

# Academic Influence of Social Network Sites on the Collegiate Performance of Technical College Students

Jameson McFarlane, Thorne J. McFarlane, Leon Bernard

**Abstract**—Social network sites (SNS) is an emerging phenomenon that is here to stay. The popularity and the ubiquity of the SNS technology are undeniable. Because most SNS are free and easy to use people from all walks of life and from almost any age are attracted to that technology. College age students are by far the largest segment of the population using SNS. Since most SNS have been adapted for mobile devices, not only do you find students using this technology in their study, while working on labs or on projects, a substantial number of students have been found to use SNS even while listening to lectures. This study found that SNS use has a significant negative impact on the grade point average of college students particularly in the first semester. However, this negative impact is greatly diminished by the end of the third semester partly because the students have adjusted satisfactorily to the challenges of college or because they have learned how to adequately manage their time. It was established that the kinds of activities the students are engaged in during the SNS use are the leading factor affecting academic performance. Of those activities, using SNS during a lecture or while studying is the foremost contributing factor to lower academic performance. This is due to “cognitive” or “information” bottleneck, a condition in which the students find it very difficult to multitask or to switch between resources leading to inefficiency in information retention and thus, educational performance.

**Keywords**—Social network sites, social network analysis, regression coefficient, psychological engagement.

## I. INTRODUCTION

ALTHOUGH SNS have been around since 1997 [1], it was not until 2005 - 2006 when Facebook was introduced to the rest of the world for anyone with an email address that we saw an exponential proliferation in the number of people, from all walks of life and from all ages, who adopted, explored and used this social service [1], [2]. Since then, SNS has become ubiquitous with a projected three billion users world-wide to be connected to SNS by 2020 [3]. Whereas the world's top five SNS are Facebook, YouTube, Instagram, Twitter and Reddit with an estimated 1.79, 1.0, 0.5, 0.3, 0.2 billion monthly visitors, respectively [3], in North America, the top SNS are Facebook, Instagram, Pinterest, Twitter and LinkedIn

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[4], in the United States, Facebook accounts for 79% of all users of SNS [4]. Further in the United States, the majority of the people who use SNS are individuals between ages 18 and 29 years (88% of users) who possess some level of college education (82% of users) [4], [5].

SNS are platforms that allow users to share all sorts of information about themselves, their friends and families; to keep in contact with new people; to share files, load and upload pictures, share links and other pertinent information that their followers or friends might find it useful to know [6], [7]. SNA data can be downloaded and analyzed to produce a treasure trove of information for researchers and academics alike who are interested in studying the characteristics of social groups, an area known as social network analysis (SNA).

SNA has been used in the past to determine what impact, if any that SNS use have on the academic performance or grade point average (GPA) of college students. Several researchers have found that SNS use by students have a net positive effect on the GPA of college students [8], [9]. Other researchers have determined that the use of SNS significantly negatively impacts the GPA of college students as a lack of student engagement as well as multitasking and switching which reduces a person's cognitive resources to accomplish a diversity of tasks successfully [10]-[15]. Still further studies have established no correlation whatsoever between college students' grades and the use of SNS like Facebook [16], [17].

Numerous studies have already been done on the dynamics that affect college students' GPA especially in their freshman year when they are most vulnerable to academic success or student attrition. Among other variables, there is empirical evidence to prove high school grade point average (HSGPA) is one of the key predictors of academic performance of first year college students [18]-[20]. Meanwhile, other factors that could impact college GPA include: academic self-efficacy and optimism [21]; achievement motivators [22]; student engagement [8], [9], [23], [24]; and even differing pedagogical approaches to teaching in the high schools [25].

Past studies on the impact of SNS and academic performance of college students have focused primarily on four-year colleges except for a study by Evans et al. that was implemented in a community college environment [26]. However, there has not been any research work to date to determine if a correlation exists between HSGPA and the use of SNS in two-year technical colleges. This study is an attempt to fill that gap.

In this study, the focus is on whether a college student's academic performance, essentially a student's GPA, is affected by the usage of SNS such as Facebook, Twitter, Instagram, YouTube, LinkedIn, and so on. While there is empirical data supporting HSGPA, Facebook usage and college academic performance, the use of other SNS are yet to be established.

The primary objectives of this study are:

- R1: Does the use of SNS impact the academic GPA of students in the first two years of college?
- R2: Does the amount of time students use SNS impact their GPA?
- R3: Does the kind of activity students are engaged in while using SNS affect their academic performance in the classroom?

The next section is a review of the literature. Section III is the research design. In Section IV is the presentation and discussion of the results. Finally, Section V is the discussion, implications, limitations and conclusion of the findings.

## II. LITERATURE REVIEW

In this section, an overview of the various factors that can be used to predict a student's academic GPA in college is presented. This is absolutely important specifically because college students are most vulnerable to dropping out and student attrition in their first two years of college.

There are a significant number of factors that impact the academic performance of college students. These include, among other factors, socio economic status, environmental, racial or ethnic classification, time management, academic competencies, student engagement, faculty, level of course, and so on. For the purpose of this study, the impact of academic performance on college is examined. Then, an overview of the influence of student engagement to learning is presented. Finally, SNS is evaluated to determine its effect on learning.

### A. Predicting College GPA - Academic Performance

A substantial amount of work has been done on academic success in high school (HSGPA, class rank and course contents), performance on standardized tests such as SAT or ACT, and its association with students' academic success in college along with student attrition. These studies have found that both high school academic success and the scores on standardized tests are two of the most significant predictors of success in college [20], [21], [27]-[30]. A study by Johnson and Wolfe found that HSGPA, SAT scores and self-control account for 19%, 5% and 9% of the variance of college GPA, respectively [31]. Zwick and Sklar did a similar study on minority students which yielded similar results [32]. However, Camara and Michaelides believe that with so many high school students currently having GPAs reaching in excess of 4.0, standardized exams have thus become more reliable and valid in predicting students' academic success in college [19], [33].

