

The Role of Social Media in Shaping Academic Performance: A Case Study using Multiple Linear Regression Analysis

Nornadiah Mohd Razali^{1*}, Nur Aliessa Azizul Rahman², Nur Aqilah Hashim³, Az'lina Abdul Hadi⁴, Nur Niswah Naslina Azid @ Maarof⁵ and Nuralina Azlan⁶

^{1,2,3,4,6}Mathematical Sciences Studies, College of Computing, Informatics and Mathematics, UiTM Negeri Sembilan Branch, 70300, Negeri Sembilan, Malaysia

⁵Mathematical Sciences Studies, College of Computing, Informatics and Mathematics, Universiti Teknologi MARA Kelantan Branch, Bukit Ilmu, Machang, Kelantan, Malaysia

Authors' email: nornadiah@uitm.edu.my*, aliessaazizul@gmail.com, aqilahflamers@gmail.com, azlinahadi@uitm.edu.my, niswah@uitm.edu.my and nuralina@uitm.edu.my

*Corresponding author

Received 15 May 2024; Received in revised 10 June 2024; Accepted 23 June 2024
Available online 30 June 2024
DOI: <https://doi.org/10.24191/jmcs.v10i1.3744>

Abstract: In the era of rapid technological advancement, social media has become an integral part of the daily lives of students, offering a platform for connectivity, information sharing, and self-expression. While these platforms have undoubtedly revolutionised communication and networking, their influence on various aspects of an individual's life, particularly on academic performance, has been a subject of growing concern and debate. This study delves into the impact of social media on students' academic performance. The Social Media Addiction Questionnaire (SMAQ) and Social Media Engagement Questionnaire (SMEQ) instruments were adopted to measure social media addiction and social media engagement of the students, respectively. A Cumulative Grade Pointer Average (CGPA) was used to measure students' academic performance. This study involved a total of 363 students selected from a public university in Malaysia through convenience sampling. A multiple linear regression analysis (MLR) was employed to analyse the impact of social media on academic performance. The results indicated that the time spent on social media per day, tolerance, and intense desire were significant predictors of students' performance, while impaired control, harmful use, and social media engagement were not significant predictors of students' performance. This research offers a comprehensive contribution by examining both the theoretical and practical dimensions of social media usage among students. Theoretically, it expands the current understanding of social media addiction by identifying specific dimensions – intense desire and tolerance – that significantly affect academic performance, emphasising the importance of viewing social media addiction as a multifaceted issue rather than a singular problem. It also provides insights into the mechanisms through which excessive social media use can hinder academic outcomes, such as decreased concentration, reduced study time, and increased procrastination.

Keywords: Academic performance, SMAQ, SMEQ, MLR, Social media.

1 Introduction

Social media networking is the intellectual, social, and political connection approach that is rapidly expanding due to its capacity to spread important information swiftly. Social media is being used by a growing number of students and members of the education community in addition to working adults [1]. The advent of platforms such as TikTok, Facebook, Twitter, and Instagram have transformed the way individuals communicate, share information, and build connections, allowing users to maintain



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relationships with others worldwide. Additionally, with the advancement of technology and the rise in internet usage, social media has become a crucial part of their daily lives.

The pervasive influence of social media has become an integral aspect of the lives of students worldwide. The use of social media platforms improves learning chances, allows for real-time contact outside of the classroom, promotes opportunities for collaboration, and improves creativity of the students. Students may also engage in open online discussions with instructors and share information about what they have learned. Moreover, social media gives students access to experts around the world, promotes interaction and cooperation among peers, and offers a forum for exchanging knowledge and concepts.

The appropriate use of social media could be beneficial to students. However, excessive use of it could be harmful and cause an addiction. Social media addiction is a type of internet addiction in which people have an overwhelming desire to use social media [2]. People who are addicted to social media usually have excessive concerns about it and are driven by an insatiable urge to access and use social media. Research has indicated that out of all ages of students, university students show the highest frequency of social media usage [3]. Students' increased use of social media for non-academic purposes usually disturbs the learning environment and impedes their ability to advance academically [4].

