"Mediating Effect of Academic Self-Regulation to Facebook Usage and Mathematics Performance"

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ABSTRACT

This study examined the relationship between Facebook usage and students' mathematics performance, and whether academic self-regulation mediated this relationship. Using a quantitative descriptive-correlational design, data were collected from 322 first-year students at Monkayo College of Arts, Sciences, and Technology via an adopted survey instrument. Analyses included mean, standard deviation, Pearson r, multiple regression, and Sobel z-value. Results showed high self-regulation in self-planning, monitoring, instruction, and reaction, but low self-evaluation. Facebook usage was high, with most students spending three to five daily hours. Students' mathematics scores indicated near mastery. There was a negligible negative correlation between Facebook hours and mathematics performance, while reasons for Facebook use were not significantly related. Mediation analysis suggested partial mediation by self-regulation, but the Sobel test found the indirect effect not statistically significant. Overall, findings suggest Facebook usage and academic self-regulation influence mathematics performance, but other factors may also contribute.

Keywords: mathematics education, academic self-regulation, Facebook usage, mathematics performance, universal sampling, descriptive-correlation

INTRODUCTION

Background of the Study

Mathematics is considered a basic foundation of science and technology. It helps students better understand other subjects and serves as an important base for academic success. Mazana et al. (2019) stated that, although it is highly valued, many students continue to struggle to understand the subject. It has been considered a major concern in the field of education. Students still continue to demonstrate low performance in Mathematics.

Across various countries, poor mathematics performance has been identified as a problem in classrooms. For instance, a study conducted by Fitriati (2024) on ongoing difficulties in mathematics among students in Indonesia revealed poor mathematics performance due to difficulty achieving satisfactory levels. As a developing country, Indonesia needs to respond quickly to the challenges of the 21st century. Similarly, Markus (2019) pointed out an important concern: the consistently low performance of Indonesian students in mathematics, a pattern widely reported in several studies over the past decade. It is supported by the results of the Program for International Student Assessment (PISA), which also showed that the students' mathematics achievement in Indonesia has remained low and relatively unchanged, with average scores of 375 in 2012, 386 in 2015, and 375 in 2018. These alarming records indicate a widespread learning crisis affecting international students. This is not only caused by teaching gaps. Karikari et al. (2020) said that students' study habits were the primary cause of poor mathematics performance. This country's data only show that mathematics remains an issue in academic performance.

In the Philippine setting, students' mathematics performance continues to decline in international standards. Based on the 2022 PISA, the Philippines ranked 77th out of 81 participating countries, placing it among the lowest-performing nations in mathematics (Ines, 2023). Consistently, national assessments such as the National Achievement Test (NAT)have revealed persistently low scores. Furthermore, Galabo et al.(2018)

found that public school students in Davao City exhibited significant gaps in basic mathematical competencies, reflecting national trends and indicating a systemic issue in mathematics learning.

Moreover, in the local context of Monkayo, Davao de Oro, students face similar challenges in mathematics performance. At Monkayo College of Arts, Sciences, and Technology (MonCAST), where the researcher is currently teaching, she observed that many students struggle to understand and apply mathematical concepts. Many of them also struggle with simple mathematical problems and often feel confused when working with numbers, formulas, and calculations. In fact, several students lack a clear understanding of basic mathematics, such as simple operations.

Furthermore, this research aimed to evaluate the relationship between Facebook usage and mathematics performance in tertiary-level students, and more importantly, how academic self-regulation might play a role in that relationship. The goal is to understand whether students who manage their learning well are less affected by Facebook use in terms of their mathematics performance.

Statement of the Problem

This study focused on determining the relationship between Facebook usage and the student's mathematics performance, and examined whether academic self-regulation mediates this relationship. Particularly, it sought to answer the following questions:

1. What is the level of students' academic self-regulation in terms of:

1.1.self-planning;

1.2.self-monitoring;

1.3.self-instruction;

1.4.self-evaluation; and

1.5.self-reaction?

2. What is the level of students' Facebook usage in terms of:

2.1.reasons in using;

2.2.hours spent?