### B. Predicting College GPA – Student Engagement

In a cross sectional review of many of the research studies relating to success of college students, Braxton concluded that there are eight domains of indicators of student success in college [34]. These include: academic attainment, which to some extent is a sense of success and accomplishment [24], [35]; acquisition of general education, that is providing a common educational experience for all students [36]; development of academic competence, which includes writing and speaking in a clear, correct and effective manner [37], [38]; development of cognitive skills and intellectual dispositions, or skills that transcends the learning of a specific subject matter knowledge [8]; occupational attainment, like getting a sense of direction regarding a career [39]; preparation of adulthood and citizenship, or social skills and personal habits important for adult living [38]; personal accomplishments, in other words participating in extracurricular achievements [40]; and personal development, such as psychosocial development [8].

Kuh and his colleagues were challenged by the National Postsecondary Education Cooperative to review the literature and to compile a report that would provide an informed perspective on policies, programs and best practices that can make a difference to acceptable student performance in postsecondary education [41], [42]. They proposed that success in postsecondary education be defined broadly by academic achievement, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills and competencies, persistence, attainment of educational objectives, and post college performance [9].

It is imperative to observe that student engagement is an overarching, overriding dynamic to student success in college. Student engagement can be described as the time and effort students devote to activities that are "empirically linked" to desired learning outcomes and objectives [42]. Research has shown that students gained more from their studies when they devote more time and energy to the task at hand [8], [24], [35], [42], [43]. The time spent on tasks was underscored by Astin in a longitudinal study of student development dubbed "student involvement theory" in which he posits that the greater the quality and quantity of the physical and psychological energy a student invests in his college experience, the greater the amount of student learning and personal development [24], [35], [40].

### C. Predicting College GPA – SNS and Learning

If SNS is ubiquitous, it is predominantly common among 18-29 year olds [4], [44]. Facebook has become the defacto SNS of choice for college students [4], [45], [46]. Not only do college students spend an appreciable amount of time on these SNS at their homes and dorms, they also surreptitiously use SNS in the classroom. Some professors have resorted to banning the use of social media in the classroom because they believe it is detrimental to learning in the classroom. Other professors are unable to ban the use in the classroom and as such have reluctantly resorted to incorporating the technology in the classroom learning environment.

With the proliferation of SNS among high school and college students, a significant amount of research has been done to examine the impact that SNS usage has on the academic performance of these students. Kirschner and Karpinski found that non-Facebook users had reported a higher GPA than Facebook users [13]. They believed this was due to poor time management skills by the students, although Alloway surmised that SNS use innately creates a proclivity to procrastinate [47]. Junco also compared SNS usage and college GPA. Junco found a significantly negative relationship between time spent on Facebook and freshman GPA [5], [10], [11], [48]. In addition, it was found that there is an association between the kind of activities and GPA [48]. For example, Junco believed that posting updates which require a higher amount of cognitive resources is significantly affected by multitasking thereby leading to a lower GPA. Ophir observed that switching (multitasking) requires a person to juggle his or her limited cognitive resources to accomplish the different task successfully which leads to greater inefficiency [12]. In a related study, Fox et al. found a negative relationship between students who IMing and reading comprehension and overall GPA. They found that the more time students spend on Instant Messaging (IM) the lower their reading scores, and consequently, the lower their GPA [49]. The lowering comprehension can be comparable to texting whilst driving.

Further, a number of researchers have linked the use of SNS and GPA to the negative effects of multitasking [10], [14], [15], [48]. Fried [15] and Lauricella [14] suggested that considerable multitasking on off task activities considerably affect student learning. Other researchers have penned this multitasking effect as “cognitive bottleneck”. Cognitive bottleneck or information bottleneck is a constraint in which one focuses on more than one activity at a time. This interferes with memory decisions and often leads to memory leakage or forgetting and redoing of associated tasks [50]-[53]. This can negatively impact student grades.

### III. RESEARCH DESIGN

In this section a description of the participants along with how the data obtained for publication was gathered.

#### A. Participants

For the past four consecutive years (2014-17), Thaddeus Stevens College of Technology (TSCT) has been named and or awarded the Aspen Prize for Excellence as the top two year college in Pennsylvania as well as one of the top 150 in the country [54], [55]. TSCT is a state run technical institution named in honor of the US Representative and abolitionist, Thaddeus Stevens. The student population is primarily from the lower socio economic status (SES) and the majority of the students live on campus. A total of 150 students from over 18 programs voluntarily participated in the online survey. The students were not offered any incentives to complete the survey. They were also reminded that their participation is voluntary as an analysis of the survey results will be published.

By a significant margin, the students in the survey primarily

used Facebook and YouTube in both high school and college. More students in college used Instagram and LinkedIn than in high school (see Figs. 1 and 2).

