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Analyzing the Impact of Smartphone Use and Mobile Distraction in Higher Education

Shreeraj Khatiwada[1]

[1]Assistant Lecturer of Information & Technology (IT)
Makawanpur Multiple Campus, Hetauda

Corresponding Author
Shreeraj Khatiwada
Email: shreerajhtd@gmail.com

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Abstract

This study explores the impact of smartphone use and mobile distraction on the academic performance of college students. Utilizing a mixed-methods approach, data were collected from 286 students through surveys and open-ended responses. Quantitative analysis revealed that a majority of students use smartphones for 4–6 hours daily, with social media, entertainment, and messaging as primary activities. Chi-squared tests showed significant associations between academic performance and factors such as usage duration, frequency of checking phones while studying, anxiety over disconnection, perceived addiction, procrastination, and impact on sleep and mental health. Sentiment analysis indicated that while many students acknowledge the academic benefits of smartphones, a substantial portion reported negative effects like distraction and stress. Thematic analysis of student suggestions highlighted the importance of self-regulation, time management, and institutional support. The findings underscore the need for targeted digital wellness initiatives to mitigate mobile distraction and enhance academic success.

Keywords: smartphone usage, mobile distraction, academic performance, higher education, student focus, procrastination, mental health, digital wellness, time management, focus strategies, student well-being, digital habits

1. Introduction

In today's digital age, smartphones have become a common part of everyone's life. They help people stay connected, access information, and perform daily tasks with ease (Raento et al., 2009). Especially for students in higher education, smartphones offer many benefits. They can use them to attend online classes, search for study materials, take notes, and

stay in touch with teachers and friends (Junco, 2012). However, the overuse of smartphones has also brought several problems, particularly in the field of education.

Many students are spending too much time on their phones, often during lectures or study time. They get distracted by social media, games, videos, and constant notifications (Han & Yi, 2019). This not only affects their ability to focus but also reduces the time they spend on studying. This reduces their focus on learning and decreases the time spent on meaningful study. As a result, their academic performance, classroom participation, and memory power are negatively affected (Lepp et al., 2014). Instead of being tools for learning, smartphones are becoming a source of distraction. Poor time management and lack of concentration are common outcomes (Samaha & Hawi, 2016).

This issue is not only seen in one country - it is happening worldwide. However, the effects can be different depending on the local environment and culture. In Nepal, smartphone use among college and university students has increased rapidly. Most students carry their smartphones everywhere and feel uneasy when not using them, even for a short time (Khatiwada, 2024). This behavior has raised new concerns for teachers, institutions, and the students themselves.

In higher education, students are expected to focus on learning and preparing for their future careers. But the constant availability of smartphones has made it harder for them to stay attentive in class. Many students check their phones during lessons or while doing assignments, which affects their ability to concentrate and fully understand the content (Giunchiglia et al., 2020). Frequent distractions can result in poor academic outcomes and also affect emotional well-being.

Research from different countries shows that excessive smartphone use is linked to poor academic performance, high levels of stress, sleep problems, and even anxiety (Kuss & Griffiths, 2017a; Throuvala et al., 2019) . However, in Nepal, especially in developing cities and small town - there has not been enough research on how smartphones are affecting students in higher education. Therefore, it is very important to study this issue in the current context.
This research seeks to shed light on the significant issue of smartphone use and mobile distractions in higher education, particularly in the context of Nepal. As smartphones continue to become an integral part of students' lives, understanding their impact on academic performance, mental health, and overall well-being is crucial. The research aims to explore the frequency of smartphone use during study and class time, the connection between distractions and academic outcomes, and the mental and emotional effects on students. Given the increasing reliance on digital tools for learning post-COVID-19, this study holds even greater relevance in today's educational environment. By focusing on these critical aspects, the research will provide valuable insights that can guide students, educators, and institutions in developing strategies to mitigate distractions and harness the benefits of smartphones for educational purposes. Ultimately, the goal is to forward a healthier relationship with technology that supports academic success and mental well-being, ensuring that smartphones become a tool for learning rather than a barrier to it.

1.1 Literature Review

A study conducted by Lepp et al. (2015) explored the relationship between smartphone use and academic performance among college students. The study found that higher

smartphone use is negatively correlated with GPA, suggesting that excessive smartphone use may hinder academic success. The authors emphasized the need for awareness programs aimed at educating students about the potential academic risks associated with excessive smartphone use.

The study by Kuss and Griffiths (2017) conducted a comprehensive review of the psychological literature on online social networking and addiction. They highlighted that excessive smartphone use is associated with various mental health issues, including anxiety, depression, and stress. The authors emphasized the need for further research to understand the underlying mechanisms linking smartphone addiction to psychological well-being.

According to LBEF Research Journal of Science (2019) , a study conducted in the Kathmandu Valley investigated the effects of mobile phone use on undergraduate students' academic performance. The findings revealed a significant negative correlation between excessive smartphone usage and students' GPA and study focus. The research emphasized the need for increased awareness and structured smartphone use among students to minimize academic disruption.

