomial logistics regression, private study time, social media.

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I. INTRODUCTION

The most commonly used method of communication is social media networking. It is being used by individuals belonging to every walk of life [1]. It is a computer-mediated tool that allows students to create, share, and exchange information, ideas, pictures, and videos for virtual communities and learners—the public's widely accepted social media. Numerous online networking platforms include but are not limited to Facebook, Twitter, Instagram, Pinterest, YouTube, LinkedIn, Google+, Flickr, Snapchat, Vine, and Tumblr. The capacity of Social Media networking to spread valuable data quickly has made it the quickest-developing method of association. Social media has also changed numerous businesses, however, the most impact of it is in classroom teaching and the overall education system. It is generally used regularly by millions of people across the globe for different reasons. Many social media users are made up of youth, most of whom are college students [2].

Social media has become one of the most widely used forms of communication by people of all ages. Students have easy access to the internet and engage in social networking activities. Since its inception, the number of users has steadily increased, especially among students, who are subjected to a great deal of neglect and challenges in their academic performance, resulting in a rapid decline in educational quality [3]. It issharing and generating knowledge, and these features are of great value in the context of higher education. It also plays an important role in the field of education and student's life; accessing information, providing information, and communicating via social media is easier and more convenient. Teachers and students are connected and can use these platforms to work on their education. Professors are expanding their social media usage to host live lectures, offer off-hours, support for students, or even host student debates. It helps teacher educators to be connected to their students off campus as well as with their ex-students. They can share ideas and point students to Skype, WhatsApp, LinkedIn, and Facebook. The advantages of using social media for educational purposes are far-ranging. A study stated that using social media tools improved the student's learning opportunities, allowed for real-time communication outside the classroom, fostered collaborative opportunities, and enhanced creativity. Students can watch educationally relevant videos or exchange information about what they have watched and learned, and then join online to further discussion with teachers. Even the teachers can also learn from the students during social networking interactions. Similarly, a teacher can supervise students while learning, reflecting, sharing, interacting, and summarizing discussions. Social media provides a forum to contact peers and teachers from wherever they are, offering the flexibility of extended duty hours. Some social media, especially Facebook, WhatsApp, YouTube, and Kaizala App, features may encourage students to be involved in social and creative learning progressions that extend beyond traditional educational settings and institutions [1].

1.1 Statement of the Problem

Today the Internet is the most important source of information and the growing dimensions of the use of social media by students cannot be underestimated. Students use social media anywhere and anytime when an internet connection is available to meet their educational needs [4]. On the contrary, some dangers are associated with social networking sites such as E-crime, internet addiction, laziness, a standard crime like fraud, and kidnapping; and immoral acts like pornography, prostitution, and cyber-bullying [5]. Today students at all levels, especially tertiary levels, have been using social networking sites (SNSs) to complete their assignments and research papers. Research on the effects of social media on the academic performance of Nigerian college students has been very scanty. Therefore, this research seeks to investigate the effects of social media onstudents' academic performance using the multinomial logistic regression model.

1.2 Significance of the Study

This study'sfindings could enable students to identify some factors that enhance academic performance and the impact of social media on academic success. The result of the study could further educate parents on factors to give the highest priority while meeting the needs of their children for better academic performance. Finally, it could also help course advisors and counselors understand factors upon which good performance depends to enable them to give accurate counsel based on this result.

1.3 Aim and Objectives

This study aims to investigate the effects of social media on students' academic performanceusing multinomial regression analysis. The specific objectives of the study are to:

i. Investigate the effect of daily private study time using social media on academic performance.
ii. Examine the effect of age distribution on academic performance
iii. Investigate the significance of monthly internet subscriptions for social networks on academic performance.

1.3 Theoretical Concepts of Social Media

The advent of the internet in the 1990s led to major developments in the world of communication, hence the introduction of social networking sites (SNSs). The coming into being of these sites revolutionized the world of communication, and today we celebrate its improvements ranging from education to entertainment [6]. The evolution of the internet has led to its usage as the best medium of communication whereby two-thirds (2/3) of the internet world‘s population visit social networking sites (SNSs), thus serving as communication and connection tools. These networking sites are referred to as social media. Social media exploded as a category of online discourse that enables people to create content, share it, bookmark it, and network at a prodigious rate. This has breached the gap that existed in communication where people had to rely solely on traditional methods such as letters and phone calls as a mode of getting in touch with friends and relatives. The driving factors for the adoption of social media are the progressively ubiquitous access, convenience, functionality, and flexibility of social technologies. Nothing interesting is ever completely one-sided, so it is for social media as it has positive and negative effects.