While social media offers numerous benefits, its impact on students' academic performance has been a subject of considerable debate and research. As students navigate the intricate balance between online engagement and academic responsibilities, it becomes imperative to understand the nuanced ways in which social media can either enhance or impede their academic achievements. Social networking sites have intrigued scholars and educators due to their growing popularity among students and the potential impact on academic performance [5].

Scholars have proven that there is a significant relationship between social media addiction and students' academic performance. When social media is used positively, it can assist students and youth in gaining knowledge that can be used to improve their academic performance [6]. However, excessive social media use by students can result in a negative impact on academic performance [7]. As cited by Safeer and Awan [8], the easy accessibility of social media on all devices encourages the students to become addicted to it, which has a negative impact on their academic performance. Students may also experience increased levels of academic burnout due to social media addiction, which negatively affects their ability to focus on academic tasks [9]. This result agrees with the previous results acquired by several other scholars [10–12]. Hence, this study aims to shed light on the relationship between social media usage and academic performance on the targeted samples, providing more insights into the challenges and opportunities that arise in contemporary educational environment.

2 Methodology

This section describes the research methodology and statistical analyses employed in the study.

A Study Design

A cross-sectional study was employed with a population of 5594 students from a selected public university in Malaysia. Based on Krejcie and Morgan [13], a total of 363 students were selected by using convenience sampling due to the unavailability of the sampling frame. A questionnaire was distributed to the students via social media platforms such as WhatsApp, Telegram, and Instagram. A duration of one month was designated for the data collection process, commencing on October 1st and concluding on October 30th, 2023.

B Research Instrument

An online questionnaire was used as a tool for data collection. The questionnaire was arranged in three sections. In the first section, respondents were asked for their age, gender, faculties, cumulative grade point average (CGPA), and a single question about the total number of hours spent using social media daily. A 20-item Social Media Addiction Questionnaire (SMAQ) in English [14] was adopted to measure internet addiction in the second section. The response to each of the SMAQ items was self-rated by the students on a 6-point Likert scale, with options being 1 (strongly disagree), 2 (disagree), 3 (weakly disagree), 4 (weakly agree), 5 (agree), and 6 (strongly agree). SMAQ was measured by four domains, namely intense desire, impaired control, tolerance, and harmful use. These domains served as the independent variables in the Multiple Linear Regression Analysis. The overall SMAQ score was the sum of individual scores for each of the 20 items, with higher scores suggesting a greater risk of addiction. In the meantime, section three contains questions to measure social media engagement. The Social Media Engagement Questionnaire (SMEQ) was adopted from Przybylski et al. [15] to measure the degree to which people's primary everyday activities are influenced by social media. The SMEQ scale has five items with eight response options ranging from 0 (Not one day) to 7 (Every day). To measure the student's academic performance, participants were asked for their cumulative GPA as of the day they filled out the questionnaire.

C Statistical Analysis

Descriptive analyses were utilised to delineate the demographic profile of the students, the total duration of daily social media usage, and the current CGPA of the students. Then, an inferential analysis was performed to investigate the influence of social media addiction (intense desire, impaired control, tolerance, and harmful use), time spent on social media, and social media engagement on students' academic performance.

i. Descriptive Analysis

Frequency tables were constructed to describe the distribution of the students by their demographic profile. On top of that, summary statistics such as mean and standard deviation were produced to describe the average time the students spent on social media per day as well as the CGPA of the students.

ii. Multiple Linear Regression (MLR) Analysis

MLR analysis was employed to describe the relationship between social media and academic performance. Specifically, the social media usage, which served as the independent variables in the MLR model, was measured by six factors: social media addiction (intense desire, impaired control, tolerance, and harmful use), time spent on social media, and social media engagement. Students' academic performance served as the dependent variable, and it was measured by the students' CGPA. The following model was estimated to identify the significant factors.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon \quad (1)$$

where Y = CGPA

β_s = Regression coefficients

X_1 = Social media addiction (Intense Desire)

