

# The Relationship between Smartphone Addiction and Academic Performance in College Students

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## Abstract

**Objectives:** Smartphone addiction is a growing concern that can impact social, psychological, and health, while contributing to functional impairments. This study aimed to determine the relationship between smartphone addiction and the grade point average (GPA) of undergraduate college students in the U.S.

**Methods:** This descriptive study consisted of 53 undergraduate college students. The Smartphone Addiction Scale (SAS) and overall grade point average (GPA) was gathered via survey. The data was analyzed through Pearson's correlation to demonstrate the association between these variables.

**Findings:** While not statistically significant at the  $\alpha = .05$  level, the results suggest an almost statistically significant negative correlation ( $r = -0.210$ ,  $p = .066$ ) indicating a weak but noteworthy association between smartphone addiction and GPA.

**Conclusion:** Smartphone addiction is a growing concern that has shown to impact quality of life in Asian countries. These results suggest further research with larger samples in the U.S. is needed to inform college students of the risks smartphone addiction can have on academic success.

**Keywords:** smartphone addiction, cellphone addiction, GPA, college students, academic performance

## 1. Introduction

Cell phones or "smartphones" are an essential part of college life and culture, as they are observed to be used in every college setting, including the classroom (Lepp, Barkley, & Karpinski, 2015). Smartphones can enhance students' educational experience by providing immediate and convenient access to online information retrieval, file sharing, and interaction with their classmates and instructors (Lepp, Barkley, & Karpinski, 2015). The term "smartphone" was first introduced in 1997, when a phone company named, Ericsson introduced its GS 88 "Penelope," branding it as the first "smartphone" due to its advanced features (Sonawane, Mahajan, & Shinde, 2019).

Research reports that many college students perceive their phones primarily as a leisure device and most commonly use them for social networking, watching videos, surfing the net, and gaming (Lepp, Li, & Barkley, 2015). If used for non-class-related purposes, smartphones can negatively distract learning and potentially create an adverse effect on learning (Omer, 2020). The main differentiating feature of a smartphone from a standard phone is that it has permanent access to the internet, and consequently, all of the internet's appealing and/or possible problematic content (Panova & Carbonell 2018). Smartphones were used by 2.5 billion people in 2016, 2.7 billion in 2017, 2.9 billion in 2018, 3.4 billion in 2019, 3.6 billion in 2020, and predicted usage will increase to 3.8 billion by 2021, raising smartphone addiction concerns (O'Dea, 2020).

According to a study conducted by Prekshaa et al. (2019) of 146 medical students in India, 25% scored in the addicted category; while Aljomaa and colleagues (2016), in an assessment of 416 participants found 48% ( $n = 200$ ) met their standard of 'addiction.' While relevant literature has sprouted over recent years, most of the research that has occurred in Asian countries and continues to be not recognized in the Diagnostic and Statistical Manual of Mental Disorders (Boumosleh & Jaalouk, 2017). The purpose of this current research study is to examine the

relationship between smartphone addiction and academic performance (GPA) in college students. Further research on the topic of smartphone addiction was recommended by American Psychiatric Association (APA) in order to list it as a formal diagnosis in the DSM-5 (Cha & Seo, 2018). This study aimed to fill that gap and determine the relationship between smartphone addiction and academic performance (GPA) in American college students, as guided by the following research question: *Is there a relationship between smartphone addiction and academic performance among college students?* Based on the analysis of existing research, the present authors hypothesized that students with a higher degree of smartphone addiction would have lower GPAs as measured by the smartphone addiction scale (Kwon et al., 2013).

## 2. Literature Review

Smartphone addiction is a phenomenon that concerns the uncontrollability of smartphone use, leading to social, psychological, and health problems such as withdrawal, tolerance, and functional impairments (Cha & Seo, 2018). Other addiction symptoms include salience, phantom phone signals, anxiety, and behavioral addictions, posing a severe risk to health and overall quality of life (Omer, 2020). It has also been found that smartphone addiction could be related to depression, loneliness, and lowered self-esteem (Kwon et al., 2013a).