1.4 The Positive effect of social media on students' academic life

Students' academic life has moved to a different dimension since social media networks were introduced. Several studies have affirmed that social media plays an important role in students in higher education, including the study conducted by [7]. In their study, the authors recognized four (4) major advantages of social media usage by higher education students, including enhancing relationships, improving learning motivation, offering personalized course material, and developing collaborative abilities. Indeed, social media has contributed greatly to facilitating learning in the 21st century. The answers to the causes of flexible studies today might not be far-fetched because of the great contribution that social media platforms provide when used judiciously. Furthermore, there have been other schools of thought that state that social media is a nuisance to students' academic life.

1.5 The negative effect of social media on students' academic life

Davies and Cranston [8] enumerated some of the risks associated with social media,including criminal activities such as identity theft and fake contacts, which are prevalent today, sexual abuse or harassment, and unsuitable advertising. Also, cyberbullying, online harassment, sexting, Facebook depression, and privacy concerns are some of the challenges associated with social networking. Cyberbullying is a category of bullying that occurs in the digital realm or medium of electronic text. It is any behavior performed through electronic or digital media by individuals or groups that repeatedly communicates hostile or aggressive messages intended to inflict harm or discomfort on others. Cyberbullying is one of the serious threats in the social media environment and has called for several studies to determine its causes. The causes of cyberbullying were significantly related to the use of proactive aggression, justification of violence, exposure to violence, and less perceived social support of friends. Privacy concerns are another concern everyone involved in social networking faces. The rate at which people post or share fake information calls for alarm and it is difficult to ascertain that what people say, and post are truly who they are. Individuals' private information is publicly displayed on some of these social networks and malicious people take advantage and perpetrate all kinds of harassment.

1.6 Theoretical concepts related to the effect of social media on academic performance.

Below are some of the theoretical concepts related to the effect of social media on academic performance

1. Distraction Theory: This theory suggests that social media can distract students, diverting their attention away from academic tasks and negatively impacting their performance. The constant notifications, messages, and social interactions on social media platforms can interrupt studying or learning activities, leading to reduced focus and productivity [9].
2. Cognitive Load Theory: This theory proposes that social media use can increase the cognitive load on students. Cognitive load refers to the mental effort required to process and understand information. When students engage with social media while studying, their cognitive resources may be divided between academic tasks and social interactions, reducing comprehension and retention of information [10].
3. Self-Regulation theory: This suggests that individuals can regulate and control their behaviors to achieve desired goals. In the context of social media and academic performance, this theory emphasizes the importance of self-regulation skills in managing the use of social media. Students with strong self-regulation skills can effectively balance their social media use with their academic responsibilities, minimizing negative impacts on their performance [11].
4. Social Comparison Theory: This theory suggests that individuals compare themselves to others to evaluate their abilities and achievements. On social media, students may be exposed to posts and updates highlighting the accomplishments and successes of their peers, which can lead to feelings of inadequacy or increased pressure to perform. This comparison can affect students' self-esteem and motivation, potentially influencing their academic performance [12].
5. Multitasking Theory: Multitasking refers to the simultaneous performance of multiple tasks. Some students may attempt to multitask by engaging in social media activities while studying. However, research suggests that true multitasking is not possible, and instead, task-switching occurs, resulting in reduced efficiency and quality in both academictasks and social media use [13].