X_2 = Social media addiction (Impaired Control)

X_3 = Social media addiction (Tolerance)

X_4 = Social media addiction (Harmful Use)

X_5 = Time spent on social media per day (in hour)

X_6 = Social media engagement

ε = error term

3 Results and Discussion

A Demographic Profile of the Respondents

Demographic profiles of the students were presented in Table 1. Based on gender distribution, most of the students were male, accounting for 258 (71.1%) students, while females made up the rest of the sample with a total of 105 (28.9%) students. On the other hand, in terms of faculty distribution, the most substantial cohort of students, numbering 235 (64.7%), belonged to the Faculty of Computing, Informatics, and Mathematics (CCIM). The Faculty of Sport Science and Recreation (FSR) comprised 18.5% of the students (67 students). The Faculty of Administrative Science and Policy Studies (FSPPP) comprised 16.8% of the students (61 students). Overall, the results reflect a higher representation of male students and a significant concentration of students in the CCIM faculty.

Table 1: Demographic Profile of the Students

Demographic Profile	Frequency (%)
Gender	
Male	258 (71.1)
Female	105 (28.9)
Faculty/College	
College of Computing, Informatics and Mathematics(CCIM)	235 (64.7)
Faculty of Sport Science and Recreation (FSR)	67 (18.5)
Faculty of Administrative Science and Policy Studies (FSPPP)	61 (16.8)

B Summary Statistics of CGPA and Time Spent on Social Media

Table 2 reports the average and standard deviation of CGPA and the time spent by the students on social media daily. The mean CGPA of the students is 3.31 with a standard deviation of 0.46. This indicates that, on average, students have a CGPA of 3.31, with most students' CGPA varying within ± 0.46 from the mean. Furthermore, the summary statistics suggest that while the average time spent on social media daily is around 3 hours, there is a variation in how much time students spend on social media, with the time varying widely among students. This is shown by the average time spent on social media of 3.04 hours, with a standard deviation of 2.88 hours. In summary, the data shows that while students maintain a fairly consistent CGPA, their daily social media usage varies considerably.

Table 2: Summary Statistics

Variable	Mean	Standard Deviation
CGPA	3.31	0.46
Time spent on social media daily	3.04	2.88

C The Impact of Social Media on Student's Academic Performance

The MRL model was estimated to analyse the relationship between social media and students' academic performance. As an initial step to the analysis, the estimated model was checked for its adequacy by ensuring that the model fulfilled all the assumptions of the MLR model. Figure 1 shows the normal probability plot of the residuals. It portrays that the errors are normally distributed since almost all points lie approximately on the 450 line. The plot of residuals versus predicted values is presented in Figure 2, and it reveals that the homogeneity of variance assumption is also fulfilled since the figure depicts no obvious systematic pattern. The figure also indicates that there is a linear relationship

between the dependent variable and independent variables. The VIF values of less than 10 and TOL values of more than 0.20, shown in Table 3, for all variables indicate the absence of multicollinearity problems. Therefore, all assumptions of the MLR model are fulfilled. The model is appropriate and can be used to describe the impact of social media on students' academic performance.

