# Social media use and academic performance among high school students: Roles of purpose of use and time spent on social media

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#### Abstract

Studies have shown that social media (SM) can influence academic performance both positively and negatively depending on the students' social media use (SMU) behaviors. This study examines the influence of purpose of SMU, time spent on SM and their interaction on students' academic performance. The sample comprised 197 Grades 11 and 12 students from a private high school in Addis Ababa. We collected data on students' academic performance from official school records and the students' demographics and SMU behaviors through a survey questionnaire The findings indicated that slightly more than 60% of the students used SM for non-educational purposes and on average these students spent more time on SM than those who used SM for educational purposes. The students who used SM for educational purposes scored significantly higher in all four subjects (English, mathematics, chemistry and physics) than those who used SM for non-educational purposes. Students who spent shorter time on SM daily scored significantly better in all four subjects than those who spent longer. The purpose-by-time interaction effect is, however, not statistically significant. In conclusion, the findings showed that spending more time on SM contributes negatively to students' academic performance irrespective of the purpose of SMU.

# Introduction

Social media (Facebook, twitter, YouTube, etc.) have made communication between/among individuals and groups much easier and faster. Consequently, they have gained popularity around the globe. The number of social media users in the world, according to a recent estimate, is more than five billion while the figure for Africa is more than 600 million (Internet World Stats, 2021). The same source estimated the number of social media

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users in Ethiopia to be more than 21 million. The source further indicated that the internet growth rate in Ethiopia from 2000 to 2021 was 211.4%.

Despite their popularity, social media have negative consequences as well as benefits (Badri et al., 2017). In particular, if social media (SM) are not used properly, their disadvantages outweigh their benefits (Azizi et al., 2019). The use of SM, for example, can have both negative and positive influence on students' academic performance (Talaue, 2018) depending on whether they use it for academic or non-academic purposes. How long students stay on SM is also an important factor.

On the positive side, studies have found several positive impacts of social media use (SMU). For example, while social media is crucial in disseminating information and knowledge within shortest period of time (Sood et al., 2020), it also enhances students' participation, cooperation and access to a wealthy of instructional materials (Adelakun et al., 2023). Furthermore, Jacobsen and Forste (2011) disclosed a significant positive association between SMU and face-to-face social interaction among first year university students. More specifically, for every hour increase on average in SM exposure, average face-to-face interaction increased by about 10 to 15 minutes. They concluded that SMU facilitates rather than replaces face-to-face social interaction. Other benefits reported in the literature include enhanced communication, social connection and technical skills (Miah et al., 2012).

On the other hand, a number of studies have investigated the relationship between SMU and academic performance among university and high school students. Whereas the majority of the available studies reported negative association, a few studies have found positive associations at least in some academic activities. For example, Mingle and Adams (2015) found somewhat mixed results among high school students in Ghana. Whereas the results showed that social media use has negative effects such as poor grammar, late submission of assignment, less study time and poor academic performance, there were respondents who showed improvement in their reading skills as a result of their participation on social media. It should be noted that researchers (e.g., Alwagait et al., 2015) have also found no linear relationship between SMU and GPA among university students. Studies that investigated the association between SMU and academic performance reported significant negative association (e.g., Jacobsen & Forste, 2011; Miah et al., 2012; Nsizwana et al., 2017). That is, obsessive use of SM among students is associated with lower academic performance. Similar findings were reported by Tayo et al. (2019), which linked poor writing and spelling skills to excessive social media use among Nigerian undergraduate university students.

But what does the literature say about the association between purpose of students' SMU and their academic performance on the one hand and time spent on SM and academic performance on the other?

Students can use SM for different purposes. Many use SM simply as pastime and fun activity while others use them for educational purposes (Akyildiz & Argan, 2012; Sanchez et al., 2014). Still others use them to discuss different issues with people of their kind, share information, establish or maintain relationships, get entertained and share media such as pictures and videos (Gwena et al, 2018). Furthermore, students use social media to exchange text messages, to follow their friends, to catch up news, to listen to music and to download new applications (Bal & Bicen, 2017).