A study by Thapa et al. (2020) explored mobile phone dependence among undergraduate medical students in Eastern Nepal. The study found that over 21% of students exhibited signs of mobile phone dependency, with frequent usage linked to anxiety and difficulty concentrating on academic tasks. The authors highlighted the importance of promoting digital awareness and offering counseling support within educational institutions.

In a study focusing on medical students, S. et al. (2021) assessed the impact of smartphone use on academic performance and mental health. The findings indicated that excessive smartphone use is associated with poor academic outcomes and increased stress levels. The authors recommended implementing strategies to manage smartphone use among students to improve their academic and psychological well-being.

In a meta-analysis by Sunday et al. (2021), the authors examined the association between smartphone addiction and academic performance. The analysis revealed a negative correlation, indicating that higher levels of smartphone addiction are associated with lower academic achievement. The study underscored the importance of addressing smartphone addiction to enhance students' academic success.

Research conducted by Sharma et al. (2023) analyzed smartphone addiction and its behavioral and health effects among paramedical students. Nearly half of the students reported using smartphones for more than five hours a day, with most admitting to using them while studying. The study revealed increased stress, poor sleep, and decreased academic focus among frequent users, emphasizing the need for healthier digital usage patterns among students.

Yao and Wang (2023) investigated the concept of technostress resulting from smartphone use and its impact on university students' sleep quality and academic performance. The study concluded that excessive smartphone use leads to technostress, which adversely affects sleep and academic outcomes. The authors suggested implementing measures to manage smartphone use to reduce technostress among students.

The study by Abuhamdah and Naser (2023) examined smartphone addiction and its mental health risks among university students in Jordan. The research found a significant association between smartphone addiction and psychological distress, including symptoms of

depression and anxiety. The authors highlighted the need for interventions to address smartphone addiction to promote mental health among students.

In a cross-sectional study conducted in Wuhan, China, Qiu et al. (2024) explored the relationship between smartphone distraction, social withdrawal, digital stress, and depression among college students. The findings indicated that smartphone distraction directly affects depression levels, with social withdrawal and digital stress serving as mediating factors. The study emphasized the importance of addressing smartphone distraction to improve students' mental health.

The research conducted by Jin et al. (2024) investigated the mediating role of academic procrastination and the moderating role of time management in the relationship between smartphone distraction and academic anxiety. The study found that smartphone distraction leads to increased academic procrastination, which in turn heightens academic anxiety. Effective time management was identified as a mitigating factor in this relationship.

Montag et al. (2024) explored the relationship between smartphone use and mental health among adolescents. Their findings indicated that problematic smartphone use is linked to increased levels of anxiety and depression. The study suggested that interventions targeting smartphone addiction could be beneficial in improving mental health outcomes among young individuals.

1.2 Research Gap

The existing literature on smartphone use and its impact on academic performance primarily highlights the negative effects but leaves gaps in understanding the specific factors that contribute to distractions in higher education. Most studies focus on smartphone addiction or general dependency but do not explore how often these distractions occur in academic settings or which smartphone activities lead to the most disruptions. Moreover, while some research has examined the psychological well-being of students, few studies have looked into the strategy's students use to manage smartphone distractions or their views on digital wellness programs. This study aims to address these gaps by investigating the factors that contribute to smartphone-related distractions, students' perceptions of these distractions, and the strategies they employ to manage their smartphone use. Conducted in Hetauda, Nepal, this research aims to offer valuable insights for improving academic performance and managing smartphone use in educational environments.

1.3 Research Objective

To examine the major factors contributing to mobile distraction among students, analyze their correlation with academic performance and mental well-being, and explore students’ perceptions and suggestions regarding smartphone use and digital wellness.

1.4 Research Question

1. What are the primary factors contributing to mobile distraction among higher education students during academic activities, and how frequently do these distractions occur?
2. How does smartphone usage and mobile distraction relate with academic performance among higher education students?

3. What are students' perceptions, sentiments, and proposed strategies for managing smartphone-related distractions within academic contexts?

2. Materials and Method Used

This research aims to explore the impact of smartphone use and mobile distractions on academic performance in higher education. With the rapid rise of smartphone usage among students, understanding the relationship between mobile distractions and student focus, performance, and well-being has become crucial. This study provides insight into the extent of smartphone use in academic environments, its causes, consequences, and strategies students employ to manage distractions. The research uses a mixed-methods approach that includes both quantitative and qualitative data collection, ensuring a comprehensive understanding of the issue.

2.1 Survey Questionnaire Development

To understand how smartphone use affects students in higher education, a structured questionnaire was developed. The questions were based on existing research about mobile distraction, smartphone habits, and student performance. The goal was to collect useful information in a clear and organized way. The questionnaire consisted of 19 questions. Among them, 17 were close-ended questions, and 2 were open-ended questions.