II. LITERATURE REVIEW

Several studies have been conducted to assess the association between social media use by college students and academic performance. Foster et al [14] used an interview protocol to examine the influence of some selected demographic, homesrelated, school-related, teachers-related, and pupils-related factors as predictors on pupils' Basic Education Certificate Examination (BECE) performance in mathematics as categorical response variable (upper grade, average grade, and lower grade) using multiple logit model. A combination of systematic and simple random sample of 62 pupils was selected from a cohort of BECE candidates of University Junior High School in Cape Coast municipality. The findings showed that the age of pupils and class size were significant in the two models. The findings in the first model show that the incidence of upper grades in BECE mathematics is largely dependent on the age of pupils and class size, with younger pupils exhibiting significantly upper grades than older pupils, and with pupils in smaller class sizes showing significantly upper grades than those in large class size respectively. In the second model, the occurrence of average grades in BECE mathematics is also largely dependent on the age of pupils and class size, with younger pupils exhibiting significantly average grades than older pupils, and with pupils in smaller class sizes showing significantly average grades than those in large classes respectively. Other significant predictors in the first model are gender, school location, and homework, and in the second model, parental educational level. The study concluded that pupils who lack the benefit of the factors especially (school location, class size, self-homework undertaking, and parental education) have a high probability of recording poor performance (lower grades) at BECE mathematics. Mushtaq et al. [15] investigated the positive and negative effects of social media on the academic performances of students at Alberoni University of Afghanistan. Using a quantitative approach to collect the relevant data, the authors administered 371 survey questionnaires among the undergraduates in nine faculties. The authors concluded that despite public views concerning the misuse of social media among students in society, most of the students were interested in using social media positively for their education. The positive impacts of social media among undergraduates appeared to be higher as compared to negative impacts. However, the results of ANOVA showed that there were no statistically significant differences between the positive and negative impacts of social media and students' academic achievements. The authors concluded that educators and students could use social media as informational and communicational tools to improve the learning process. Alamri et al. [16] examined the Social Media Applications (SMA) factors used for active collaborative learning (ACL) and engagement (EN) to assess the students' academic performance in measuring education sustainability, as well as examining their satisfaction with its use. The study employed constructivism theory and the technology acceptance model (TAM) as the investigation model. Using structural equation modeling for data analysis, the results showed that all the hypotheses were supported and positively related to sustainability for education, confirming significant relationships between the use of SMAs and the rest of the variables considered in the model (interactivity with peers (IN-P), interactivity with lecturers (IN-L), ACL, EN, perceived ease of use (PEOU), perceived usefulness (PU), SMA use, student satisfaction (SS), and students' academic performance (SAP). Alamri, et al. [16] addressed the literature gap by investigating the factors associated with Social Media Applications (SMA) used for active collaborative learning (ACL) and engagement (EN), and their influence on students' academic performance and education sustainability. The study revealed that all hypotheses were supported, demonstrating positive relationships between the use of SMAs and the variables considered in the model. Specifically, significant associations were observed between SMAs and education sustainability, as well as between various interactive elements, satisfaction, and academic performance. Their findings highlighted the multifaceted role of social media in promoting active learning, engagement, and satisfaction among students, ultimately contributing to education sustainability. Palla and Sheikh [17] investigated the impact of social media usage on the academic performance of college students in Kashmir, using a structured survey questionnaire. Their study findings showed that many of the students use social media networking sites to fulfill their educational needs. YouTube is the most used social media network among undergraduate students. Most of the students feel that social media networks are easy to use, and they have been using these sites for the past three years. Sivakumar [1] examined the effects of social media on the academic performances of students in Cuddalore District. The survey method was adapted to collect the relevant data for the study. It was concluded that despite public views concerning the misuse of social media among students in society, most of the school students were interested in using social media positively for their academic purposes. However, the results of ANOVA showed that there were significant differences between academic achievement and the impact of social media among Students. The authors suggested that educators and students could use social media as teaching and learning tools to ease and improve the learning process. Contrary to [1] results, Lau [18] examined whether and how social media usage and social media multitasking predict academic performance among university students. From a sample of 348 undergraduate students at a comprehensive university in Hong Kong, the study found that using social media for academic purposes was not a significant predictor of academic performance as measured by cumulative grade point average, whereas using social media for nonacademic purposes (video gaming in particular) and social media multitasking significantly negatively predicted academic performance. Sakala et al. [19] conducted a study applying multinomial logistic regression model diagnostics to identify outlier communities in childbirth weight in Malawi. This finding suggests the presence of potentially beneficial motherhood practices within these rural clusters that could offer valuable insights to policymakers in the child healthcare sector. By studying these outlier communities, policymakers may uncover practices or interventions that contribute to improved childbirth outcomes, thereby informing strategies for enhancing child healthcare practices and policies in Malawi. Abdillah, et al. [20] conducted a study to analyze learning difficulties in statistics courses, recognizing that every student aspires to achieve satisfactory academic performance. Using multinomial logistic regression analysis, the researchers identified several independent variables that influence student learning difficulties in statistics courses. These variables include gender, regional origin, learning motivation, and learning resources. Conversely, variables such as majors at school, monthly tuition allowance, and study patterns were found to have no significant effect on learning difficulties. The findings of the study highlight the multifaceted nature of factors contributing to learning difficulties in statistics courses, emphasizing the importance of considering various socio-demographic and motivational factors. The results provide valuable insights for educators and policymakers in tailoring interventions and support mechanisms to address the diverse needs of students in statistics education. Gaspar et al. [21] focused on the use of a multinomial logistic regression model to analyze the determinants of students' academic performance in mathematics. A simple random sample of 393 students was selected from a cohort of first-year students of Zamse Senior High/Technical in the Bolgatanga Municipality. A questionnaire was used to gather data from the students. The results indicated that the occurrence of good performance in mathematics is largely dependent on the sex of students with male students showing significantly good performance than female students. Another significant predictor of good academic performance in mathematics was the age of students, with younger students exhibiting good academic performance than older students. Mother's employment also contributed significantly to good performance in mathematics with students whose mothers were employed showing better academic performance than their counterparts whose mothers were not employed. Abiodun et al. [22] examined the academic performance of undergraduate students using multinomial logistics regression and their findings showed that the sex of students and mode of admission significantly affect the level of academic performance and that male students were likely to have higher performance than female students. The residential status of students was also found to have a significant effect on the academic performance of undergraduate students with residential students exhibiting a higher performance compared to non-residential students. Marina [23] employed multinomial logistic regression analysis to predict the risk of injuries among vulnerable road users (VRUs) based on spatial and temporal assessments. The study's results demonstrated that specific spatial and temporal variables significantly impact the number and severity of crashes involving VRUs. By identifying these variables, policymakers and urban planners can implement targeted interventions and safety measures to mitigate the risk of injuries among vulnerable road users. This research contributes to developing predictive models and strategies to enhance road safety and promote sustainable transportation practices in urban environments.