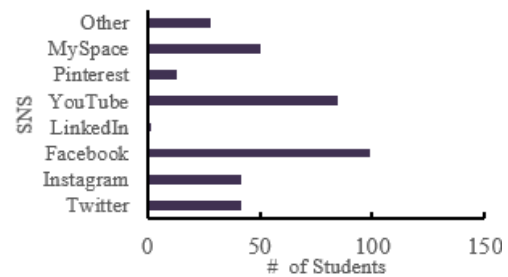


Fig. 1 SNS in High School

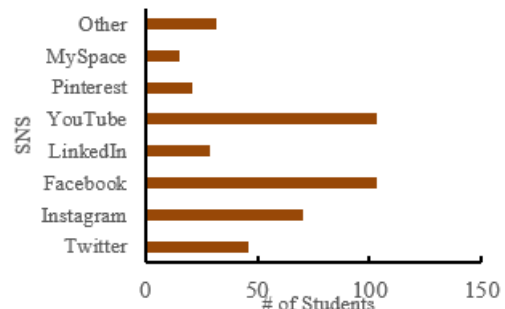


Fig. 2 SNS in College

#### B. Research Design

The survey consisted of 16 multiple choice/multiple grid questions. It was created and designed using Google Forms. The survey questions addressed 11 different areas including: SNS usage; names of SNS websites used; how frequently they use SNS websites; the amount of time spent daily on SNS; how often they use their mobile phones to visit SNS during lecture; do they have special times for using and visiting SNS; their academic GPA at the end of high school and that of the first three semesters of college; do they have specific reasons for using SNS; and what is their age, gender and ethnicity. A sample of the survey questions is attached to the appendix.

Once the survey was completed, the data was downloaded into an excel spreadsheet for analysis. Upon the data download and cleansing, r programming was used for the data visualization. In all, 142 students from 18 programs responded to the survey. Eighty-four percent of the respondents were males, which is typical of the technical college (see Table I). In order to determine whether the students' academic grades had declined or not, each student was asked to provide a range for the HSGPA as well as the range for their college academic GPA for their first three semesters at TSCT. In other words, only sophomores were allowed to participate in this survey. Table II below gives a summary of the students' academic GPA.

#### C. Procedure

At the beginning of the spring semester (January, 2017) an email was sent to a certain number of the sophomore college

faculty informing them of the survey and the need to encourage their students to participate in it. They were asked to allow the students 20 minutes of their time to complete the 16 item questionnaire between February 13 and 24. The survey was created using Google Forms. Once the form was completed, a hyperlink was generated. This hyperlink was included in an email addressed to the faculty of the various programs on January 27. Once the due date had expired, the data was downloaded to an .xls file for processing. Numeric values or attributes were given to the responses to determine whether correlations existed. Regression analysis and data visualizations were then calculated using r programming.



Fig. 3 Relative Age of Respondents

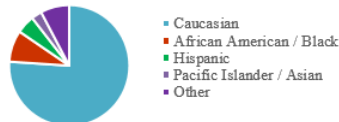


Fig. 4 Ethnic Background

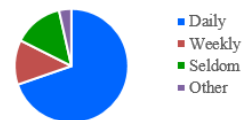


Fig. 5 How Often SNS is Used

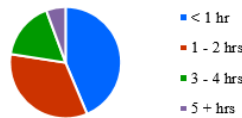


Fig. 6 Daily Usage of SNS

TABLE I  
SUMMARY OF PARTICIPANTS

Category	# of Participants
Female	19
Male	123
Total	142

TABLE II  
SUMMARY OF PARTICIPANTS AND GPA

# of Participants	Academic GPA			
	< 1.99	2.0 – 2.64	2.7 – 3.64	3.7 – 4.0
HSGPA	5	24	83	30
Semester 1	2	22	69	49
Semester 2	3	23	74	42
Semester 3	4	26	72	40

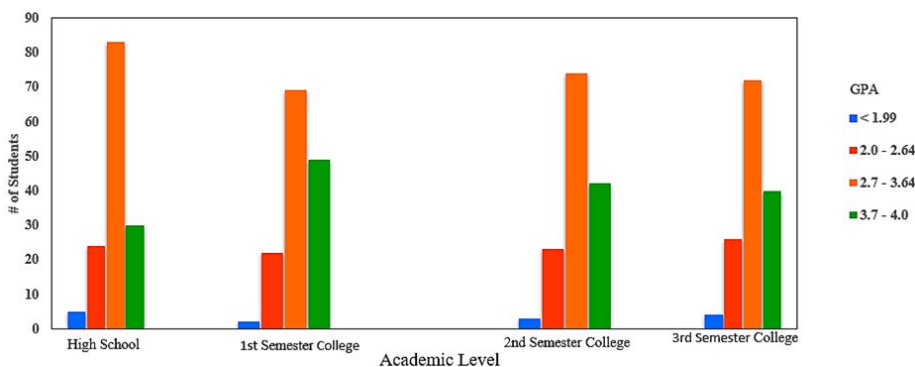


Fig. 7 End of Semester GPAs

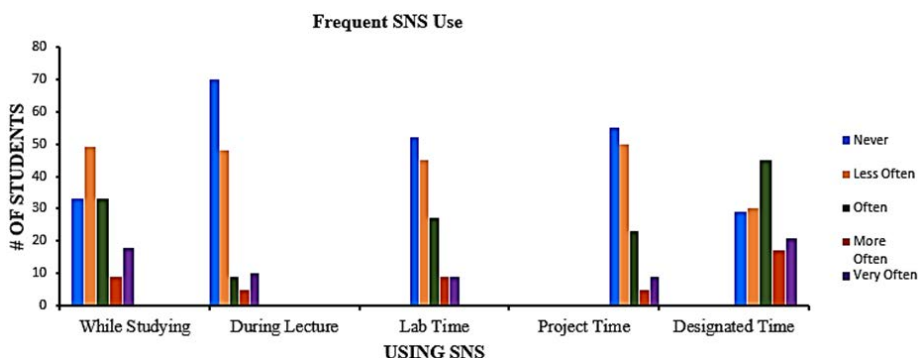


Fig. 8 Typical Times SNS are Used

IV. EXPERIMENTAL RESULTS AND DISCUSSION

*A. Does the Use of SNS Impact the Academic GPA of Students in the First Two Years College?*