The questionnaire had six main sections:

- **Section A: Demographic Information** — Asked about gender, age, academic year, and program of study to help compare different student groups.

- **Section B: Smartphone Usage Patterns** — Focused on how often students use their phones, what they use them for, and how often they check them while studying or in class.

- **Section C: Causes of Mobile Distraction** — Explored what makes students use their phones during study time, such as boredom, habit, or notifications. It also included questions about phone anxiety and addiction.

- **Section D: Consequences of Mobile Distraction** — Looked at how phone use may affect focus, grades, sleep, and mental health.

- **Section E: Strategies and Attitudes** — Asked if students try to manage their phone use, what methods they use, and whether they support digital wellness programs in their colleges.

- **Section F: Open-Ended Questions** — Gave students space to share their personal thoughts on how smartphones impact their studies and how phone use could be better managed.

2.2 Study Population and Data Collection

The target population for this study comprises undergraduate students enrolled in different academic programs: BSc. CSIT, BCA, BIM, BICTE, and BBA. These students are from three higher education institutions located in Hetauda City: Makawanpur Multiple Campus, Hetauda City College, and Hetauda School of Management.

To gather the required data, a convenience sampling method was used, targeting students who were easily accessible and willing to participate. This approach helped gather data efficiently from students actively involved in academic settings.

A structured questionnaire was distributed to a total of 747 students across the selected institutions. Out of these, 297 responses were received. After conducting a thorough data cleaning process to eliminate incomplete or inconsistent responses, a final dataset of 286 valid responses was retained for analysis. This ensured the accuracy, integrity, and reliability of the study results.

2.3 Sample Size Determination

To ensure that the findings are statistically sound and representative of the broader student population, a sample size calculation was conducted using the formula for a finite population proportion, as recommended by (Thompson, 2012) :

$$S = \frac{\frac{z^2(P)(1-P)}{e^2}}{1 + \frac{z^2(P)(1-P)}{e^2\,N}}$$

Where:

S = Sample size for a finite population

Z = Z-score corresponding to the 95% confidence level (1.96)

P = Estimated population proportion (0.5, assuming maximum variability)

e = Margin of error (0.05)

N = Total population size (747 students)

$$S = \frac{\frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2}}{1 + \frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2 * 747}}$$

$$\approx 254$$

Hence, a minimum sample size of 254 students was required for this study. With 286 valid responses collected, the sample size meets and exceeds this requirement, ensuring adequate statistical power for subsequent analysis.

2.4 Data Analysis Techniques

- **Descriptive Analysis**

  Descriptive data analysis involves summarizing and describing the key features of a dataset to better understand its central tendencies, variability, and distribution (Kemp et al., 2017). In this research, descriptive analysis is conducted through data visualization methods like pie charts and bar charts. These visual tools are essential for analyzing the dataset, as they provide a clear representation of the frequency

distribution of categorical variables. By using these charts, the study uncovers valuable insights into the distribution patterns of key variables, helping to better interpret and communicate the findings, and making it easier to understand students' behaviors and perspectives.

- **Data Statistics**

  According to Greenwood and Nikulin (1996), the chi-squared test is an important statistical method used to analyze categorical data, allowing for the exploration of relationships between variables and the assessment of their independence within the dataset. By applying this test, the study aimed to determine if observed frequencies significantly differed from the expected frequencies, offering insights into the connections between the variables under investigation. The use of the chi-squared test enabled the identification of any significant differences, helping to uncover patterns or dependencies within the data. Therefore, the chi-squared test played a key role in shaping the analytical framework of this research, enhancing the depth and accuracy of the findings.

$$\boldsymbol{X^2 = \sum \frac{(O_i - E_i)^2}{E_i}}$$

  Where,

  X^2 represents the chi-squared test statistic

  O_i is the observed frequency for each category.

  E_i is the expected frequency for each category under the null hypothesis.

- **Qualitative Data Analysis**

  The open-ended responses will be analyzed using sentiment analysis and thematic analysis.

  For sentiment analysis, the VADER (Valence Aware Dictionary and sentiment Reasoner) tool will be used, as VADER is better suited for short, informal text typical of student responses. VADER will calculate polarity scores (ranging from -1 to +1) to classify responses into positive, negative, or neutral categories, and selected examples will be highlighted for interpretation.

  For thematic analysis, Count Vectorizer will be applied to extract frequent keywords, and a Word Cloud will be generated to visualize major terms. Following this, a manual thematic grouping will be conducted to organize related ideas into broader themes, including time management, self-regulation, phone-free study zones, digital wellness education, app restrictions, and outdoor activities. This approach aims to systematically identify and interpret students' suggestions for reducing mobile distraction.