3. What is the student's mathematics performance in Mathematics in the Modern World in terms of test scores for the first semester of Academic Year (A.Y.) 2025-2026?

4. Is there a significant relationship between student's Facebook usage in terms of their reasons in using it and their mathematics performance?

5. Is there a significant relationship between students' Facebook usage in terms of hour spent and mathematics performance?

6. Does academic self-regulation, in terms of self-planning, self-monitoring, self-instruction, self-evaluation, and self-reaction mediate students' Facebook usage and mathematics performance?

METHODOLOGY

Research Respondents

The respondents of this study were first-year college students taking up Bachelor of Secondary Education

(BSED), Bachelor of Elementary Education (BEED), and Bachelor of Business Administration (BSBA) program at MonCAST enrolled during the first semester of the 2025-2026 school year having 1977 number of students in total. They were chosen because they represented the population of first year college students who has Mathematics in the Modern World subject and was exposed to Facebook usage. Students from the Agriculture Department were excluded because they were not enrolled in the subject Mathematics in the Modern World for the semester and, therefore, do not meet the criteria for inclusion in the study.

Furthermore, this study had 322 sample size. The sampling technique used in selecting research respondents was universal sampling. This method involves all members of a defined population in a study, ensuring that every individual meeting the inclusion criteria is part of the sample. The table below shows the distribution of the respondents per program.

Respondents of the Study

Program/Course	**Respondents**
BSBA- Marketing Management	87
BSBA- Financial Management	61
BSBA- Human Resource Management	93
BSED- English	23
BSED- Mathematics	13
BSED- Social Studies	26
BEED- Generalist	19
Total	**322**

Data Collection Procedure

The following procedures were followed in collecting the data for this study.

Securing permission to conduct the study. The researcher requested an endorsement letter from the Dean of the Graduate School of the Assumption College of Nabunturan (ACN) to conduct this study. The researcher requested a copy of ethical clearance by sending a letter to ACN ethics and review committee. After that, the researcher submitted a request letter to conduct the study to Monkayo College of Arts, Sciences and Technology. Once confirmation received, the administration of survey questionnaire to the research respondents were followed.

Distribution of Survey Questionnaires. The questionnaire was directly distributed to the research respondents and was thoroughly explained by the researcher to guide the students. Respondents were given enough time to answer.

Retrieval of Questionnaires. After completing the questionnaire, the researcher immediately collected the instrument.

Data Gathering and Confidentiality. The collected data was encoded and analyzed based on the research problems. The researcher observed confidentiality to the data collected. The data was submitted to the school's statistician for the computation. The researcher was interpreted and made conclusions out of the results.

Data Analysis Plan

This research is a quantitative-correlational research design. The research instrument used in conducting the study was a survey questionnaire adopted from Imam & Samsodin (2024) for Facebook Usage and Akhtar &Mahmood (2013) for Academic Slef-Regulation.

The following tools were used in the analysis and interpretation of the collected data.

Mean. It was used to determine the level of academic self-regulation, Facebook usage, and mathematics performance of the respondents.

Pearson Product Moment Correlation (Pearson r). It was used to determine the significant relationships between Facebook Usage and Student's Mathematics Performance.

Multiple Linear Regression. This was used to determine the mediating effect of Academic Self-regulation to students' Facebook usage and mathematics performance

Sobel z-value. It will be utilized to determine the value for mediating effect of academic self-regulation to Facebook Usage and student's Mathematics Performance.

RESULTS AND DISCUSSION

This part presents the results obtained from the collected data and the subsequent analyses and interpretation based on the problems. This presents the level of academic self-regulation, level of Facebook usage, mathematics performance, Correlation Analysis between Facebook Usage and Student's Mathematics Performance, and Mediating Effect of Academic Self-Regulation on the Relationship between Facebook Usage and Mathematics Performance.

Level of Academic Self-Regulation as Perceived by the Respondents

This section presents the results addressing the first statement of the problem, which examines the level of academic self-regulation as perceived by the respondents in terms of self-planning, self-monitoring, self-instruction, self-evaluation, and self-reaction.