III. METHODS

Many statisticians believe the multinomial Logistic Regression model is the most important tool for analyzing categorical data. It is employed when dependent variables involve three or more categories. This model explains the correlation between the dependent variable and the independent variable when their values are obtained with rating scales [24].

1.1 Sources of Data

This study focused on students' academic performance, a case study of Joseph Sarwuan Tarka University, Makurdi Benue State, Nigeria. The participants were enrolled during the 2018-2019 academic year. Data associated with their academic performance were collected as well as their demographic and social media data such as Cumulative Grade Point Average (CGPA), monthly subscription to social networks, daily private study time on social media, age, marital status, monthly stipend, and residency. Five academic departments were randomly selected including Mathematics, Statistics & Computer Science, Animal Breeding, Crop & Environmental Protection, Agricultural Economics, and Soil Science. A random sample of 1,692 students was selected to participate in the study. 877 responses were received yielding a 51% return rate as presented in Table 1.

Table 1. Sample selection with the number of responses

Department	Sample	Response
Animal Breeding	400	196
Agric. Economics	291	166
Crops & Environmental Protection	221	141
Math/Stat./Computer Science	538	225
Soil Science	242	149
Total	**1692**	**877**

1.2 Statistical Model

The general multinomial logit model is given as:

$$log\left(\frac{\pi_i}{1-\pi_i}\right) = \beta + \sum_{j=1}^{p} \beta_i X_j \quad (1)$$

where π is a conditional probability of the form $p(y = 1/x_1, \ldots\ldots x_p)$. That is, it is assumed that success is more or less likely depending on the combination of values of the predictor variables. With logistic functions given as:

$$\pi_i = \frac{e^{\beta + \sum_{j=1}^{p} \beta_i X_j}}{1 + e^{\beta + \sum_{j=1}^{p} \beta_i X_j}} \quad (2)$$

$$1 - \pi_i = \frac{1}{1 + e^{\beta + \sum_{j=1}^{p} \beta_i X_j}} \quad (3)$$

where $j = 1,2,3,..,p;\ i = 1,2,\ldots,n.$

Let y denote the student's Cumulative Grade Point Average (CGPA) level.