3. Results and Discussions

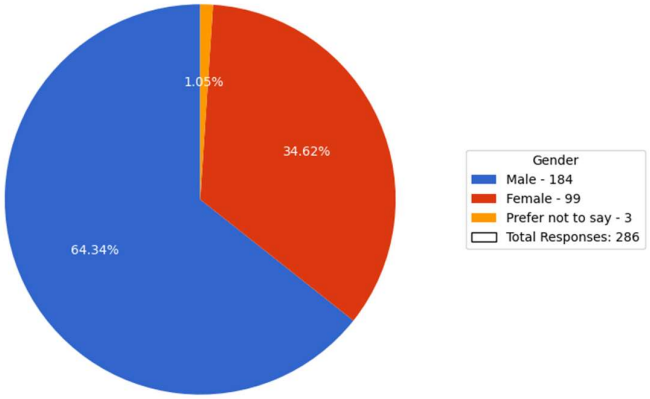
This chapter presents the findings of the study, focusing on the impact of excessive smartphone use and mobile distraction on the academic performance of college students. The

results are analyzed in relation to the research questions, which explore the relationship between smartphone usage, student focus, academic performance, and well-being. Data visualization techniques, including charts, graphs, and statistical analyses, are employed to clearly and effectively present the findings.

Section A: Demographic Information

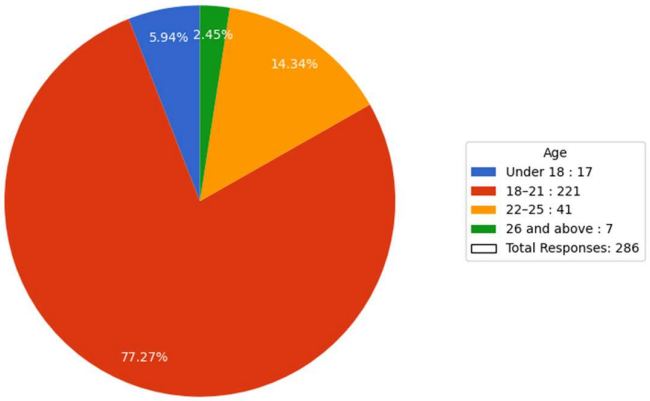
The demographic characteristics of the respondents, including age, gender, academic program, and year of study, were analyzed and are presented below.

Figure 1: *Distribution of Respondents by Gender*



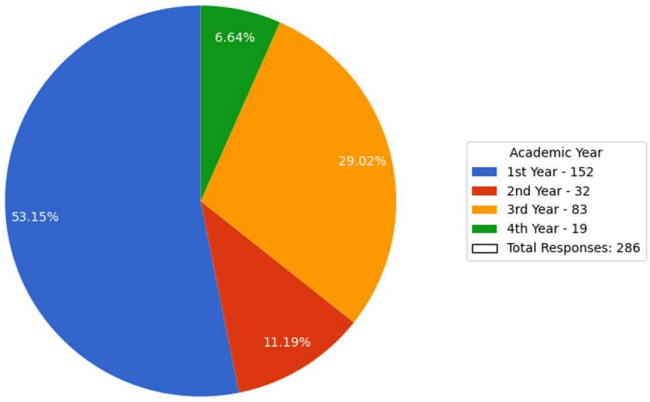
Out of 286 respondents, the majority male participation may slightly influence smartphone usage patterns observed in the study, but the gender mix still provides balanced insight into mobile distraction across students.

Figure 2: *Distribution of Respondents by Age*



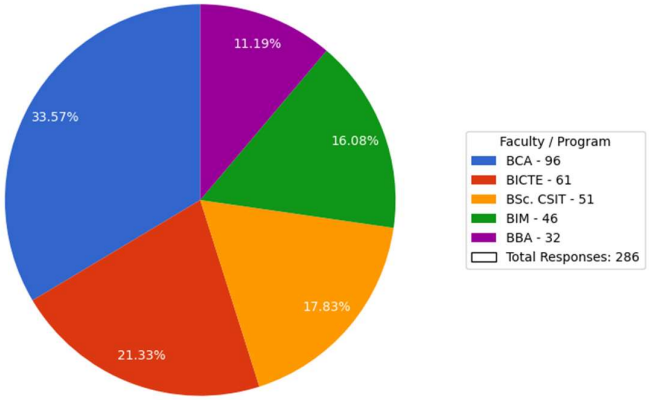
The majority of respondents (77.3%) were between 18–21 years old, followed by 22–25 years (14.3%), under 18 (5.9%), and 26 and above (2.4%). This highlights that most participants are typical undergraduate-age students, making the data highly relevant to analyzing mobile distraction in higher education contexts.

Figure 3: *Distribution of Respondents by Academic Year*



Most respondents (53.1%) were in their 1st year of study, followed by 3rd year (29.0%), 2nd year (11.2%), and 4th year (6.6%). This shows a strong representation from early-stage undergraduates, which is important as first-year students may be more prone to mobile distractions while adjusting to college life.