Students may use SM for one purpose or another, but so long as they use them for non-academic purposes, the use would compete for students' attention as well as their time (Kirschner & Karpinski, 2010). That is, if a student for example uses SM exclusively for recreational purposes, this kind of use would compromise time to spend on study or doing homework. On the other hand, if students use SM for academic purposes, such use could be worthwhile because it may help the students benefit academically from their stay on SM and perform well at school.

Unfortunately, studies show that most students tend to use SM for social rather than academic purposes. According to Akyildiz and Argan (2012), for example, even though students use Facebook for social and educational purposes, they mostly use SM for social purposes (e.g., to have fun, to contact with friends, to follow photos, videos and events) rather than for education or schooling purposes. Research (e.g., Mulisa & Getahun, 2018) has also shown that the leading perceived benefits of SMU for secondary school students are recreational and relational; i.e., the role of SMU on students' academic activities is not a primary consideration for secondary school students. Thus, excessive usage of social media by students for non-academic purposes leads to poor academic performance through decreased study time and increased procrastination (Farrell & Burnton, 2020).

In general, despite differences in the exact proportions, they reported, most studies consistently showed that far smaller proportions of students, be they high school or college students, used social media mostly for academic purposes. A quick survey of available studies by the present authors indicates that the proportion of students who use social media for academic purposes could be as small as one percent (Kolhar et al., 2021), 6.4 percent (Alharahsheh & Obeidat, 2019) or 16.2 percent (Kolan & Dzandza, 2018). Associated with this, there is fear among parents, teachers, and leaders of high schools and colleges that if students use SM mostly for recreational and social purposes rather than for academic purposes, it would detrimentally affect their academic performance.

In brief, as with parents and teachers, researchers are concerned that students' SMU mostly for nonacademic purposes would negatively affect their academic performance. Despite the concern, only a handful of researchers (e.g., Hameed et al., 2022) have directly investigated the issue. That is, the topic has so far attracted limited research attention. A study of the academic performance of students who use SM mostly for academic purposes and those who use SM mostly for non-academic purposes is, therefore, warranted.

If most students use SM for non-academic purposes as shown above, another cause for concern would be how long would they stay on SM. According to a study conducted last year (Asrat et al., 2023), the majority (33.8%) of Ethiopian social media users spend between 2 and 4 hours a day on digital media whereas about a quarter (25.2%) of them spend between 4 and 8 hours. Whereas the time spent on SM reported in this study is concerning, this does not characterize high school students because only few (less than 5%) of the participants were aged 18 or lower.

In general, if students cannot manage their out-of-school time properly for academic activities, their academic performance will suffer, for they will have lesser time for study and doing homework. Many parents and guardians are worried that students are spending too much time on Facebook and other social media sites and have not enough time for study (Owusu-Acheaw & Larson, 2015). However, if students use social media for academic

purposes, research indicates that it improves their academic achievement (Sivakumar, 2020). There is evidence to support that time spent on academic activities has a significant positive association with GPA (Amin et al., 2016) and this is true even after controlling for previous performance (Jacobsen & Forste, 2011). That is, spending longer time doing academic activities would increase students' GPA. Thus, the main question would be whether students can have enough time to spend on academic activities if they use SM for non-academic activities.

Earlier studies that compared the academic performance of students who use and those who do not use SM have reported significant difference. For example, according to Kirschner and Karpinski (2010), college Facebook users have lower GPAs than students who are not. The main explanation advanced was that users spend much more of their time on Facebook than reading compared to those who did not use Facebook. The next question focuses on SM users who differ in amount of time they spend on SM.

A number of studies have found statistically significant negative correlation between time spent on SM and academic performance or GPA in the United States (Jacobsen & Forste, 2011; Kirschner & Karpinski, 2010; Paul, et al., 2012), Europe (e.g., Rouis et al., 2011), Asia (e.g., Jamil et. al., 2020) and Africa (e.g., Nsizwana et al., 2017). That is, as students spend more time on SM, their academic performance or GPA tends to become lower (Boahene et al., 2019). Evidence further shows that this relationship holds even after controlling for offline time use (Jacobsen & Forste, 2011). In contrast, other studies (e.g., Alwagait et al., 2015; Negussie & Ketema, 2014) have reported no significant relationship between time spent on SM and their academic performance or GPA. Thus, a re-examination of the relationship is necessary.