$y_1 = 1{:}\ 3.50 - 4.49(second\ class\ upper).$

$y_2 = 2{:}\ 2.50 - 3.49(second\ class\ lower)$

$y_3 = 3{:}\ 1.50 - 2.49(third\ class\ lower)$

Then the logic function of a student scoring second class lower, and third class lower relative to second class upper can be modeled in two logits as follows:

$$Log\left(\frac{\pi(y = 2/xiAGE + \cdots + MRS}{\pi(y = 1/xiAGE + \cdots + MRS}\right) = \beta + \beta_{21}AGE + \cdots + \beta_{26}MRS \quad (4)$$

$$Log\left(\frac{\pi(y = 3/xiAGE + \cdots + MRS}{\pi(y = 1/xiAGE + \cdots + MRS}\right) = \beta + \beta_{31}AGE + \cdots + \beta_{36}MRS \quad (5)$$

Hence, the corresponding probabilities for equations 4 and 5 are:

$$\pi i\ (second\ class\ upper) = \frac{1}{1 + \sum_{j=1}^{2} e^{\beta_j x_i}} \quad (6)$$

$$\pi i\ (second\ class\ lower) = \frac{e^{\beta + \beta_2 x_i}}{1 + \sum_{j=1}^{2} e^{\beta_j x_i}} \quad (7)$$

$$\pi i\ (third\ class\ ) = \frac{e^{\beta + \beta_3 x_i}}{1 + \sum_{j=1}^{2} e^{\beta_j x_i}} \quad (8)$$

Statistical software was used to fit the models, and the maximum likelihood (ML) method was used to estimate the model parameters [25]. The dependent variable is the student's CGPA, which has three categorical levels: second class upper (3.50-

4.49) coded as 1, second class lower (2.40-3.49) coded as 2, and third class (1.50-2.39) coded as 3.

1.3 Assumptions of the Multinomial Logistic Regression Model

Some assumptions of multinomial logistic regression are defined below:

i. Dependent variables should be measured at the nominal level with more than or equal to three values.
ii. It should have one or more independent variables that are continuous, ordinal, or nominal (including dichotomous variables). However, ordinal independent variables must be treated as continuous or categorical.
iii. It should also have independence of observations, and the dependent variable should have mutually exclusive and exhaustive categories (i.e., no individual belonging to two different categories).
iv. There should be no multicollinearity. Multicollinearity occurs when you have two or more independent variables that are highly correlated with each other.

The method of maximum likelihood estimates the parameters of the multinomial logistic regression model by maximizing the likelihood function.

$$g(y_{1,} \ldots, y_1) = \prod_{i=1}^{n} \left[\frac{n!}{\prod_{j=1}^{J} y_{ij\,!}} \prod_{j=1}^{J} p_{ij}{}^{y_{ij}} \right] (9)$$

The log-likelihood function of the parameters to be estimated is:

$$L(\beta) = \sum_{i=1}^{n} \sum_{j=1}^{J-1} \left(y_{ij} \sum_{k=0}^{k} x_{ik}\, \beta_{ki} \right) - n_i \log \left(1 + \sum_{j=1}^{J-1} \exp\left(\sum_{k=0}^{K} x_{ik} \beta_{kj} \right) \right) \quad (10)$$

The significance of a single predictor variable in logistic regression is tested using the likelihood ratio test and Wald statistic. The likelihood ratio test for a particular parameter compares the likelihood of obtaining the data when the parameter is zero (L_0) with the likelihood (L_1) of obtaining the data evaluated at the maximum likelihood estimate of the parameter. The test statistic is defined as G (likelihood test) is compared with Chi-square distribution with 1 degree of freedom.

$$G = -2 \ln \frac{L0}{L1} = -2(\ln L_0 - \ln L_1) \; (11)$$

A Wald test was conducted to measure the significance of each independent variable toward the dependent variable.

$$W_k = \left(\frac{\hat{\beta}_k}{standard \;\; error \;\; (\hat{\beta}_k)} \right)^2 (12)$$

$\hat{\beta}_k$ is the $k - th$ estimated regression coefficient.