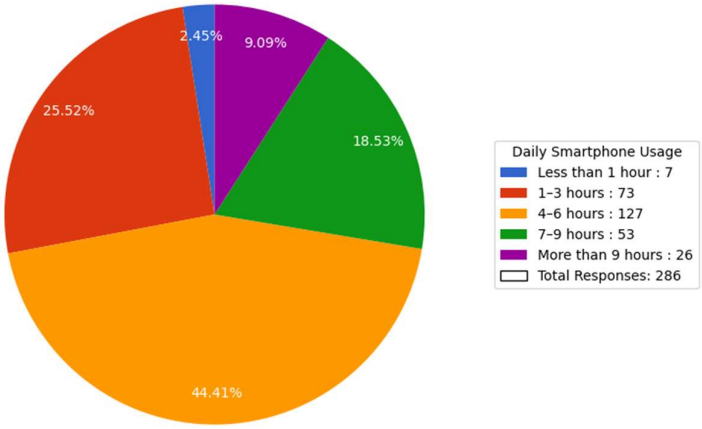
Figure 4: *Distribution of Respondents by Faculty/Program*



The highest number of respondents were from the BCA program (33.57%), followed by BICTE (21.3%), BSc. CSIT (17.8%), BIM (16.1%), and BBA (11.2%). This indicates a diverse participation across technical and management disciplines, providing a well-rounded perspective on mobile distraction trends among different academic programs.

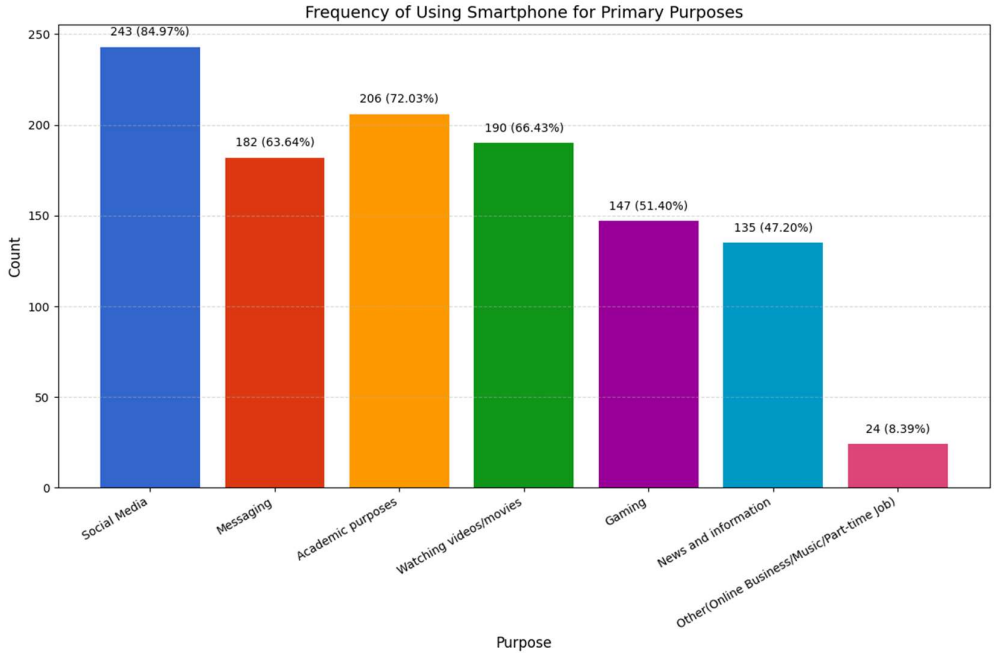
Section B: Smartphone Usage Pattern

Figure 5: *Respondents' Average Daily Smartphone Use*



The majority of students (44.4%) reported using their smartphones for 4–6 hours daily**,** followed by 1–3 hours (25.5%) and 7–9 hours (18.5%). A smaller portion of respondents indicated more than 9 hours (9.1%) and less than 1 hour (2.4%) of usage. These results highlight that a significant number of students spend extended periods on their smartphones each day, which may increase the risk of distraction and impact academic focus which is key concerns addressed in this study.

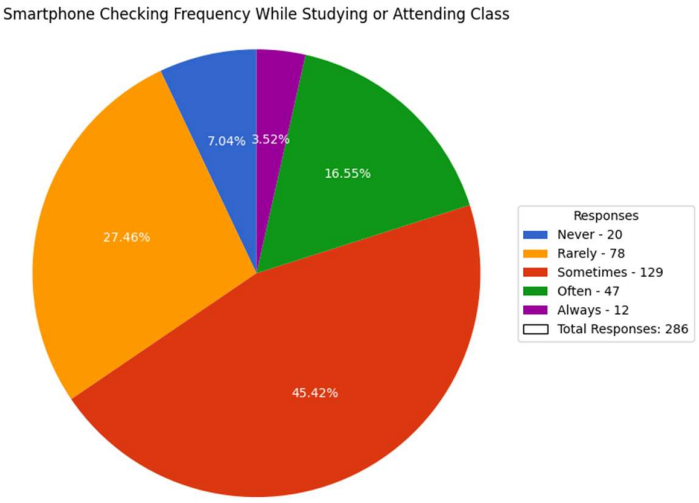
Figure 6: *Respondents' Primary Purposes for Smartphone Use*