## **Problem Statement**

As shown above, studies have reported mixed results (negative in several studies but no relationship in others) regarding the relationship between time spent on SM and academic performance. Results reported by few researchers (Hameed et al., 2022) also suggest the need for further empirical evidence about the relationship between the purpose of SMU and academic performance. More importantly, to the researchers' knowledge no study has thus far investigated the interaction of the two variables (time spent on SM and purpose of SMU) and its effect on students' academic performance. It is useful to know, for example, whether spending more time on SM for education rather than non-education purposes benefits students' academic performance.

On the whole, the literature suggests further research on the role of the purpose of SMU, time spent on SM and their interaction in relation to students' academic performance. The present study therefore sought to answer the following research questions: (1) does the purpose students use SM relate in any significant way to students' academic (that is, English, mathematics, chemistry and physics) performance? (2) Does the amount of time spent on SM make a significant difference on students' academic performance? (3) Is the time spent-by-purpose interaction effect statistically significant? That is, do the time students spend on SM and purpose of their SMU interact to influence their academic performance significantly?

Obtaining answers to the above questions is useful for several reasons. The findings may present evidence to guide parents' effort to make their children's SMU purposeful. For example, the findings can provide information to parents regarding what aspects of their children's SMU (time, purpose or both) their monitoring should target. Similarly, the evidence can help teachers in guiding students and their parents on how children should use SM fruitfully. While the above points show the findings' potential practical contributions, the findings can contribute theoretically by extending the existing literature in terms of the role of the (time-by-purpose) interaction effect.

# **Methods**

## **Research Design**

The main purpose of the study was to investigate the relationship between students' SMU (that is, purpose of SMU, time spent on SM and their interaction) and their academic performance. The study investigated the relationships using quantitative approach. More specifically, the study employed a correlational design. The main independent variables were time spent on social media (30 minutes or shorter daily or more than 30 minutes daily and purpose of social media use (education or non-education purposes). The dependent variable was students' academic performance in English, mathematics, chemistry and physics used separately.

#### **Study Participants and Sampling Technique**

The target population of the present study comprises all students in Grades 11 and 12 in one private high school in Addis Ababa, Ethiopia. The study participants were 197 [(75 female and 122 male); 110 Grade 11 and 85 Grade 12)] students drawn from this school. The school had three Grade 11 classes and three Grade 12 classes. All the students from two of the three sections participated in this study. The researchers chose the school for two reasons: (i) as a private school where students from middle income families study, we assumed and later confirmed that many of the students in the school use social media and (ii) it was convenient to collect data from the school because one of the authors had a friend who teaches there, which made data collection more convenient. Table 1 below shows the profile of the sample students.

#### Table 1

Variable	Level	Frequency	Percent
Grade	11	110	55.8
	12	87	44.2
Sex	Female	75	38.1
	Male	122	61.9
Time Spent on SM Daily	Up to 30 minutes	73	37.1
	More than 30 minutes	124	62.9

*Grade, Sex and Social Media Use Profiles of the Sample* (n = 197)

Bahir Dar Journal of Education Vol. 25 No. 2 May 2025	Seleshi Z. Teketel et al

Variable	Level	Frequency	Percent
Purpose of SMU	Education	76	38.6
	Non-education	121	61.4

*Note*. SM = Social media, SMU = Social media use

As shown in Table 1 above, the sample is composed of more male than female students ( $\chi^2$ = 11.21, df = 1, p = .001). The number of students who reported to have spent 30 minutes or less daily on SM is also significantly less than that of the students who reported to have spent more than 30 minutes daily ( $\chi^2$ = 13.2, df = 1, p = .001). With regard to the purpose of SMU, about 61 percent of the students use SM for non-educational purposes as compared to nearly the 39 percent who used SM for education purposes ( $\chi^2$ = 10.28, df = 1, p = .001).

#### Procedure

First, the second author got permission from the school's administration to gather all relevant data from students and from official school records after producing a letter of support from the School of Psychology, Addis Ababa University, detailing his identity and the purpose of the study. Following administration of the questionnaire, the researchers gathered the students' first semester scores in English, mathematics, chemistry and physics from official school records with the support of the school staff. The students were pursuing their education in the natural science stream. The researchers randomly selected the four school subjects for examination. Then data were entered and analyzed using the SPSS software.