Pseudo R square has been developed in logistic regression to provide measures of the usefulness of the model. The Cox and Snell's R square is given as:

$$R^2 = 1 - \left[\frac{L(M_{intercept})}{L(M_{full})} \right]^{2/n} \; (13)$$

Nagelkerke's R square is given as:

$$R^2 = \frac{1 - \left[\frac{L(M_{intercept})}{L(M_{full})} \right]^{2/n}}{1 - [L(M_{intercept})]^{2/n}} \quad (14)$$

$L(M_{intercept})$ is the likelihood of the intercept model,

$L(M_{full})$ is the likelihood of the full model.

McFadden's R square, which is defined as:

$$R^2 McF = 1 - \frac{\ln L_M}{\ln L_0} (15)$$

Where L_0 is the value of the likelihood function for a model with no predictors (i.e. with intercept only), and L_M is the likelihood function for the model being estimated. The McFadden R square ratio indicates the improvement over the intercept model offered by the full model.

IV. RESULTS

This section presents the results of the findings. It presents the result of model fitting information, goodness of fits, pseudo-R-square, likelihood ratio test, and parameter estimates.

1.1 Model Fitting Information

Chi-square statistics were used to assess the overall effectiveness of the model. Table 2 indicates that the model fits the data significantly better than the null model since the p-value (sig.) is less than 0.05.

Table 2. Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ration Test		
	-2Log Likelihood	Chi-Square	**df**	**Sig**
Intercept Only	1245.738			
Final	1060.484	185.255	30	0.000

1.2 Pseudo R-square

The value of the Chi-square statistics might not indicate how strong or the extent to which the association between the dependent variable and the independent variables is. As a result, the Pseudo R-squared measures were used to determine the strength of association. Considering Table 3, all three measures (Cox and Snell, Nagelkerte& McFadden) indicate weak correlations between the dependent variable and the set of independent variables since the values are greater than 0.05.

Table 3. Pseudo R-Square

Cox and Snell	0.190
Nagelkerke	0.216
McFadden	0.099

1.3 The Likelihood Ratio Test

The Likelihood ratio test is used to assess the contribution of each variable to the model.

Table 4 shows that each variable contributes significantly to the model, except location, since p-values are less than 0.05.

Table 4. Likelihood Ratio Test

Effect	Model Fitting Criteria	Likelihood Ratio Test		
	-2Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	1060.484	0.000	0	.
Age	1089.500	29.017	6	0.000
MRS	1098.059	37.576	2	0.000
Loc	1061.229	0.746	2	0.689
MTS	1085.586	25.102	6	0.000
MTB	1118.280	57.797	8	0.000
PST	1106.360	45.876	6	0.000

Note: MRS (Marital status), Loc (Location), MTS (Monthly subscription), MTB (Monthly budget), and PST (Private study time on social media).

1.4 Goodness of Fits

The overall significance/performance of the model in this study was assessed by using Goodness-of-Fit. The goodness of fitdetermines whether the model adequately fits the data.The goodness of fits result from Table 5 indicates that the model's predictions significantly differed from the observed values; hence, the model does not adequately fit the data since the p-value is less than 0.05.

Table 5. Goodness of Fits

	Chi-Square	df	Sig
Pearson	983.124	232	0.000
Deviance	912.999	232	0.000

1.5 Parameter Estimates

Regarding the two logistic regression models, the "third class(3.50-4.49)" forms the baseline category against which the other two classes are directly compared. The table shows the estimated parameters of the two regression models predicting membership in the two different levels of academic performance. The second column in the table indicates the unstandardized regression intercept and slopes for the two regression models. The corresponding significance level and the Odds ratio follow. The two models include both the intercept and the slopes for the predictor variables. The intercept of the first model is the log of the ratio of the probability of a student getting "second class lower" to the probability of a student getting "second class upper" and the second model is the log of the ratio of the probability of a student scoring a "third class" to the probability of that student scoring "second class upper". Each subgroup of grading (second class lower and third class) is compared with the baseline category of "second class upper".

The parameter estimates table summarizes the effect of predictor variables as shown in table 6.