Self-Planning. Table 1 presents the results of perceived academic self-regulation in terms of self-planning.

Table 1. Self-Planning

Indicators	Mean	Description
I consciously make sure that my class attendance does not go below 80%.	3.39	High
I can perform well all activities in the class assigned by the instructor.	3.15	High
I keep record of all class notes provided by the instructors.	3.15	High
I compete with the high achievers among my class fellows.	2.51	High
I set goals for attaining grades in the class.	3.08	High
I am regular in class because I am well aware of rules to be dropped from a course.	3.23	High
I work to get first position in the class.	2.53	High
I always submit my written assignment to my instructor before other students in the class.	2.73	High

I always come five minutes before class time.	2.87	High
I work just to pass this course.	3.08	High
Overall Mean	**2.97**	**High**

As reflected in the table, the overall mean of 2.97, described as high, indicates that students' academic self-regulation in terms of self-planning is often evident. The item "I consciously make sure that my class attendance does not go below 80%" has the highest mean, 3.39, with a descriptive rating of "high". This implies that students' academic self-regulation is often evident. However, the lowest mean of 2.51 was acquired by the item, "I compete with the high achievers among my class fellows" with a descriptive rating of "high," reflecting that academic self-regulation of the students is oftentimes evident.

Self-Monitoring. Table 2 presents the results of perceived academic self-regulation in terms of self-monitoring.

Table 2. Self-Monitoring

Indicators	**Mean**	**Description**
I am aware of disciplinary rules and regulations of semester system.	3.35	High
I know about the promotion rules of semester system.	3.18	High
My good performance in the class is the result of instructor's motivation.	3.22	High
I am well aware of Grade Point Average (GPA) system of assessment and evaluation.	3.40	High
I know about the means through which my assessment will be made in semester system.	3.12	High
My good performance in the class is due to the support of my family and friends.	3.20	High
Use technical terms in the classroom learning is sometime difficult but helpful in understanding the subject.	3.11	High
Overall Mean	**3.23**	**High**

As shown in Table 2, the overall mean of 3.23, described as high, indicates that students' academic self-regulation, particularly self-monitoring, is often evident. The item, "I am well aware of the Grade Point Average (GPA) system of assessment and evaluation", has the highest mean of 3.40, described as "high," which means that the academic self-regulation of the students is oftentimes evident. Meanwhile, the item "Use of technical terms in classroom learning is sometimes difficult but helpful in understanding the subject" obtains the lowest mean of 3.11 with descriptive rating of "high", indicating that the academic self-regulation of the students is oftentimes evident.

Self-Instruction. Table 3 presents the results of perceived academic self-regulation in terms of self-instruction.

Table 3. Self-Instruction

Indicators	**Mean**	**Description**
Assignment method is very boring and useless in learning situation.	2.62	High
I give up/skip difficult parts of learning material provided.	2.59	High

I usually rely on cramming the learning material.	2.28	Low
I like study in group because that enhances my learning ability.	2.99	High
I can search the reading material given as assigned by the instructor.	3.07	High
I use highlighting, heading, chunking and other study helps in learning books and other materials.	3.11	High
I feel difficult to complete assignment given by the teacher in time.	2.35	Low
Overall Mean	**2.72**	**High**

Table 3 shows that the overall mean of 2.72, which falls under the descriptive rating of high, indicates that the students' academic self-regulation in terms of self-instruction is oftentimes evident. The item "I use highlighting, heading, chunking and other study helps in learning books and other materials" has the highest mean of 3.11, described as "high," indicating that students' academic self-regulation is often evident. In contrast, the item "I usually rely on cramming the learning material." has the lowest mean of 2.28, with a descriptive rating of "low," indicating that the student's academic self-regulation is rarely evident.

Self-Evaluation. Table 4 presents the results of perceived academic self-regulation in terms of self-evaluation.