Here six different responses were analyzed to determine the academic impact or the change in GPA from high school through the end of the first semester in their sophomore year. That is, the predictor is academic GPA. The six different responses include: whether or not they have SNS accounts; did they use SNS in high school; what current SNS they are using; how often they visit these SNS; when were they introduced to SNS and; for how long they have been using SNS. Figs. 9-12 below are comparative linear models as well as sample plots for each of the aforementioned academic GPAs as well as sample plots.

```

Coefficients:
      Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.24126    0.20489  15.819  <2e-16 ***
HAS.SNS      -0.07880    0.11397   -0.691  0.4905
CURR.SITES   0.11123    0.04365   2.548  0.0119 *
HS.SITES     -0.12233    0.04691   -2.608  0.0101 *
REGULAR      -0.01755    0.03563   -0.492  0.6232
INTRO        0.07090    0.04220   1.680  0.0952 .
YEARS       -0.01458    0.07201   -0.203  0.8398
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5432 on 135 degrees of freedom
Multiple R-squared:  0.07283, Adjusted R-squared:  0.03162
F-statistic: 1.767 on 6 and 135 DF, p-value: 0.1104
    
```

Fig. 9 HS Linear Model

It can be observed from the highly significant Pr (> |t|) value and the high t-value (15.819) in Fig. 9 that the null hypotheses should be rejected. In other words, a correlation exists between the HSGPA and the responses. The large F-distribution (1.767) also implies that there is a relationship. The main factors that affect the GPA are the number of SNS sites visited and, to a lesser extent, when the students were introduced to SNS. However, because the coefficient of determination ( $r^2$ ) is so small (0.07283), then the strength of the association between the variables is not very strong.

Figs. 10-12 present the regression model for each of the first three college semesters. It can be observed that a correlation exists between SNS use and academic GPA in each semester. It should be noted however, that the coefficient of determination and the F-distribution is larger in the first semester of college than any of the other semesters. This implies that there is a stronger correlation in the first semester of college. In addition, the p-value is also smaller in the first semester than the other semesters as well, which confirms our assumption. It should be noted that by the end of the third semester in college, the strength of the association is marginally significant at all. In fact, a close examination of the residual graphs below show that only Figs. 13 and 14 and to a lesser degree Fig. 15, have a regular pattern and a residual centered on the mean. By far, Fig. 13 has the best pattern which is also an indication of the existence of a correlation between the variables.

```

Coefficients:
      Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.43356    0.19804  17.337  <2e-16 ***
HAS.SNS      0.17558    0.11016   1.594  0.1133
CURR.SITES   0.07822    0.04219   1.854  0.0659 .
HS.SITES     -0.08735    0.04534   -1.926  0.0562 .
REGULAR      0.02857    0.03444   0.829  0.4083
INTRO       -0.08000    0.04079   -1.961  0.0519 .
YEARS       -0.08528    0.06961   -1.225  0.2226
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.525 on 135 degrees of freedom
Multiple R-squared:  0.08541, Adjusted R-squared:  0.04476
F-statistic: 2.101 on 6 and 135 DF, p-value: 0.05706
    
```

Fig. 10 College 1<sup>st</sup> Semester Linear Model

```

Coefficients:
      Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.39137    0.20171  16.813  <2e-16 ***
HAS.SNS      0.11465    0.11220   1.022  0.3087
CURR.SITES   0.07993    0.04297   1.860  0.0650 .
HS.SITES     -0.08960    0.04618   -1.940  0.0545 .
REGULAR      0.02647    0.03508   0.755  0.4518
INTRO       -0.08633    0.04154   -2.078  0.0396 *
YEARS       -0.03671    0.07090   -0.518  0.6054
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5348 on 135 degrees of freedom
Multiple R-squared:  0.08046, Adjusted R-squared:  0.0396
F-statistic: 1.969 on 6 and 135 DF, p-value: 0.07435
    
```