A study by Lepp et al., (2015) examined the relationship between total cell phone use and academic performance while controlling for confounding variables of academic performance which included the student's *major* ( $p = 0.081$ ), *gender* ( $p < 0.001$ ), *class standing* ( $p < 0.001$ ), and *smoking* ( $p < 0.001$ ). The population consisted of 518 college students from the Midwestern United States. The self-efficacy for self-regulated learning (SE: SRL) and the self-efficacy for academic achievement (SE: AA), and self-assessment of how many hours are spent on their phone per day. They found a negative correlation between college students' GPA and cell phone use ( $r = -0.234$ ), after controlling for confounding variables. Compared to the low-use and moderate groups, the GPA of students with higher cell phone use was significantly lower ( $p < .001$ ) (Lepp et al., 2015). Another research study by Bjornsen & Archer (2015) examined the relationship between cell phone use and academic performance among 218 college students from a medium-sized Southeastern University. They used a *cell phone use* questionnaire and found that in-class test scores were negatively associated with cell phone use ( $p = .035$ ).

Conversely, a similar study found no significant correlation between smartphone use and GPA in Australian students ( $r = -0.1$ ) and Korean students ( $r = -0.12$ ) (Winkel et al., 2019). However, when looking at specific phone apps and comparing it to GPA, there was a negative correlation with social media ( $r = -.24$ ,  $p < .05$ ), buying tickets/shopping ( $r = -.21$ ,  $p < .05$ ), and watching videos ( $r = -.20$ ,  $p < .05$ ).

Similarly, Afrein and colleagues (2017) administered the *Smartphone Addiction Scale* (SAS) to a 30-item questionnaire to 247 business students from a private university in Dhaka City of Bangladesh. The researchers also administered an *Internet-Related Addictive Behavior Inventory*, which resulted in five smartphone addiction factors: withdrawal, impatience, daily-life disturbance, withdrawal, and positive anticipation, which led to hampered relationships between students and their family members. They found the primary concern to be the daily-life disturbance of daily life activities ( $p = 0.000$ ), leading to hampered relationships between students and their family members.

A study conducted by Khan et al. (2019) also had similar results among a sample size of 360 students from two private universities using a self-administered questionnaire, validated by other studies using the *Estonian Smartphone Addiction Proneness Scale*, and the *Smartphone Addiction Inventory*. This study concluded a significant negative correlation between smartphone addiction and GPA among college students ( $r = -0.52$ ,  $p < 0.01$ ). The outcomes of smartphone addiction were negatively associated with time management among college students ( $r = -0.29$ ,  $p < 0.01$ ) (Khan et al., 2019).

In contrast, a recent study by Boumosleh and Jaalouk (2017), found opposing results. The purpose of this study was to examine the relationship between smartphone addiction and academic performance after controlling for the potential confounding variables, such as gender, drinking alcohol, age at which a smartphone was used for the first time, smartphone use for study-related purposes, class, and faculty. Results suggest that smartphone addiction among college students did not correlate with academic performances after controlling for the confounding effects ( $p = 0.08$ ) (Boumosleh & Jaalouk, 2017). Similarly, Hawi and Samaha (2016) determined that, regardless of the students' genders, those who were at low risk of smartphone addiction, as determined by the SAS, had a higher chance of achieving higher academic performance than those at high risk of smartphone addiction (Hawi & Samaha, 2016). In a study performed by Karki, Singh, Paudel et al. (2020), they determined that males are more addicted to smartphones than the females using the mean addiction score from SAS-SV.

The research found that the risks related to problematic mobile phone use include physical, psychological, and

mental health conditions (Omer, 2020). Research also found that University students are at potential risk because they reportedly spend a considerable amount of time using their smartphones for either academic or entertainment-related purposes (Omer, 2020). In a more practical sense, Kuznekoff and Titsworth (2012) quantified this impact by having 47 students participate in a study in which three groups participated in a learning activity. The participants were spread among three groups: control, minimally smartphone distracted, and highly smartphone distracted. On average, the students in the control groups score a letter grade and a half higher than those on the highly distracted group on two post-lesson tests.