Table 4. Self-Evaluation

Indicators	**Mean**	**Description**
I am hesitant to speak English and to take part in class discussion in English language.	2.13	Low
I feel hesitant when I am asked to present assigned work in front of the class.	2.16	Low
I am not satisfied with my performance in the class.	2.29	Low
Overall Mean	**2.19**	**Low**

As shown in the table, the overall mean of 2.19, which is described as low, indicates that students' academic self-regulation in terms of self-evaluation is rarely evident. The highest mean of 2.29, described as "low", was obtained by the item, "I am not satisfied with my performance in the class". This means that the student's academic self-regulation is rarely evident. Meanwhile, the lowest mean of 2.13, described as "low", was obtained by the item "I am hesitant to speak English and to take part in class discussion in the English language". This implies that the student's academic self-regulation is rarely evident.

Self-Reaction. Table 5 presents the results of perceived academic self-regulation in terms of self-reaction.

Table 5. Self-Reaction

Indicators	**Mean**	**Description**
I participate in classroom discussions to enhance my understanding of the lesson and improve my grades.	3.06	High
I usually study according to the study schedule set by myself.	3.02	High
My good performance in the class is due to my own efforts.	3.25	High

Overall Mean	**3.10**	**High**

As shown in the table, the overall mean of 3.10, which is described as high, indicates that students' academic self-regulation in terms of self-evaluation is often evident. The highest mean of 3.25, described as “high”, was obtained by the item, “My good performance in the class is due to my own efforts”. This means that the student's academic self-regulation is rarely evident. Meanwhile, the lowest mean of 3.02, described as “high”, was obtained by the item “I usually study according to the study schedule set by myself”. This implies that the student's academic self-regulation is rarely evident.

Level of Facebook Usage as Perceived by the Respondents

This section presents the results addressing the second statement of the problem, which examines the level of Facebook Usage as perceived by the respondents, including reasons for use and hours spent.

Reasons in Using. Table 6 presents the results of the level of Facebook usage of the respondents in terms of their reasons for using Facebook.

Table 6. Reasons in Using

Indicators	**Mean**	**Description**
Facebook helps me gain more knowledge in school activities.	2.83	High
Facebook is like a habit to me in this age.	3.06	High
I am using Facebook for academic purposes.	2.76	High
I am using Facebook to contact my family.	3.46	High
Because of using Facebook app, I cannot be able to finish my homework in school.	2.59	High
I am using Facebook while in the classroom.	2.28	Low
I am using Facebook while the teacher is discussing the lesson.	1.82	Low
I am using Facebook to entertain myself alone while the teacher is not around.	2.80	High
Facebook can improve my reading skills.	2.91	High
Overall Mean	**2.72**	**High**

Table 6 shows an overall mean of 2.72, described as high, indicating that students’ reasons for using Facebook are often evident. The item “I am using Facebook to contact my family” has the highest mean of 3.46, with a descriptive rating of “high,” indicating that students’ reason for using Facebook is often evident. On the other hand, the lowest mean of 1.82, which is described as “low”, was obtained by the item “I am using Facebook while the teacher is discussing the lesson”. This indicates that the students’ reasons for using Facebook rarely manifest.

Hours Spent. Table 7 presents the results of the level of Facebook usage of the respondents in terms of their hour spent for using Facebook.

Table 7. Hours Spent

Hour Spent	Frequency	Percent
Less than 3 hours	72	22.4%
3-5 hours	116	36%
6-8 hours	70	21.7%
9-10 hours	43	13.4%
Over a day	21	6.5%
Total	**322**	**100%**

As shown in the table, the most common frequency is 3-5 hours, with 116 respondents (36%), indicating that most students spend several hours on Facebook each day. On the other hand, the lowest frequency is over a day, with 21 respondents (6.5%), indicating that only a few students spend an excessive amount of time on Facebook.

Students' Mathematics Performance

This section presents the results addressing the third statement of the problem, which examines the students' mathematics performance in Mathematics in the Modern World for the first semester of Academic Year (A.Y.) 2025-2026.