Note: Age (1: below 20, 2: 20-25, 3: 26-30, 4: 30 and above); Marital Status (MRS) (1: single, 2: married); Location (Loc) (1: On-campus, 2: Off-campus); Monthly Stipend (MTS) (1: less than $20, 2: $20-$40, 3: $40-$50, 4: $50 and above); Monthly Budget for social media (MTB) (1: below $2, 2: $2-$4, 3: $4-$6, 4: free mode, 5: $6 and above); Daily Private Study Time on social media (PST) (1: less than 1hr, 2: 1-2hrs, 3: 3-4hrs, 4: 4hrs and above).

Table 6. Parameter Estimates

CGPA		B	Sig.	Exp(B)
	Intercept	-1.863	0.08	
	Age-1	3.371	0	29.115
	Age-2	1.976	0.025	7.214
	Age-3	2.124	0.016	8.363
	Age-4	0	.	.
	MRS-1	-2.249	0	0.106
	MRS-2	0	.	.
	Loc-1	-0.077	0.676	0.926
2.40-3.49	Loc-2	0	.	.
	MTS-1	0.651	0.289	1.918
	MTS-2	0.765	0.207	2.148
	MTS-3	0.038	0.096	3.14
	MTS-4	0	.	.
	MTB-1	0.963	0.001	2.62
	MTB-2	0.974	0	2.649
	MTB-3	0.038	0.918	1.038
	MTB-4	-0.316	0.427	0.729
	MTB-5	0	.	.
	PST-1	1.872	0	6.502
	PST-2	1.096	0.001	2.992
	PST-3	0.563	0.079	1.756
	PST-4	0	.	.
	Intercept	-0.311	0.752	.
	Age-1	0.399	0.655	1.49
	Age-2	-0.587	0.438	0.556
	Age-3	0.044	0.954	1.045
	Age-4	0	.	.
CGPA		B	Sig.	Exp(B)
	MRS-1	-0.954	0.049	0.385
	MRS-2	0	.	.

	Loc-1	-0.189	0.39	0.828
1.50-2.39	Loc-2	0	.	.
	MTS-1	0.996	0.153	2.708
	MTS-2	0.345	0.619	1.412
	MTS-3	-0.928	0.354	0.395
	MTS-4	0	.	.
	MTB-1	0.261	0.479	1.298
	MTB-2	0.473	0.15	1.605
	MTB-3	0.947	0.018	2.579
	MTB-4	0.925	0.021	2.522
	MTB-5	0	.	.
	PST-1	0.803	0.181	2.232
	PST-2	0.497	0.122	1.644
	PST-3	-0.76	0.027	0.468
	PST-4	0	.	.

From Table 6, Age-1, Age-2, Age-3, MRS-1, MTB-1, PST-1, and PST-2 were significant in 2.40-3.49 while MST-1, MTB-3, MTB-4, and PST-3 were significant in 1.50-2.39.

Table 7. Logit Parameter Estimates

Predictor		Coefficient	P	Exp(B)
Logit 1	Constant	0.5538	0.346	
	Age	-0.3520	0.018	0.70
	MRS	2.0602	0.000	7.85
	Loc.	0.1503	0.401	1.16
	MTS	0.0893	0.503	1.09
	MTB	-0.3493	0.000	0.71
	PST	-0.4893	0.000	0.61
Logit 2	Constant	-0.1856	0.789	
	Age	0.2653	0.123	1.30
	MRS	1.0597	0.017	2.89
	Loc	0.2126	0.312	1.24
	MTS	-0.5995	0.000	0.55
	MTB	-0.0164	0.824	0.98
	PST	-0.5373	0.000	0.58

Table 7, logit 1 (second class lower) shows that Age, Marital status, monthly budget for network subscription, and daily private study time on social media were significant. In contrast, marital status, monthly stipend, and daily private study time on social media were significant in logit 2 (Third class lower).