### 2.1 Purpose

The present study was guided by the *Model of Human Occupation* (MOHO), a client-centered holistic approach to care (Cole & Tufano, 2020). Addiction interferes with the ability to engage in education, affecting overall academic performance. The theoretical base of MOHO focuses on the dynamic interplay of the person and the environmental variables. Thus, the present authors hypothesize that smartphone addiction can affect the process of engagement in higher education learning, where students must fully engage with academic material with reduced external distractors.

While the literature presents a significant amount of research in this area, results are inconsistent, and few have occurred with US participants. This study seeks to further add to the literature specific to the US northeast population. This study is both relevant and timely as college students must continue to manage work, study, social activities, particularly in increasingly stressful environments such as the Covid-19 pandemic, which was simultaneously occurring during the collection of this data in October of 2020.

## 3. Methodology

### 3.1 Participant Selection & Data Collection

Dominican College's Institutional Review Board (IRB) approved the study. Study subjects consented to participation via email. The survey was sent via email to all undergraduate Dominican College students. The online survey included two sections: Smartphone Addiction Scale Short-Version (SAS-SV) and a demographic questionnaire. Students were provided detailed step-by-step directions on how to obtain their actual GPA. The final data removed participants who were either not undergrad college students or failed the embedded trap questions designed to ensure accurate and meaningful participation.

### 3.2 Reliability/Validity of Outcome Measures

The Smartphone Addiction Scale Short-Version (SAS-SV) developed by Kwon et al., (2013) has been commonly used in previous research on smartphone research. The initial version was a modification of the Korea-scale (K-scale), which looked at internet addiction. The SAS consists of 33 items with a six-point Likert scale that ranges from a 1 (strongly disagree) to a 6 (strongly agree) and is based on six factors (Kwon et al., 2013a). The six factors include *withdrawal, daily-life disturbances, overuse, positive anticipation, tolerance, and cyberspace-oriented relationships*. The SAS-SV has a strong internal consistency with a Cronbach's alpha = 0.91, as well as high internal-reliability (Cronbach's alpha = 0.966) during its developmental stages (Kwon et al., 2013a).

### 3.3 Data Analysis/Statistical Procedures

This study was a quantitative design and used a parametric test (Pearson's Correlation) to find the strength to determine the relationship between academic performance and smartphone addiction. Statistical Analysis of data was performed using the statistical program Statistical Package for the Social Sciences (SPSS). A statistical significance was set to 0.05. This study is one-tailed based on the literature and unidirectional hyposthesis. Based on the G power calculation, the study required a minimum population size of 150 participants with an effect size of  $r = 0.20$ .

## 4. Results

Participants who completed the survey consisted of 83 undergraduate students with diverse nationalities, backgrounds, and courses, attending Dominican College in Orangeburg, New York. The students completed the Smartphone Addiction Scale, the background information survey, and the consent form. However, several students ( $n = 29$ ) failed to fulfill the trap questions within that sample. Furthermore, among the 54 final participants who were eligible to be part of the study, one participant could not obtain their GPA due to computer error. Ultimately, the final sample was refined to 53 students (43 females, 10 males), with an attrition rate of 36.14%.

The GPA of undergraduate students ( $n = 53$ ) ranged from 0 to 4.0, with a mean of 3.3661 (SD = 0.61554). The mean GPA for this sample was higher than expected for the average undergraduate population, which means there

is a possibility of skewness due to the high achieving nature of students who take the time to complete a research survey request.

Among this sample, a negative correlation was found between GPA and SAS scores ( $r = -0.210$ ,  $p = .066$ ) using Pearson's correlation, suggesting that the higher the student scored on the smartphone addiction score, the lower the student's GPA was.

## 5. Discussion

While these results are not statistically significant at the  $\alpha = 0.05$  level, results demonstrated a negative correlation between smartphone addiction and GPA, which is consistent with earlier research studies (Arefin et al., 2017; Bjornsen, & Archer, 2015; Hawi & Samaha, 2016; Khan et al., 2019; Lepp et al., 2015; Omer, 2020; Winskel et al., 2019). The present study is *underpowered* and would likely have met statistical significance with a larger sample, as evident by similar effect size findings in the literature. Results are congruent with the theoretical framework for this study, suggesting that addiction might impact academic performance and impacting function.