Table 8. Mathematics in the Modern World Performance

Indicator	Mean Score	Proficiency Level	Mastery Level
Test Scores in Mathematics in the Modern World	32.93	51-74	Near Mastery

As presented in Table 8, the students obtained a mean score of 32.93 in their final examination. Based on the Mastery Level Classification, the computed range of 51–74 corresponds to Near Mastery. This result indicates that the students demonstrate a moderate level of understanding of the mathematical concepts covered in the course. While the students show some competence in Mathematics in the Modern World, there is still a need for improvement to reach the Mastery level or higher.

Pearson's Correlation Analysis between Facebook Usage and Student's Mathematics Performance

This section presents the results addressing the fourth and fifth statement of the problem, which examines the relationship between Facebook Usage and students' Mathematics Performance.

Table 9. Correlations

Variable	P-value	Correlation	Remarks	Interpretation
Hour Spent and Score	0.000	-0.223 (negligible correlation)	Reject Ho_1	Significant
Reasons and Score	0.712	-0.021 (negligible correlation)	Accept Ho_2	Not Significant

Table 9 shows that there is a significant but negligible negative correlation between the number of hours spent on Facebook and students' mathematics performance (r= -0.223, p= 0.000). This indicates that as the hours spent on Facebook increase, the mathematics scores tend to decrease, although the relationship is weak. On the other hand, the correlation between students' reasons for using Facebook and mathematics performance is not

significant and negligible (r= -0.021, p= 0.712). This suggests that the reasons why the students use Facebook do not significantly affect their mathematics scores.

Mediating Effect of Academic Self-Regulation on the Relationship between Facebook Usage and Mathematics Performance

This section presents the results for the sixth statement of the problem which examine the mediation analysis to determine whether academic self-regulation mediates the relationship between students' Facebook usage and their mathematics performance.

Academic Self-Regulation as a Mediator to Facebook Usage and Math performance. Table 10 presents the regression analysis used to examine the mediating effect of academic self-regulation on the relationship between Facebook usage and mathematics performance. The analysis follows the four-step procedure commonly used in mediation analysis.

Table 10. Regression Analysis of Facebook Usage, Academic Self-regulation, and Mathematics Performance

Step	Path	Direction of Path	Unstandardized Beta		Standardized Coefficients	p-value	Remarks
			B	Std. Error	B		
1	c	Facebook Usage → Math Performance	0.975	0.025	0.970	0.000	Significant
2	a	Facebook Usage → Academic Self-regulation	11.393	1.241	0.687	0.000	Significant
3	b	Academic Self-regulation → Math Performance	0.042	0.005	0.687	0.000	Significant
4	c'	Facebook Usage → Math Performance (with mediator, Academic Self-regulation)	11.452	4.107	0.680	0.006	Significant

Table 10 shows the four-step procedure in mediation analysis. Step 1 (path c) presents the linear regression analysis to test the direct effect of Facebook Usage on Mathematics Performance. The result shows the standardized beta coefficient is 0.970, with a p-value of 0.000, which implies significance. This result means that the Facebook usage significantly predicts the mathematics performance of the students, and hence test for a mediator is meaningful, since the direct effect is statistically significant.

Step 2 (path a), Facebook usage was regressed on academic self-regulation to determine whether Facebook usage significantly predicts the mediator. The results are noteworthy, with a standardized beta coefficient of 0.687 with a p-value of 0.000 and less than α=0.05, which is statistically significant. This result indicates that students' Facebook usage can also predict their academic self-regulation. In other words, variations in students' Facebook usage are associated with differences in their level of academic self-regulation.

Step 3 (path b) examined the effect of academic self-regulation on mathematics performance. The regression analysis generated a standardized beta coefficient of 0.687 with a p-value of 0.00, showing a significant relationship. This suggests that academic self-regulation significantly predicts mathematics performance. Students who demonstrate higher levels of academic self-regulation tend to perform better in mathematics.

Step 4 (path c') tested the effect of Facebook usage on mathematics performance while controlling for the mediator, academic self-regulation. The result shows a standardized beta coefficient of 0.680 with a p-value of 0.006, which remains statistically significant. However, the beta coefficient decreased from 0.970 (path c) to

0.680 (path c') after the mediator was introduced into the model. Additionally, since the p-value is 0.006 at c', which means significant, only "partial mediation" is obtained. This further implies that the academic self-regulation partially accounts for the relationship between Facebook usage and math performance of the students.