#### **Data Gathering Tools**

This study reports part of the findings from a relatively larger study which examined the relationships among a number of variables (including intensity of SMU, number of Facebook friends, purpose of SMU, time spent on SM, depression, anxiety, stress, and academic performance). The researchers collected data from students using questionnaire. In this paper, we report findings pertaining to the relationships of three variables, namely time spent on SM each day, purpose of SMU, and students' academic performance in four school subjects (that is, English, mathematics, chemistry and physics).

While the data on SMU were collected through the questionnaire described above, we obtained the data on students' academic performance in English, mathematics, chemistry and physics from official school records. The data on students' academic performance were the students' first semester score in each of the four school subjects. The maximum possible score for each subject is 100.

## **Data Analysis Methods**

We used two-way ANOVA to examine the two main effects (that is, time spent on SM and purpose of SMU) and the interaction effect (that is, time-by-purpose interaction effect) on students' academic performance in English, mathematics, chemistry and physics.

The researchers also used chi-square test to compare differences in proportions (or frequencies) of groups.

Because distributions of the raw scores for the four subjects (i.e., English, mathematics, chemistry and physics) at each grade level have their own means and standard deviations, scores were not directly comparable. We thus converted the raw scores at each grade level to T Scores with the intention to merge scores of Grade 11 and Grade 12 students on each school subject to make the sample size larger. Larger sample size, in turn, improves power of the test. In other words, because the T scores of each subject at each grade level has the same mean (50) and standard deviation (10), scores of Grade 11 and Grade 12 students on each subject were directly comparable. Thus, for each school subject, the researchers merged and analyzed the T scores of Grade 11 and Grade 12 students<sup>\*</sup>.

#### **Ethical Considerations**

Because we collected data directly from the students through a questionnaire (demographics and SMU) and from official school records (academic scores), students were asked to write their names on the questionnaire so that we can collect their academic scores from the school's official records. We, however, deleted all names as soon as we completed data entry. Thus, all data obtained from the participants were anonymized and confidentiality was ensured.

Before the students completed the questionnaire, verbal informed consent was obtained from all the participants after the nature of the study was fully explained to them. The students were informed that they could withdraw at any time from the study and cease to respond to any question they felt uncomfortable.

## **Results**

This section presents the results of the analysis of data collected from 197 students. The students were aged between 16 and 20 with a mean age of 17.6 years (standard deviation = 0.86). Before analyzing the data, we conducted preliminary analysis to verify the assumptions (that is, normality and homogeneity of variance in particular) of two-way ANOVA. The verification showed that the assumptions were tenable. The major assumption of the chi-square test is concerned with the sample size in the expected frequency cells. When degree of freedom equals one (as in the present study), stringent statisticians recommend that the expected frequency in each cell be at least 10. In the present study, the minimum expected frequency was 28.16 indicating that the assumptions of the chi-square test were tenable.

#### Students' Performance in English, Mathematics, Chemistry and Physics

As shown in Table 2, the students' academic performance in English, mathematics, chemistry and physics significantly correlated with each other. The correlation coefficients

<sup>\*</sup> We also run the same analysis (two-way ANOVA) using the raw scores for Grade 11 and Grade 12 students separately. This analysis produced the same results for each grade students separately. Just like the T scores, analysis of the raw scores produced statistically significant main effects (i.e., for purpose of SMU and time spent on SM) but non-significant purposeby-time interaction effect. In fact, linear transformation of raw scores does not alter shape of a distribution but allow meaningful averaging and comparisons.

range from moderate to high (that is, .67 to .84). The estimated reliability coefficients\*\*for the scores in English, mathematics, chemistry and physics were in the acceptable range.

#### Table 2

Variable	Reliability	1	2	3	4
1. English	0.77	_	.69***	.67***	$.78^{***}$
2. Mathematics	0.91		_	$.82^{***}$	$.79^{***}$
3. Chemistry	0.92			_	$.84^{***}$
4. Physics	0.89				_

Intercorrelations of the Study Variables (N = 197)

*Note.* \*\*\*\* p < .001

Table 3 presents a cross-tabulation of the two independent variables (purpose of SMU and time spent on SM daily). The data show that the two variables are not independent of each other as suggested by the number of students in each of the four cells formed by the interaction of the two variables. In other words, the chi-square test of independence is statistically significant ( $\chi^2 = 5.64$ , df =1, p = .018). That is, those who reported to have used SM for educational purposes are nearly equally divided in terms of time spent on SM. In contrast, among those who used SM for non-educational purposes, the number of students who have spent more than 30 minutes is about 2.27 times as many as the number of students who have spent 30 minutes or shorter. Overall, a larger proportion of the students (n = 37, 30.6%) who used SM for non-educational purposes stayed on SM for more than an hour (this extends up to more than three hours for some of them) daily compared to those who used SM for educational purposes (n =7, 9.1%).