The analysis shows that the most common purpose for smartphone use among students is social media (243 responses), followed by academic purposes (206 responses), and watching

videos/movies (190 responses). Messaging (182 responses) and gaming (147 responses) are also major activities. Meanwhile, news and information (135 responses) and other activities like online business, part-time jobs, and music (24 responses) were less commonly cited. This suggests that while academic use is significant, entertainment and communication dominate students' smartphone activities.

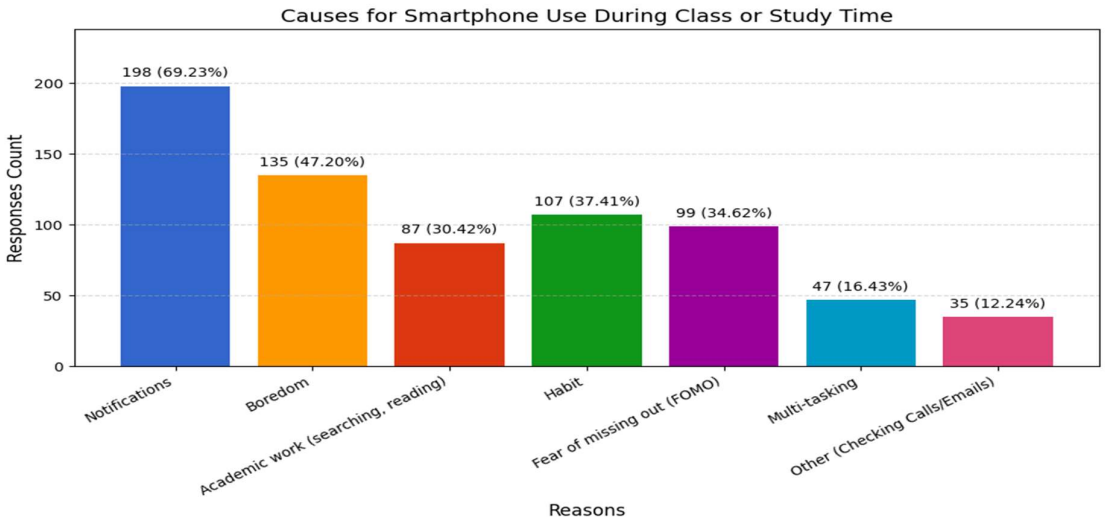
Figure 7: *Frequency of Checking Smartphones While Studying or in Class*



Most students reported checking their smartphones sometimes (45.4%) or rarely (27.4%) while studying or attending class. A notable number also admitted doing so often (16.5%), while only a few said never (7.0%) or always (3.5%). This indicates that intermittent phone checking is a common habit**,** potentially contributing to reduced concentration and learning efficiency.