Fig. 11 College 2<sup>nd</sup> Semester Linear Model

```

Coefficients:
      Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.05597    0.21356  14.310  <2e-16 ***
HAS.SNS      0.17462    0.11879   1.470  0.144
CURR.SITES   0.06853    0.04550   1.506  0.134
HS.SITES     -0.08248    0.04890   -1.687  0.094 .
REGULAR      0.03874    0.03714   1.043  0.299
INTRO       -0.06573    0.04398   -1.494  0.137
YEARS       -0.03699    0.07506   -0.493  0.623
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5662 on 135 degrees of freedom
Multiple R-squared:  0.06399, Adjusted R-squared:  0.02239
F-statistic: 1.538 on 6 and 135 DF, p-value: 0.1703
    
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Fig. 12 College 3<sup>rd</sup> Semester Linear Model

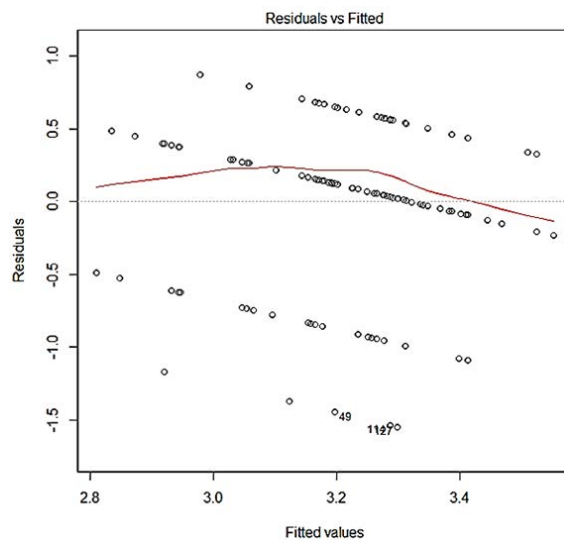


Fig. 13 Residuals High School

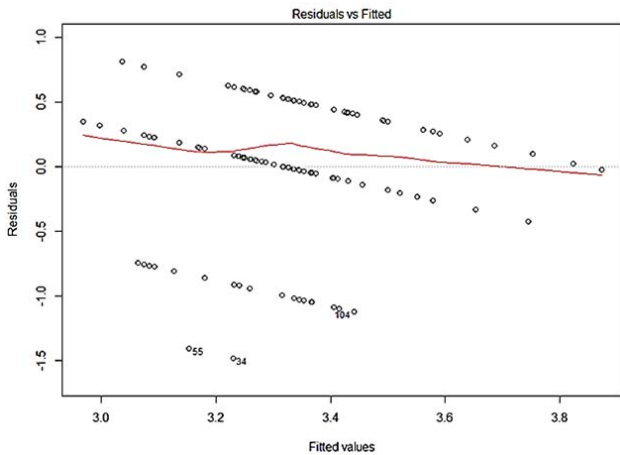


Fig. 14 Residuals College 1<sup>st</sup> Semester

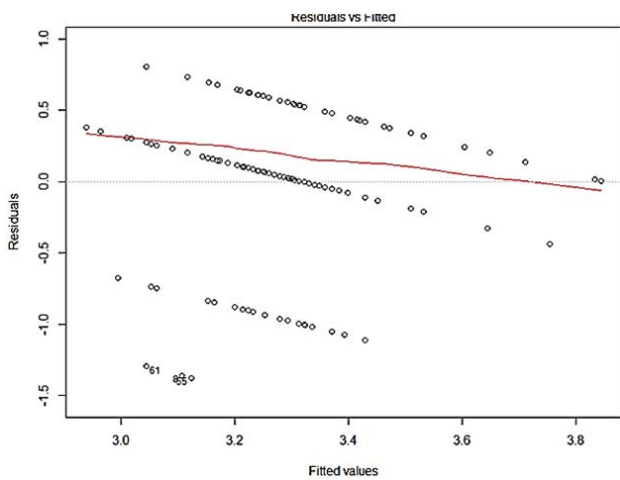


Fig. 15 Residuals College 2<sup>nd</sup> Semester

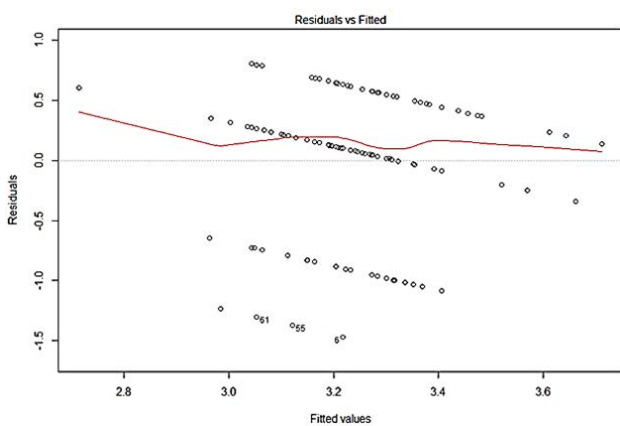


Fig. 16 Residuals College 3<sup>rd</sup> Semester

**B. Does the Amount of Time Students Use SNS Impact Their GPA?**

Here, the goal is to determine the regularity of the respondents' visits to the SNS, how much time they spend on the social networking sites per day, and how frequently they visit the SNS per week and its impact on academic GPA. In

addition, the ratings the respondents provided of their SNS use over the past year is also used in the calculation. Table III offers a synopsis of the coefficient results.

TABLE III  
COEFFICIENT VALUES

GPA	t value	Standard Error	R <sup>2</sup>	F-statistics	p-value
HS	25.131	0.13194	0.02595	1.226	0.3028
College 1 <sup>st</sup> Semester	25.729	0.12856	0.02348	1.106	0.349
College 2 <sup>nd</sup> Semester	24.780	0.13169	0.00701	0.3247	0.8075
College 3 <sup>rd</sup> Semester	22.601	0.13696	0.02466	1.163	0.3263

Overall, a correlation exists between academic GPA and the regularity of the student visit on social networking sites. A close examination of Table III, illustrates slightly large p-values. This is a clear indication that the correlation between the response variables and the predictor is not vastly significant. It can be perceived by the large 0.8075 p-value of the SNS in the second college semester that SNS does not reflect any significance in the respondents' academic GPA. Further, the small values of the coefficient of determination ( $r^2$ ) undoubtedly attest to a weak correlation among the variables. For example, the r-squared value for the second semester is 0.00701, which is relatively low in comparison with the other semesters. What is most intriguing is that the SNS correlation in the second college semester is considerably weaker than that of the third semester. Figs.17-20 offer a better pictorial analysis of the standard error for the correlation of time spent on SNS and its impact of academic performance. It can be observed that all except the residuals for the third semester depict nearly straight lines with no residuals centered on the mean. This is a strong indication of a poor fit – in other words there is no strong correlation.