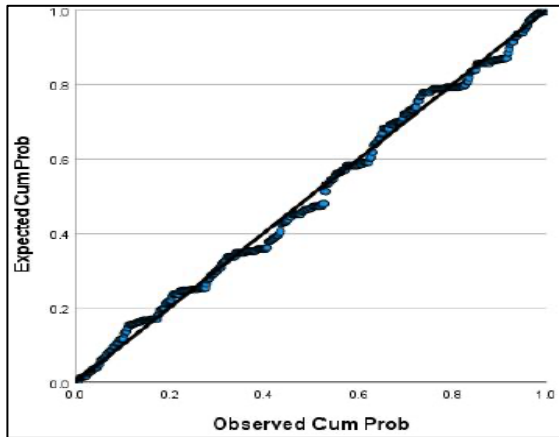


Figure 1: Normal Probability Plot of the Residuals

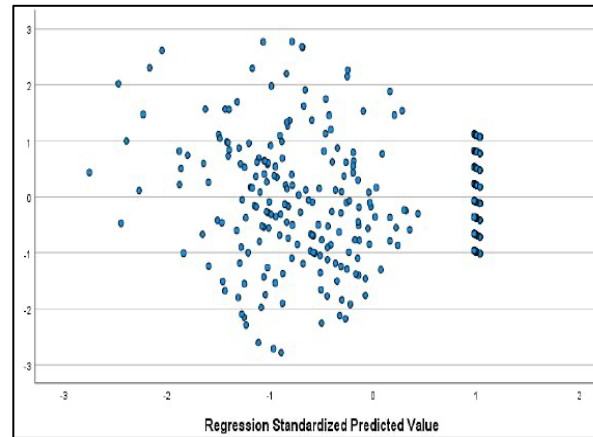


Figure 2: Plot of Residuals Versus Predicted Values

The p-value for the ANOVA F test is less than 0.05, suggesting that the regression model fits the data well. The estimated regression model is appropriate and can significantly be used to describe the relationship and predict students' academic performance based on social media usage.

Table 3: Summary of MLR Results

Variables	Parameter Estimate	t-statistic	p-value	TOL	VIF
Intense desire	-0.032	-10.272	<0.001	0.340	2.940
Impaired control	-0.011	-1.184	0.237	0.323	3.100
Tolerance	0.027	3.025	0.003	0.361	2.769
Harmful use	0.006	0.839	0.402	0.579	1.726
Time spent on social media per day	-0.020	-2.290	0.023	0.484	2.064
Social media engagement	0.005	1.220	0.223	0.317	3.154
p-value for ANOVA F Test = 0.000					

Based on Table 3, intense desire ($p < 0.001$), tolerance ($p = 0.003$), and time spent by the students on social media per day ($p = 0.023$) have a significant impact on students' academic performance, while other independent variables in the MLR model do not have a significant impact on the academic performance. Therefore, the final estimated regression model can be written as:

$$Y = -0.032 * \text{Intense desire} + 0.027 * \text{Tolerance} - 0.020 * \text{Time spent} \quad (2)$$

The parameter estimates indicate a decrease in CGPA by 0.032 as the intense desire score increased by one. Meanwhile, for tolerance, the CGPA increased by 0.027 as the tolerance score increased by one. Moreover, as the time spent by the students on social media per day increases by one hour, the CGPA decreases by 0.02.

4 Conclusion

Social media has become an integral part of daily life, especially among students. While it offers numerous benefits, its impact on academic performance can be mixed. The impact of social media on academic performance depends largely on how students manage their time and use these platforms. Students must learn how to use social media responsibly so that its positive effects outweigh its

drawbacks. This study investigated the association between students' academic performance and social media addiction, social media engagement, and time spent on social media. Two of the four dimensions of social media addiction, namely intense desire and tolerance, were found to be significantly related to students' academic performance. This indicates that social media addiction did play an important role in determining students' academic achievement. The strong urge or craving to use social media worsened students' academic performance. In addition, the longer students spent on social media to achieve the desired satisfaction level, the lower was their academic performance. The findings also demonstrated that SMEQ was not a significant predictor, suggesting that students' academic achievement was unaffected by their engagement with social media. Although the objective of the study was accomplished, there were some aspects of the study that could be improved in the future. For instance, the results of the study could be improved by considering more factors that contribute to the internet addiction. Moreover, future researchers could consider using a more recent instrument in measuring social media addiction and social media engagement.