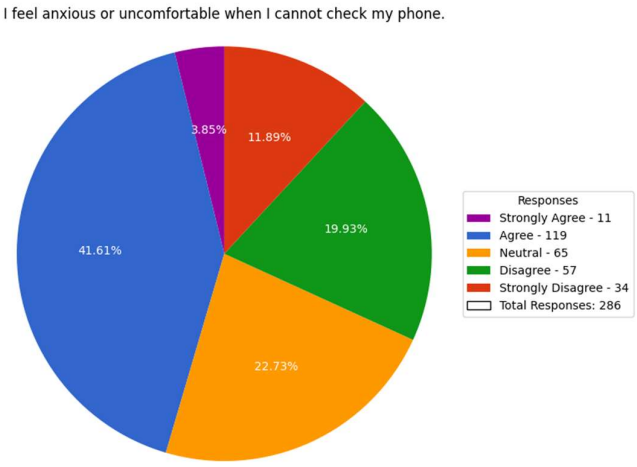
Section C: Causes of Mobile Distraction

Figure 8: *Causes for Smartphone use during class or study time*



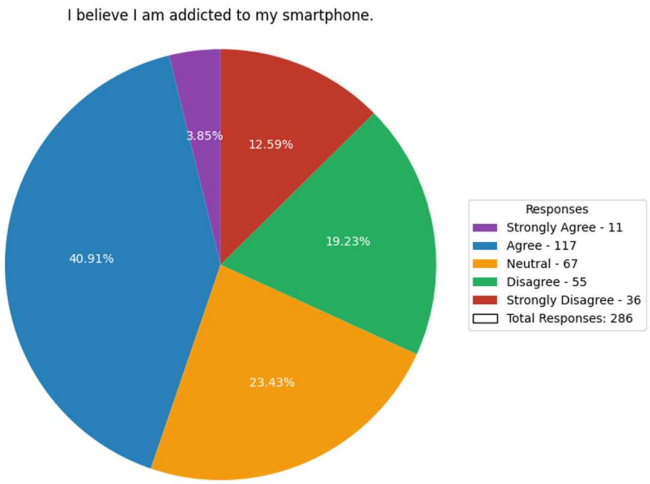
Among the factors causing smartphone use during class or study time, notifications (198 responses) were the leading trigger, followed by boredom (135 responses) and habitual use (107 responses). Fear of missing out (FOMO) (99 responses) and academic work (87 responses) were also notable reasons, though academic use appeared less frequent than non-academic causes. Multi-tasking (47 responses) was less common, while a small group cited other reasons like checking calls and emails (35 responses). This indicates that most smartphone distractions stem from external alerts and internal habits rather than academic necessities.

Figure 9: *Level of Anxiety When Unable to Check Smartphone*



A significant portion of respondents agreed (41.6%) or strongly agreed (3.8%) that they feel anxious or uncomfortable when unable to check their phones, indicating signs of phone dependency or anxiety**.** Meanwhile, 19.9% disagreed and 11.9% strongly disagreed**,** showing a less affected group. The remaining 22.7% were neutral**.** These results suggest that a large share of students experience mild to moderate levels of phone anxiety**,** which can contribute to distraction and impact academic performance.

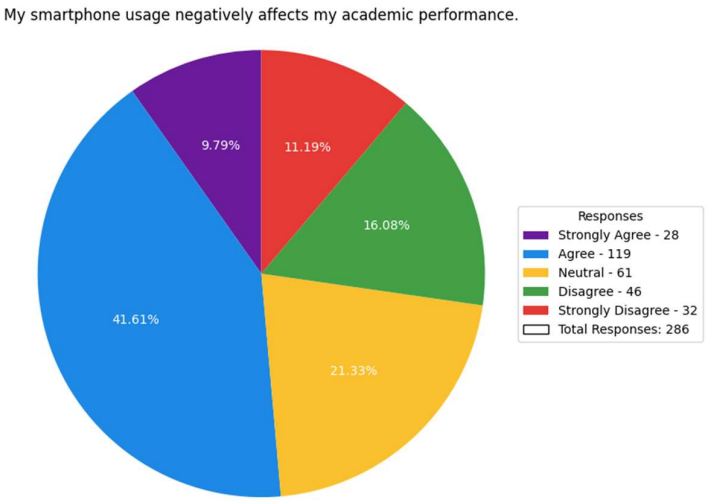
Figure 10: *Respondents' Self-Perception of Smartphone Addiction.*



The responses regarding perceived smartphone addiction show that 41% of respondents agreed **or** strongly agreed (4%) that they feel addicted to their smartphones, indicating a strong recognition of smartphone dependence among a considerable portion of the student population. On the other hand, 19.2% disagreed or strongly disagreed (12.6**%)**, while 23.4% remained neutral on the matter. This reflects a variety of perspectives**,** with many students acknowledging their perceived addiction, which can have a significant impact on both academic focus and well-being.

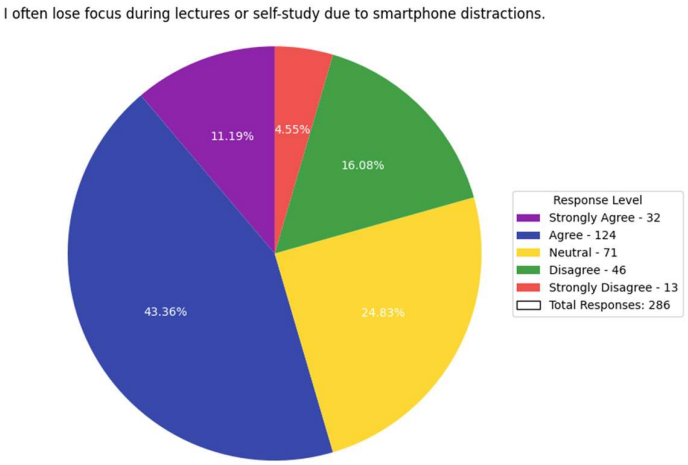
Section D: Consequences of Mobile Distraction

Figure 11: *Respondents' Perception of Smartphone Usage Impact on Academic Performance*