1.6 Model Fitting

$$Log\left(\frac{\pi(y=2/Age+..+PST}{\pi(y=1/xiAge+..+xiPST}\right) = 0.5538 - 0.3520Age + 2.0602MRS - 0.3493MTB - 0.4894PST \quad (16)$$

$$Log\left(\frac{\pi(y=3/MRS+...+xiPST}{\pi(y=1/MRS+...+PST}\right) = -0.1856 + 1.0597MRS - 0.5995MTS - 0.5373PST \quad (17)$$

V. DISCUSSION

The result from Table 2 indicates that the model fits the data significantly better than the null model since the p-value is less than 0.05. Considering the values in Table 3, all three values indicate weak correlations between the dependent variable and the set of independent variables. From Table 4, the results showed that each variable has a significant contribution to the model except location since p-values are less than 0.05. The result of the goodness of fits from Table 5 showed that in the predictions by the model, the observed values were significantly different from the predicted values hence the model does not adequately fit the data since the pvalue is less than 0.05. From Table 6, the results of the second class lower relative to second class upper showed that students who are below age 20yrs, 20 to 25yrs, and 26 to 30yrs are more likely to obtain second class lower relative to second class upper than those above 30yrs of age with significance values 0.0, 0.025, 0.016 respectively, controlling other predictor variables. In other words, students below 20 years of age are 29 times more likely to have a second class lower than those above 30. Students aged 20 to 25 are 7 times more likely to obtain second class lower than those of 30 years and above and those of age 26 to 30 are 8 times more likely to obtain second class lower than those of age 30 and above considering the odds values. The result further indicated that students who are married are more likely to have second class lower relative to second class upper than the single with a p-value of 0.0 holding other predictor variables constant. This means that students who are married are 9 times more likely to have second class lower than the single. The result also showed that students who budgeted below \$2 and \$2 to \$4 for monthly network subscriptions are more likely to obtain second-class lower relative to second-class upper than those budgeted \$6 and above with p-values 0.001, and 0.0 respectively. In other words, students who budget below \$2 and \$4 to \$6 are 3 times more likely to have second class lower than those budgeted \$6 and above. Interestingly, students who spent less than 1hr, and those who spent 1hr to 2hrs for private studies on social media are more likely to obtain second-class lower relative to second-class upper than those who spent 3hrs and above with significance values 0.00, 0.001 respectively controlling other predictor variables. In order words, students who spent less than 1 hour for private studies on social media are 7 times more likely to obtain second class lower, and those who spent 1 to 2 hours are 3 times more likely to obtain second class lower.

The results of third class lower relative to second class upper showed that those students who budgeted \$4 to \$6 for monthly network subscription and those using free mode are more likely to obtain third class relative to second class upper than those budgeted \$6 above with significance values 0.018 and 0.021 respectively. This means that students who budgeted \$4 to \$6 and those using free mode are 3 times more likely to obtain third class than those who budgeted \$6 and above.

From Table 7, logit 1 (second class lower) showed that Age, Marital status, monthly budget for network subscription, and daily private study time on social media were significant indicating that the chance of having second class lower instead of second class upper is largely dependent on age, marital status, monthly budget and daily private study time on social media with significance values 0.018, 0.000, 0.000 and 0.000, respectively. Also, from logit 2 (third class lower), marital status, monthly stipend, and daily private study time on social media were significant which indicated that the chance of obtaining third class instead of second-class upper is significantly dependent on marital status, monthly stipend and monthly budget with p-values 0.017, 0.000, and 0.000 respectively.

VI. CONCLUSION

A multinomial logit model was developed to predict the effects of social media on students' performance based on significant predictors. The findings showed that age, marital status, monthly budget for social networks, and daily private study time were significant for the second class lower (2.40 – 3.49 GPA) while marital status, monthly budget for network subscription, and private study time were also significant for the third class (1.50 – 2.49 GPA). The finding in the second class lower (2.40 – 3.49 GPA) versus second class upper (3.50 – 4.49 GPA) showed that the chance of obtaining second class lower is largely dependent on age, marital status, monthly budget for subscription, and private study time. Also, students who are below age 30yrs exhibit significantly second class lower than those of 30yrs and above. Interestingly, students who are married obtained second class lower than the single ones. Furthermore, those students who budgeted below \$2, \$2 to \$4 for monthly network subscription exhibited significantly second class lower than those budgeting \$6 above. Finally, those who spent less than 1hr, 1 to 2hrs on daily private study time obtained second class lower than those who spent 4 hours and above.

In the third class lower, the occurrence of third class is also largely dependent on marital status, monthly budget for social media, and daily private study time. Single students significantly obtain third class, those budgeted \$4 to \$6 for monthly network subscription, and those using free mode significantly exhibit third class. Finally, students that spent 3hrs to 4hrs for private studies on social media also significantly exhibit third-class lower.

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