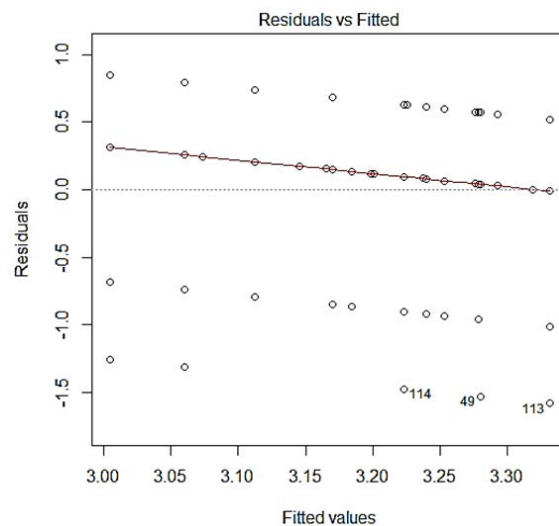


Fig. 17 HS Residuals

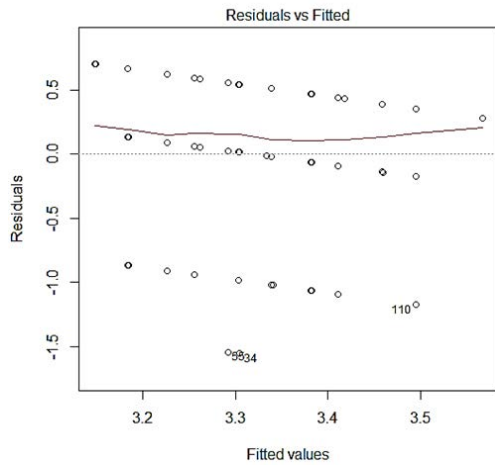


Fig. 18 College 1<sup>st</sup> Semester Residuals

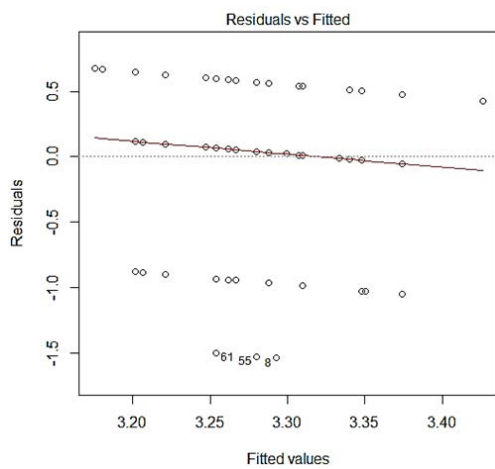


Fig. 19 College 2<sup>nd</sup> Semester Residuals

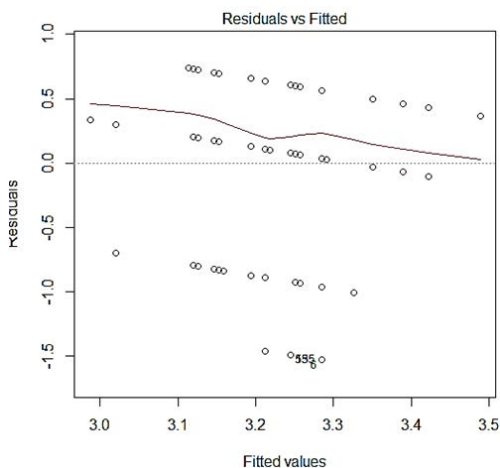


Fig. 20 College 3<sup>rd</sup> Semester Residuals

*C. Does the Kind of Activity the Students Are Engaged in While Using SNS Affect Their Academic Performance in the Classroom?*

In this section, the kinds of activities the students are engaged in while using SNS is examined to determine whether it has a detrimental effect on the learning process in the classroom. Specifically, SNS use is analyzed to establish if it has any impact on the students' studying habits and their aptitude to retain information at the same time, because the capability of the student to study effectively have a significant influence on their college academic performance. In addition, a substantial number of students have been observed using SNS in the classroom particularly during lectures. As a result, it is imperative to comprehend whether this seemingly insidious habit might be more detrimental to learning in the classroom than we anticipated. Further, the proclivity of many students to use SNS during their lab work or even while they are working on student projects is also a source of concern for faculty. It is also recognized that many students have special times dedicated for SNS use. Here, these factors are investigated from the first to the third college semesters to substantiate if they contribute to lower academic performance in college students.

It can be observed from Fig. 21 that a high degree of correlation exists between the activities and academic performance at the high school level. Specifically, using SNS during lecture or at special times have the highest negative influence on academic GPA. Further, it can also be observed from Fig. 21 that when using SNS during project work, an increase in the frequency of SNS use or even increases in the use of SNS during lecture or while studying will cause an inverse but reduction in the HSGPA. With a high F-statistic (2.085), it is concluded that a correlation exists as well. However, due to the small coefficient of determination (0.098), it can be deduced that the strength of the association between SNS use and academic performance is relatively low.