#### Table 3

Number (and Percentage) of Participants by Purpose of SMU and Time Spent on SM

Purpose of SMU	Time	Total	
	Up to 30 Minutes	More than 30 Minutes	_
Education	36 (18.3%)	40 (20.3%)	76 (38.6%)
Non-education	37 (18.8%)	84 (42.6%)	121 (61.4%)
Total	73 (37.1%)	124 (62.9%)	197 (100%)

*Note*. SM = Social media, SMU = Social media use

#### Time Spent on Social Media and its Relation to Academic Performance

Table 4 presents the descriptive statistics on students' performance on four school subjects as a function of how long they spent on SM daily. The two-factor analysis of variance (two-way ANOVA) indicates that the main effect for time spent on SM is

<sup>\*\*</sup> Calculation of the reliability coefficients for the academic performance scores was not straightforward because these were archival data. However, using the descriptive statistics available from the scores we obtained, making assumptions about the number of items (100) administered throughout the semester and employing Kuder-Richardson Formula 21 (KR-21), the reliability of the students' English, mathematics, chemistry and physics scores were estimated to be 0.77, 0.91, .92 and .89 respectively.

statistically significant (see summary of the results in Table 5). That is, the academic performance scores of the two groups who reported to have spent 30 minutes or less on SM daily and those who reported to have spent more than 30 minutes daily are significantly different. More specifically, those students who spent up to 30 minutes daily on SM scored significantly better than those who spent more than 30 minutes in English [F (1, 193) = 8.64, p = .004, partial  $\eta^2 = .043$ ], mathematics [F (1, 193) = 11.53, p = .001, partial  $\eta^2 = .056$ ], chemistry [F (1, 193) = 8.29, p = .004, partial  $\eta^2 = .041$ ] and physics [F (1, 193) = 4.44, p = .036, partial  $\eta^2 = .023$ ].

The partial  $\eta^2$  associated with each subject indicates the proportion of variance in students' academic performance that is accounted for by the time spent on SM. Accordingly, 4.3 percent of the variance in English performance, 5.6 percent of the variance in mathematics performance, 4.1 percent of the variance in chemistry performance and 2.3 percent of the variance in physics performance are accounted for by the time spent on SM. Thus, in each case, the contribution of time spent on SM in explaining the total variance in academic performance is small but significant.

Overall, academic performance differs significantly based on the length of time the students spent on SM each day. More specifically, spending 30 minutes or shorter daily on SM is significantly better than spending more than 30 minutes daily on SM as far as students' academic performance scores in English, mathematics, chemistry and physics are concerned.

#### Table 4

Purpose of	Time Spent on	English		Mathematics		Chemistry		Physics	
SMU	SM in Minutes	Ν	Mean (SD)	Ν	Mean (SD)	Ν	Mean (SD)	Ν	Mean (SD)
Education	Up to 30	36	56.20 (7.40)	36	56.67 (9.00)	36	57.63 (9.18)	36	56.20 (9.14)
	More than 30	40	54.09 (7.93)	40	53.71 (9.30)	40	54.53 (8.01)	40	55.55 (8.63)
	Total	76	55.09 (7.71)	76	55.11 (9.22)	76	56.00 (8.67)	76	55.86 (8.82)
Non-	Up to 30	37	50.85 (6.91)	37	51.05 (7.77)	37	49.30 (7.41)	37	49.73 (8.26)
Education	More than 30	84	45.02(10.56)	84	44.91(9.02)	84	44.88 (9.14)	84	44.82 (8.74)
	Total	121	46.80 (9.93)	121	46.79(9.08)	121	46.23 (8.86)	121	46.32 (8.86)
Total	Up to 30	73	53.49 (7.60)	73	53.82(8.81)	73	53.41 (9.27)	73	52.92 (9.24)
	More than 30	124	47.95(10.64)	124	47.75(9.97)	124	47.99 (9.86)	124	48.28 (10.03)
	Total	197	50.00 (9.98)	197	50.00(9.98)	197	50.00(9.98)	197	50.00 (9.98)