The present study used the SAS-SV as the measure for smartphone addiction, which has been the most widely reported in the literature. Other measures consist of the Smartphone Addiction Inventory (SPAI), which has also demonstrated satisfactory validity and reliability (Lin et al., 2014; Lin et al., 2017), and researcher-created surveys (Lepp et al., 2015; Bjornsen et al., 2015). Present authors attempted to categorize findings in the literature by outcome measures; however, no patterns appear obvious. Studies that used SAS-SV resulted in  $r$  values of  $-.315$  (Omer, 2020),  $-.2$  (Hawi & Samaha, 2016),  $-.748$  (Chaudhary & Tripathy, 2018), and  $-.12$  (Winskel, et al., 2019). Studies using the SPAI resulted in an  $r$ -value of  $-.52$  (Kahn, et al., 2019) and an Odds Ratio of 1.018 (Boumosleh & Jaalouk, 2017). The two self-report studies reported findings consisting of weak-moderate correlations, similar to results in studies that used the SAS-SV (Lepp et al., 2015; Bjornsen et al., 2015).

Strangely, the study with the largest sample size ( $n = 688$ ) is one of the few studies suggesting no correlation between smartphone addiction and GPA. However, this study suggests predictive factors when adding covariates such as alcohol drinking, age at first use of smartphones, and purpose of smartphone use (Boumosleh & Jaalouk, 2017).

The present study results, in corroboration with the present literature, suggest there appears to be a weak negative correlation with academic performance among college students, a participant group that is relatively easy to study among researchers. However, it seems evident that further exploration of this work must look at confounding variables that may influence the intended smartphone use and other addictive behaviors the participants may engage in. Furthermore, research results focused on college students should not be generalized to the academic success among all students of varying ages. College students were academically successful before the college experience and thus did not represent younger and adolescent-aged school students who never go on to higher academic learning environments.

### 5.1 Limitations and Future Research

The small sample size is a significant limitation to this study which increased the probability of making a type II error if the present authors accept the null hypothesis that there is no association between smartphone addiction and GPA. The average GPA collected during this study is higher and does not represent the average GPA of Dominican College undergraduate (freshman-senior), thus suggesting the sample group may not accurately reflect the greater student population. The present study's final limitation is that the data was collected through a self-reported survey, leading to GPA self-reporting bias.

Future research should include a larger sample size of undergraduate college students from various colleges so the results can be generalizable to adolescents who may struggle more significantly and never reach the college environment. Researchers should also consider further investigating the adverse side effects of social media apps that potentially impact individuals' mental health and well-being.

Future research could also examine the potential confounding variables' effects on the relationship between smartphone addiction and GPA such as class year, smoking, drinking, and age at first use of a smartphone (Boumosleh & Jaalouk, 2017); as well as socioeconomic status and usage pattern (Cha & Seo, 2018).

### 5.2 Contributions to Practice

The findings from this study can help promote the awareness of mental health, smartphone addiction and provide an improved understanding of potential functional impacts on the academic success of undergraduate college students. Informing college students on the risk factors of smartphone addiction and GPA can help them become self-aware of this issue while also informing best practices for targeting smartphone use toward activities that

promote academic success.

Previous literature suggests that higher education institutions and educators can enhance academic success and well-being by engaging the students physically and socially. Furthermore, spreading awareness of the benefits of using on-campus group study rooms and/or library lab rooms for in-person interactions may yield positive academic performance results rather than rely on self-studying, resulting in increased distractibility and decreased focus on academic-related tasks. Although previous studies suggest that smartphone addiction may negatively affect academic performance, using smartphones in a productive manner, such as being used as an educational tool during study sessions, may yield positive outcomes (Arefin et al., 2017; Khan et al., 2019; Klimova, 2019).

## 6. Conclusion

The findings from the present study help provide further evidence of the impact of smartphone addiction on GPA among undergraduate college students. While smartphones can be beneficial in the learning environment if used for educational purposes that promote learning and productivity overall, the present study results suggest there is a negative correlation between increased smartphone addiction and decreased academic performance. Thus, it appears institutions should take the necessary steps in creating environmental and educational awareness programs with the aim of promoting function and productivity; while also educating on the unstructured and unproductive behaviors that impair academic success.

## Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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