```

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.336493   0.101621  32.833 <2e-16 ***
TOTALFREQUENCY  0.010811   0.009519   1.136  0.258
STUDY        -0.001020   0.005725  -0.178  0.859
LECTURE      -0.002521   0.004334  -0.582  0.562
LAB          -0.013872   0.010353  -1.340  0.183
PROJECT       0.007163   0.010059   0.712  0.478
SPECIAL     -0.009484   0.034414  -0.276  0.783
RATING       -0.004611   0.049106  -0.094  0.925
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5503 on 134 degrees of freedom
Multiple R-squared:  0.0333,    Adjusted R-squared:  -0.0172
F-statistic: 0.6595 on 7 and 134 DF,  p-value: 0.7059
    
```

Fig. 21 HS Activities Coefficients

Figs. 22 and 23 offer an encapsulation of the coefficients as well as the fitted residual graphs of the activities in the second semester of college. Based on the small standard error values along with the values for the F-statistic and the p-value for the t-test, it can be fairly formulated that the coefficients are significant for the model. As such, there is a level of correlation between the dependent and independent variables.

However, the most substantial activities that affect academic performance appear to be using SNS during a lecture and while studying. Though the residuals graph (Fig. 23) does not show a clearly distinct structure, it is obvious that a pattern exists, which proves yet again that SNS use during certain activities can impact a student's academic performance in the second semester of their college.

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	3.336493	0.101621	32.833	<2e-16 ***
TOTALFREQUENCY	0.010811	0.009519	1.136	0.258
STUDY	-0.001020	0.005725	-0.178	0.859
LECTURE	-0.002521	0.004334	-0.582	0.562
LAB	-0.013872	0.010353	-1.340	0.183
PROJECT	0.007163	0.010059	0.712	0.478
SPECIAL	-0.009484	0.034414	-0.276	0.783
RATING	-0.004611	0.049106	-0.094	0.925

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5503 on 134 degrees of freedom  
 Multiple R-squared: 0.0333, Adjusted R-squared: -0.0172  
 F-statistic: 0.6595 on 7 and 134 DF, p-value: 0.7059

Fig. 22 Coefficients for Activities 2<sup>nd</sup> Semester

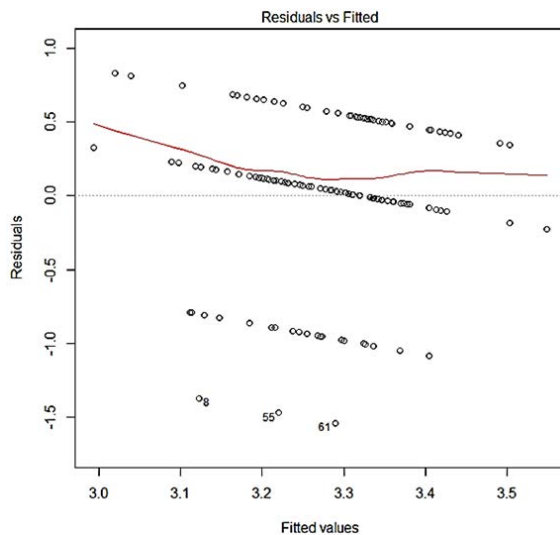


Fig. 23 Residuals for Activities 2<sup>nd</sup> Semester

In the third semester of college (Fig. 24), the coefficient figures for the activities are significantly different when compared to the second semester. Whereas a correlation exists in both semesters, it can be observed that the F-statistics and the coefficient of determination ( $r^2$ ) for the third semester is substantially larger than that of the second semester. This suggests that the association between the relationships is more significant in the third semester and that the strength of this association is also stronger in the third semester than the second semester. Furthermore, the p-value in the second semester (0.7059) is more than twice the size of that in the third semester (0.3224), again demonstrating that the relationship is more meaningful in the third semester compared to that of the second semester. It is also evident that using SNS during their study or during the course of a lecture or perhaps while working on labs continue to be the primary

activities impacting academic performance in the third semester, the main culprit here is how frequently the students use SNS. Finally, the residual graph (Fig. 25) for the third semester shows a more regular pattern than that of the second semester, which further validates that a stronger relationship exists between the variables in the third semester.

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	3.2942364	0.1052819	31.290	<2e-16 ***
TOTALFREQUENCY	0.0166034	0.0098614	1.684	0.0946 .
STUDY	0.0004792	0.0059310	0.081	0.9357
LECTURE	-0.0045986	0.0044897	-1.024	0.3076
LAB	-0.0166232	0.0107259	-1.550	0.1235
PROJECT	0.0066874	0.0104216	0.642	0.5222
SPECIAL	-0.0247641	0.0356534	-0.695	0.4885
RATING	0.0021013	0.0508745	0.041	0.9671

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5702 on 134 degrees of freedom  
 Multiple R-squared: 0.05774, Adjusted R-squared: 0.008517  
 F-statistic: 1.173 on 7 and 134 DF, p-value: 0.3224

Fig. 24 Coefficients for Activities 3<sup>rd</sup> Semester

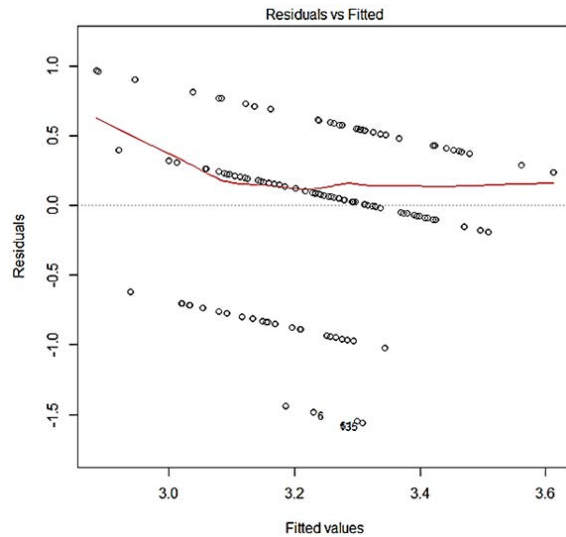


Fig. 25 Residuals for Activities 3<sup>rd</sup> Semester

## V. DISCUSSION

Overall, the results of the study provide empirical evidence that a correlation exists between college students' SNS use and their academic performance. Based on the analysis of the results, the impact of SNS on academic GPA is greatest in the first semester and is very minimal by the end of the third semester of college. In general, the results highlighted the kinds of activities the students are engaged in while using SNS is a crucial aspect in their academic GPA. Below is a discussion of the research results.

### A. Research Question I

*R1: Does the use of SNS impact the academic GPA of students in the first two years of college?*

The analysis of the research illustrates a positive correlation between the use of SNS and student academic performance from high school to college. However, it was found that the



strength between GPA and the other independent variables were stronger in the first semester of college compared to the third semester. In fact, by the end of the third college semester, the impact of SNS on academic performance is relatively non-existent. A possible explanation for this phenomena could be that the students are becoming more comfortable with the social network technology while also adjusting to the college environment. Consequently, the students are better able to balance using SNS without it having a negative effect on their academic performance. Most importantly, it is not just having an SNS account that have the greatest impact on students' grades but rather it is when they were introduced to SNS, the kind of site they are using as well as how regularly they visit the sites.

#### *B. Research Question II*

*R2: Does the amount of time students use SNS impact their GPA?*