Descriptive Statistics on Academic Performance by Purpose of Social Media Use and Time Spent on Social Media

*Note*. SM = Social Media, SMU = Social Media Use, SD = Standard Deviation

#### Purpose of Social Media Use and its Relation to Academic Performance

The study also examined if purpose for which students use SM has any relationship with their academic performance in four school subjects: English, mathematics, chemistry and physics. Descriptive statistics on the students' academic performance are shown in Table 4.

The two-way ANOVA yielded a statistically significant main effect for the purpose of SMU (see Table 5). That is, the students' academic performance scores in English, mathematics, chemistry and physics are significantly different depending on whether the students used SM mainly for education or non-education purposes. More specifically, the

students who used SM mostly for education purposes scored significantly better in English [F (1, 193) = 28.56, p = .000, partial  $\eta^2$  = .129], mathematics [F (1, 193) = 28.90, p = .000, partial  $\eta^2$  = .130], chemistry [F (1, 193) = 47.36, p = .000, partial  $\eta^2$  = .197] and physics [F (1, 193) = 42.53, p = .000, partial  $\eta^2$  = .181] than those who used SM for non-education purposes.

#### Table 5

Independent	English			Mathematics			
Variable	F	р	Partial $\eta^2$	F	р	Partial $\eta^2$	
Time spent on SM	8.64	.004	.043	11.53	.001	.056	
Purpose of SMU	28.56	.000	.129	28.90	.000	.130	
Time x Purpose	1.89	.171	.01	1.40	.238	.007	
	Chemistry			Physics			
	F	р	Partial $\eta^2$	F	р	Partial $\eta^2$	
Time spent on SM	8.29	.036	.041	4.44	.004	.023	
Purpose of SMU	47.36	.000	.197	42.53	.000	.181	
Time x Purpose	.26	.109	.001	2.59	.613	.013	

#### Summary of the Two-Way ANOVA results

Regarding the partial  $\eta^2$  associated with each school subject, 12.9 percent of the variance in English performance is accounted for by the purpose of SMU. Similarly, 13 percent, 19.7 percent and 18.1 percent of the variance in mathematics, chemistry and physics performance respectively are accounted for by the purpose of SMU. Thus, in each case, the contribution of purpose of SMU in explaining the total variance in academic performance ranges from moderate to large, and statistically significant.

#### The Interaction between Time Spent on Social Media and Purpose of Social Media Use

As shown above, students' academic performance significantly differed as a function of the two variables (that is, time spent on SM and purpose of SMU) separately. As a follow up of the two significant main effects, it is logical to examine the effect of the interaction of the two variables, if any, on the students' academic performance. Table 4 shows the descriptive statistics related to the interaction effect.

We ran two-way ANOVA and examined the interaction effect taking students' academic performance in English, mathematics, chemistry and physics as a dependent variable, one at a time. The results (see Table 5 above) show that with regard to students' English performance the interaction effect of time spent on SM and purpose of SMU is not statistically significant (F  $_{(1, 193)} = 1.89$ , p = .171). The analysis produced similar statistically non-significant purpose-by-time interaction effect for students' mathematics (F  $_{(1, 193)} = 1.40$ , p = .238), chemistry (F  $_{(1, 193)} = .256$ , p = .613) and physics (F  $_{(1, 193)} = 2.59$ , p = .109) performance. This means that spending more time on SM is associated with significantly lower academic performance as compared to spending less time and this relation remains the same regardless of the purpose of SMU (education or non-education). Put differently,

whether the students use SM for education or non-education purposes, those who reported to have spent up to 30 minutes daily performed significantly better in English, mathematics, chemistry and physics than those who reported to have spent more than 30 minutes.

# **Discussion**

This study sought to answer three research questions pertaining to the relationships between SMU (that is, time spent on SM daily, purpose of SMU and the interaction between the two) and students' academic performance (in English, mathematics, chemistry and physics). We discuss below the findings reported in the preceding section in relation to the research questions and findings of previous research.