Based on the result on the computation of mediating effects, the Sobel test yielded a z-value of 0.553 with a p-value of 0.580. Since the z-value is less than the critical value for significance (±1.96 for a 95% confidence level, α=0.05), thus, it is not significant. This non-significant result indicates that the indirect effect of the independent variable, Facebook usage, on the dependent variable, math performance, through the academic self-regulation is not statistically significant at the conventional level.

The non-significant p-value and relatively low z-value from the Sobel test suggest that the indirect effect through the mediator might be small or non-existent. This result is supported by the computed percent of total effects mediated with only 48.66% of the total effect of Facebook usage on math performance goes through the academic self-regulation, and 41.34% of the total effect is either direct or mediated by other variables not included in the model.

In relation to the null hypothesis, these findings suggest that academic self-regulation does not play a mediating role in the relationship between Facebook usage and mathematics performance. Therefore, the third null hypothesis (Ho_3) is accepted. This implies that aspects of academic self-regulation do not contribute to explaining how Facebook usage is related to students' performance in mathematics.

CONCLUSION

Based on the results, it was presented that students demonstrate a high level of academic self-regulation in terms of self-monitoring, self-planning, self-instruction, and self-reaction; this means that behaviors are oftentimes evident in their learning practices. However, self-evaluation was found to be rarely evident, suggesting that students may have difficulty reflecting on and assessing their own academic performance. In terms of Facebook usage, the students' reasons for using Facebook are highly manifested, and most students spend around three to five hours on the platform. Meanwhile, the students' mathematics performance falls under the near mastery level, indicating a moderate understanding of the course concepts with room for improvement.

The relationship analysis revealed that the hours spent on Facebook have a significant relationship with students' mathematics performance, while the reasons for using Facebook have no significant relationship with their performance. This suggests that the amount of time spent on Facebook may influence students' academic outcomes, whereas the purpose of using the platform does not necessarily affect their mathematics achievement.

Furthermore, the mediation analysis indicates that Facebook usage significantly predicts mathematics performance and also predicts students' academic self-regulation. Academic self-regulation is likewise a significant predictor of mathematics performance. When academic self-regulation is introduced as a mediator, the relationship between Facebook usage and mathematics performance remains significant but decreases in strength, indicating partial mediation. This means that academic self-regulation partly accounts for the relationship between Facebook usage and students' mathematics performance.

RECOMMENDATIONS

Based on the study results and findings, the researchers put forth the following recommendation.

Learners. Students are encouraged to strengthen their academic self-regulation skills, particularly in the area of self-evaluation, by regularly reflecting on their learning progress, identifying their strengths and weaknesses, and adjusting their study strategies accordingly. They should also manage their time spent on Facebook and other social media platforms to ensure that it does not interfere with their academic responsibilities, especially in subjects such as mathematics that require focus and consistent practice.

Instructors. Teachers may incorporate strategies that promote academic self-regulation among students, such as goal-setting activities, reflective learning tasks, and regular feedback on students' performance. Instructors may also guide students in developing responsible and balanced use of social media while encouraging learning strategies that enhance mathematical understanding and performance.

Parents. Parents are encouraged to monitor and guide their children's use of social media at home to help them maintain a balanced schedule between online activities and academic responsibilities. Providing support, encouragement, and a structured study environment may also help students improve their self-regulation skills and academic performance.

School Administrators. School administrators may consider developing programs or workshops that promote digital responsibility and effective time management among students. Implementing initiatives that strengthen students' self-regulated learning skills and integrating support programs for mathematics learning may also help improve academic outcomes.

Future Researchers. Future studies may explore other factors that could influence students' mathematics performance aside from Facebook usage and academic self-regulation. Researchers may also consider using a larger sample size, examining other social media platforms, or applying different research designs to further investigate how social media use and self-regulation affect academic performance.

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