The results of the study confirm that the more time the students spend on SNS the lower their academic performance. This can be attributed to poor time management skills and a propensity to procrastinate [5], [10], [11], [47]. This is more critical in the students' first semester of college as they have to learn to adjust to the higher level of work, different studying habits and overall more or frequent assignments. But the amount of time used on SNS is less of a factor in the second semester as compared to the first and third semesters of college. This could be because the students might be using SNS less regularly or they have more time to concentrate on their school work or they have adjusted to the rigors of the college environment. Further, it may be because they have better adjusted to college life and as such have learnt how to better manage their school work.

#### *C. Research Question III*

*R3: Does the kind of activity the students are engaged in while using SNS affect their academic performance in the classroom?*

The analysis of the results provide empirical evidence that the kind of activities the students are engaged in during SNS use has a significant effect on the academic performances of the college students. For instance, using SNS while working on labs or on projects does not have any major impact on learning. However, using SNS during a lecture or while studying have a more profound influence on academic GPA because it calls for higher student engagement and involvement. Further, using SNS in a lecture calls for a greater level of multitasking and switching on the student's cognitive capacities [12], [24], [44].

### VI. IMPLICATIONS

The results of the study provide supportive evidence for previous research [10], [11], [13], [47], [48], [56] on the negative impact of SNS use on the academic performance of college students. This negative impact is greater during the first couple of semesters of college, in particular the first semester, as the students grapple with the rigors of study and

their new environments. By the end of the third semester of college, there is very little effect of SNS on academic performance. However, it is the activities that students are engaged during SNS use that significantly affect their GPA. For example, using SNS during lectures have a negative effect on learning as well as academic performance. This also applies to using SNS while studying.

Since students spend two years in most technical colleges (and community colleges as well), it is imperative that college faculty and administrators understand this inhibitor to academic performance and to provide an environment whereby the students' grades will not falter during the course of their studies because, unlike a four-year college, they have very little time to restore and improve their grade point once it has fallen. Furthermore, prior to their graduation, college students are supposed to receive and demonstrate a certain level of skills to make them productive citizens. If they are not reaching that level of competency and proficiency in the necessary areas, then the system has failed them. To that end, administrators can provide summer activities to get the students acquainted to the technology before they begin their college quest.

Further, it can be very helpful if faculty can provide opportunities to utilize SNS in the teaching learning activities. That way, students would be less likely to use SNS in the classroom where the impact of SNS is most noticeably negative.

It is undeniable that college is a daunting proposition both economically and socially. Students have a short period of time to develop academic competence as well as cognitive and technical skills that transcends the classroom. If the students do not meet these level of competence, it may take them a while to be productive citizens or employees in the workplace. Further, if the students do not attain the minimum requirements to graduate, they have to withdraw from college which becomes an economic and social strain on the students.

### VII. LIMITATIONS

There are some limitations to this study. First of all, the sample size of the research study is very small and the environment may be different from many other colleges. Moreover, the study was done with a limited number of college sophomores. The study could yield different results if a larger number of students from a cross sectional colleges are surveyed.

Furthermore, some students take harder classes and their major is more difficult than others. In addition, some faculty provide a better methodology for student engagement and learning than others. Hence, a student's academic performance can be an overarching attitude of teaching in the classroom, the student's ability, peer tutoring, and so on, and not the use of the SNS technology per se.

While many students responded to the survey, it should be noted that a number of students did not participate in the study because they either wanted their GPA to remain private or perhaps they did not want to share their SNS activities publicly. This potentially could have skewed the results

obtained from the survey.

### VIII. CONCLUSION

SNS is an emerging phenomenon that is here to stay. The popularity and ubiquity of the SNS technology is undeniable. As the technology continues to grow we may well see a convergence of the technology with teaching methodologies in the classrooms. Moreover, as students find more and generic uses of these applications, it is likely that this technology will continue to compete with college students' activities for learning and how they prepare for their classes; the structure, methodology and the approach utilized by the faculty in making the teaching and learning environment most constructive and conducive for the students; and of course the benefits and the academic output that these students yielded from the combinations of all these emergent systems. It behooves college faculty and educational administrators to factor this SNS technology into their strategic planning in order to maximize the students' potential to design a learning that is more complete and productive.

Since two-year technical college students amass all the knowledge and skills to make them productive employees within four semesters, it is highly important that college administrators understand the factors affecting student performance in the classroom and develop means to mitigate these elements. Not only is this important for learning but it is also very critical for student college retention, an area that continues to plague both two- and four-year colleges.

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