#### Time Spent on Social Media and Academic Performance

This study found that students' academic performance is significantly different as a function of how long the students stayed on SM daily. In particular, those who spent 30 minutes or less on SM daily are in a better academic standing than their counterparts who reported to have spent more than 30 minutes daily and this was true for all four school subjects.

The findings are consistent with our initial expectations and findings of more recent (e.g., Boahene et al., 2019; Jamil et. al., 2020; Nsizwana et al., 2017) as well as earlier studies (e.g., Paul, et al., 2012; Rouis et al., 2011). One explanation is the fact that spending more time on social media is often associated with spending time unnecessarily away from academic activities. If students cannot wisely manage their time for study and if they spend more time away from it, it is not difficult to see its detrimental effect on academic performance.

At this juncture, it should be noted that there is no magic about the 30-minute cut-off point. In this connection, it is important to note that the authors have attempted to explore the relationship between students' academic performance and the amount of time spent on SM with six categories ranging from 10 minutes or shorter to more than three hours daily (see the data in the Table in Appendix A) rather than the two used in this analysis. One can easily see, however, that the distributions of students' responses across the six categories were largely uneven. Thus, the researchers merged the categories resulting in the two categories with the 30-minute cut-off point.

The main point that the findings underscore regarding time spent on SM is that students need to use their time wisely. They have to plan and distribute their out-of-school time for different activities including homework, study and SM, among other things. To make this a reality, high school adolescents should be able to control themselves in implementing their plans and try hard not to go against their own plans. In other words, the use of social media could sometimes force students to ignore their plans and stay on other things (such as listening to music, watching movies, chatting with friends, etc.) that attract their attention. That way, they could spend their time in an unplanned manner on SM.

There are indications from previous research that this could happen as a result of the students' SM addiction, which disrupts their time management skills (see Li et al., 2021) and lowers their academic achievement (Azizi, 2019) among other consequences. However, this

study does not have any evidence to support that the low academic performance of some of the students as well as the relatively long time spent on SM is related to SM addiction or time management issues. Future research may therefore examine the role of time management and SM addiction in the relationship between SMU and academic performance. While improving students' self-regulation is potentially important to resist the temptations to stay longer on SM (Rouis et al., 2011), parental support of their children through advice and monitoring could also be useful. In particular, parental monitoring may be useful to deter students' unnecessarily longer stay on SM and to focus on their academic activities during out-of-school hours.

#### Purpose of Social Media Use and Its Relation to Academic Performance

The findings of this study showed that the academic performance of those students who reported to have used SM for educational purposes was significantly better than those who used SM for non-educational purposes. This is consistent with our initial expectation and the findings of very few available studies (e.g., Hameed et al., 2022). To the best of our knowledge, we are among the few researchers who have directly examined the relationship between the purpose of SMU and academic performance and showed that the purpose of SMU has a significant influence on high school students' academic performance.

Spending time on social media for the purpose of education can enhance students' academic performance in many ways. By using SM for education purposes, students could get new information or consolidate what they already knew. One may consider this as a purposeful way of studying. Alternatively, one may consider it as a purposeful effort to work on one's weaknesses or limitations. The contribution of the purpose of SMU in explaining the variation among students in the scores of the four subjects also indicates its importance. That is, purpose of SMU alone accounts for 12.9 percent of the variance in English scores, 13 percent of the variance in mathematics scores, 19.7 percent of the variance in chemistry scores and 18.1 percent of the variance in physics scores. The contributions are significant and range from moderate to large.

On the other hand, one may consider spending time on social media for noneducational purposes (e.g., recreation, sports, and chatting) as spending time on something that is not related to education. Thus, it may have some negative impacts on one's academic performance because it leaves relatively shorter time for a purposeful or targeted study (e.g., reading, doing homework, doing exercises) and other academic engagement of the students. Besides, because the present study and several other studies (e.g., Alharahsheh & Obeidat, 2019; Kolan & Dzandza, 2018; Kolhar et al., 2021) have reported that a very large proportion of students use SM for non-educational purposes than for educational purposes; this is a cause for concern. If most students spend more time on SM for non-educational purposes, then their focus is mainly entertainment and that could harm their academic performance.