This research on social media addiction and its impact on academic performance offers a comprehensive contribution by examining both the theoretical and practical dimensions of social media usage among students. Theoretically, it expands the current understanding of social media addiction by identifying specific dimensions – intense desire and tolerance – that significantly affect academic performance, emphasising the importance of viewing social media addiction as a multifaceted issue rather than a singular problem. It also provides insights into the mechanisms through which excessive social media use can hinder academic outcomes, such as decreased concentration, reduced study time, and increased procrastination. Practically, the study provides actionable guidance for educational institutions, educators, and students. It emphasises the need for effective time management and self-regulation to balance the benefits and risks of social media, highlighting the potential for responsible social media use as an educational tool when used mindfully.

Acknowledgements

This study received no specific funding from public, commercial, or not-for-profit funding agencies. Approval has been granted from the UiTM Research Ethics Committee to conduct the study.

Conflict of Interest Statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

References

- [1] V. Raut, and P. Patil, Use of social media in education: Positive and negative impact on the students. *International Journal on Recent and Innovation Trends in Computing and Communication*, 4(1), 281–285, 2016.
- [2] Y. Hou, D. Xiong, T. Jiang, L. Song, and Q. Wang, Social media addiction: Its impact, mediation, and intervention. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 13(1), Article 4. Retrieved from <https://cyberpsychology.eu/article/view/11562> doi: 10.5817/CP2019-1-4, Feb 2019.
- [3] S. M. Azizi, A. Soroush, and A. Khatony, The relationship between social networking addiction and academic performance in Iranian students of medical sciences: A cross-sectional study. *BMC Psychology*, 7(1). doi: 10.1186/s40359-019-0305-0, 2019.
- [4] M. A. Bekalu, R. F. McCloud, and K. Viswanath, Association of social media use with social well-being, positive mental health, and self-rated health: Disentangling routine use from emotional connection to use. *Health Education & Behavior*, 46, 2019.
- [5] S. Sudha, and E. Kavitha, The effect of social networking on students' academic performance: the perspective of faculty members of Periyar University, Salem. *Library Philosophy and Practice* (ejournal), 1455, 2016.

- [6] H. Hasnain, A. Nasreen, and H. Ijaz, Impact of social media usage on academic performance of university students. In *2nd International Research Management & Innovation Conference (IRMIC)* (pp. 26–27), 2015.
- [7] J. J. Al-Menayes et al., Social media use, engagement and addiction as predictors of academic performance. *International Journal of Psychological Studies*, 7(4), 86–94, 2015.
- [8] R. Safeer, and A. G. Awan, Effects of social media on student's performance in examination. *Global Journal of Management, Social Sciences and Humanities*, 7(1), 182–204, 2021.
- [9] C. Jiao, and I. Fazilah, The relationship between Social Media Addiction, Academic Burnout, and Academic Performance among UKM Undergraduate Students: A preliminary study, *Jurnal Personlia Pelajar*, 26(1),1-17, 2021.
- [10] A. H. Busalim, The impact of Facebook Addiction and self-esteem on students' academic performance_ A multi-group analysis. 14, 2019.
- [11] V. Ndubuaku, V. Inim, U. C. Ndudi, U. Samuel, and A. I. Prince, Effect of Social Networking Technology Addiction on Academic Performance of University Students in Nigeria. 8(5), 8, 2020.
- [12] B. Foroughi, M. D. Griffiths, M. Iranmanesh, and Y. Salamzadeh, Associations between Instagram addiction, academic performance, social anxiety, depression, and life satisfaction among university students. *International Journal of Mental Health and Addiction*, 20(4), 22212242, 2022.
- [13] R.V. Krejcie and D.W. Morgan, "Determining Sample Size for Research Activities", *Educational and Psychological Measurement*, 30(3), 607–610, 1970.
- [14] S. Basu, R. Sharma, P. Sharma, and N. Sharma, Addiction-like behavior associated with social media usage in undergraduate students of a government medical college in Delhi, India. *Indian Journal of Psychiatry*, 63(1), 35, 2021.
- [15] A.K. Przybylski, K.Murayama, C.R. DeHaan, and V. Gladwell, Motivational, Emotional, and Behavioral Correlates of Fear of Missing Out, *Computers in Human Behavior*, 29, 1814-1848, 2013.