#### Does the Interaction of Time and Purpose Influence Students' Academic Performance?

The focus of this study is examining whether the interaction of the two variables (that is, time spent on SM and purpose of SMU) has an impact on students' academic performance. In the discussion above, we have seen how the two variables individually affect

students' academic performance. However, one may ask whether spending more time on SM is useful if it is for education purposes rather than for non-educational purposes. The finding showed that the interaction of the two variables is not statistically significant for any of the four school subjects.

This means that irrespective of the purpose of SMU, spending shorter time on SM is necessary if students are to perform better in all four school subjects (English, mathematics, chemistry and physics) this study examined. Put differently, spending more time on SM is not beneficial for students even when it is for education purposes so far as students' academic (English, mathematics, chemistry and physics) performance is concerned. As shown in this study, using SM for education purposes is associated with some gains in academic scores as compared to those who use SM for non-education purposes. Yet, the findings showed that students should spend relatively short time on SM daily if they are to gain in terms of academic scores from the time they spend on SM.

This finding is not consistent with our initial expectation. We expected to obtain a significant interaction effect assuming that a longer stay on SM will benefit students if their stay on SM is strictly for educational purposes while a longer stay on SM for non-educational purposes lowers their academic performance. It is therefore not clear why staying on SM longer for academic purposes was not beneficial for the students in terms of raising their academic scores. Future research can contribute in clarifying the main explanation(s) for this finding.

Even though the interaction effect was not significant, the sum of the individual contributions of purpose of SMU and time spent on SM in explaining the total variance in English, mathematics, chemistry and physics scores were 17.2 percent, 18.6 percent, 23.8 percent and 20.4 percent, respectively. The proportion of variance in English, mathematics, chemistry and physics scores that is accounted for by both purpose of SMU and time spent on SM is large and that shows how important the two variables are in students' academic performance. Finally, it should be noted from the unique contribution of each variable that the purpose of SMU is more important than time spent on SM and this is true for all four subjects.

# **Conclusion and Implications**

Even though the interaction effect is not statistically significant, purpose of SMU and time spent on SM have significant, unique contributions in explaining variations in academic performance. Overall, using SM for education purposes and spending shorter time on SM are beneficial for students' academic performance as compared to using SM for non-education purposes and staying longer on SM, respectively.

One implication of the findings is that students by no means should stay on SM for long hours. Whereas adolescents can easily give in to temptations, parents should help them overcome these temptations and avoid using SM for long hours. Teachers can also help parents by clarifying to the students both the positive and negative sides of SMU. In other words, guiding students to use SMU properly and protecting them from the undesirable impacts of SMU require the concerted efforts of students, parents and teachers, among others. The findings have implications for future research. Future research may provide the true picture of the relationships between the variables and their interaction through a carefully designed study that avoids the limitations observed in this study. In particular, future research shall reexamine the relationships of the variables (i.e., time spent on SM, purpose of SMU and academic performance) in general and their interaction in particular using a larger sample. Future research can also use better means of recording time spent on SM than asking students to estimate it. Smartphones record how long the user stay using different applications (i.e., screen time) and that could provide more accurate data pertaining to the time spent on SM than self-reported estimate of the time.

#### Limitations

The present study has limitations. First, because it is a survey rather than an experimental study, we cannot make statements of cause-effect relationships between purpose of SMU and time spent on SM on the one hand and academic performance on the other. A second limitation of this study relates to the data pertaining to the time spent on SM. The researchers asked each participant to estimate how long he/she stays on social media daily and the accuracy of these estimates is uncertain. Third, the small sample size in the present study can be a disadvantage when it comes to detecting significant effects particularly when such effects are small.

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## Appendix

As shown in the table below, time spent on SM, as an independent variable, had six levels initially. However, because the distribution was largely uneven across the six levels or categories, we merged the levels and used only two levels (30 minutes or lower and more than 30 minutes) for analysis.

Time Spent on SM	Frequency	Percent
Less than 10 minutes	8	4.1
10-30 minutes	65	33.0
31-60 minutes	80	40.6
61-120 minutes	12	6.1
121-180 minutes	12	6.1
More than 3 hours	20	10.2
Total	197	100.0

Frequency and Percent of Participants by Time Spent on Social Media