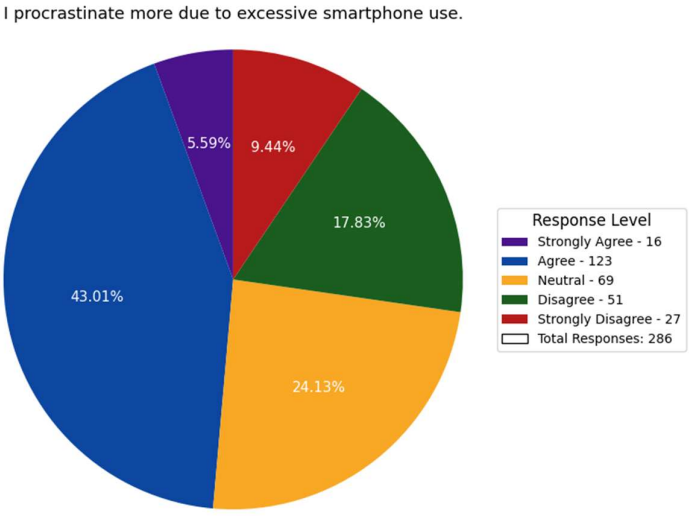
The responses to the question show that approximately 51.4% of respondents either agreed or strongly agreed, indicating that over half of the students believe their smartphone use harms their academic success. In contrast, 27.3% either disagreed or strongly disagreed with this statement, suggesting a smaller group does not perceive it as an issue. Meanwhile, 21.3% of participants remained neutral. These findings suggest that while many students acknowledge the negative impact of smartphone use on their studies, a significant portion either disagrees or remains uncertain highlighting the patterns and individual nature of smartphone use and its relationship with academic performance.

Figure 12: *Respondents' Loss of Focus During Lectures or Self-Study Due to Smartphone Distractions*



The responses to the above question show that 54.5% of respondents agreed or strongly agreed, indicating that a majority of students experience a loss of focus due to smartphone distractions. On the other hand, 20.63**%** disagreed or strongly disagreed, suggesting that a smaller group of students do not find smartphones to be a significant distraction. Additionally, 24.8% of respondents were neutral, indicating that some students neither agree nor disagree with the statement. These results emphasize the pervasive impact of smartphones on students' ability to concentrate during academic activities.

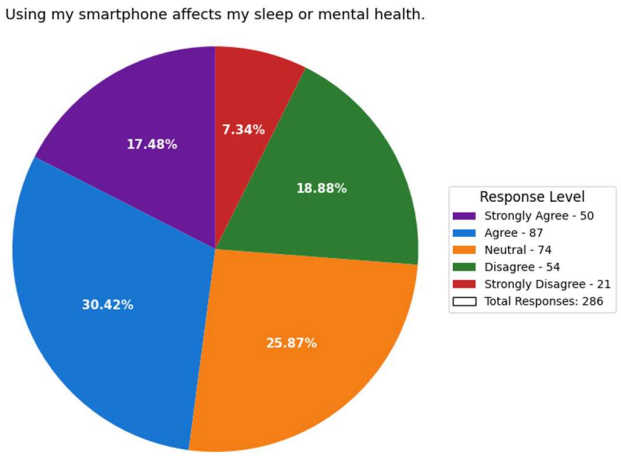
Figure 13: *Respondents' Perception of Procrastination Due to Excessive Smartphone Use*



The responses to the question about procrastination due to excessive smartphone use indicate that 48.6% of respondents agreed or strongly agreed, suggesting that a significant portion of students believe their smartphone usage contributes to procrastination. In contrast, 27.2% disagreed or strongly disagreed, implying that some students do not perceive smartphones as a major factor in their procrastination. Additionally, 24.1% of respondents were

neutral, reflecting that a portion of students may not have a strong opinion or experience regarding the link between smartphone use and procrastination. This suggests that smartphone use may play a role in procrastination for many students, but its impact varies among individuals.

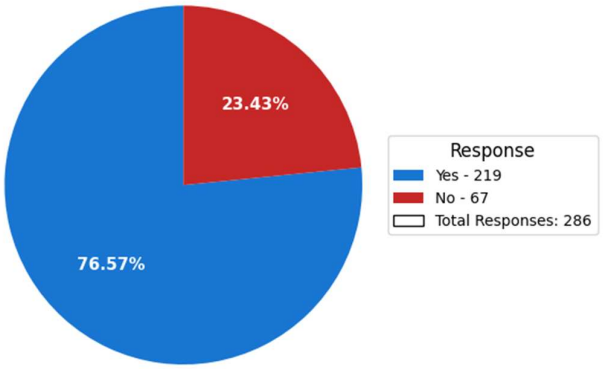
Figure 14: *Respondents' Perception of Smartphone Use Impact on Sleep or Mental Health*



The responses to the question show that 47.9% of respondents agreed or strongly agreed, suggesting that a substantial portion of students believe their smartphone usage negatively impacts their sleep or mental health. On the other hand, 26.2% disagreed or strongly disagreed, indicating that some students do not feel their smartphone use has an adverse effect on their well-being. Additionally, 25.8% of respondents were neutral, indicating that a portion of students may not experience or recognize any significant impact of smartphone use on their sleep or mental health. These findings point to a notable concern among many students about the potential mental health and sleep disruptions caused by excessive smartphone usage, though the impact appears to vary among individuals.

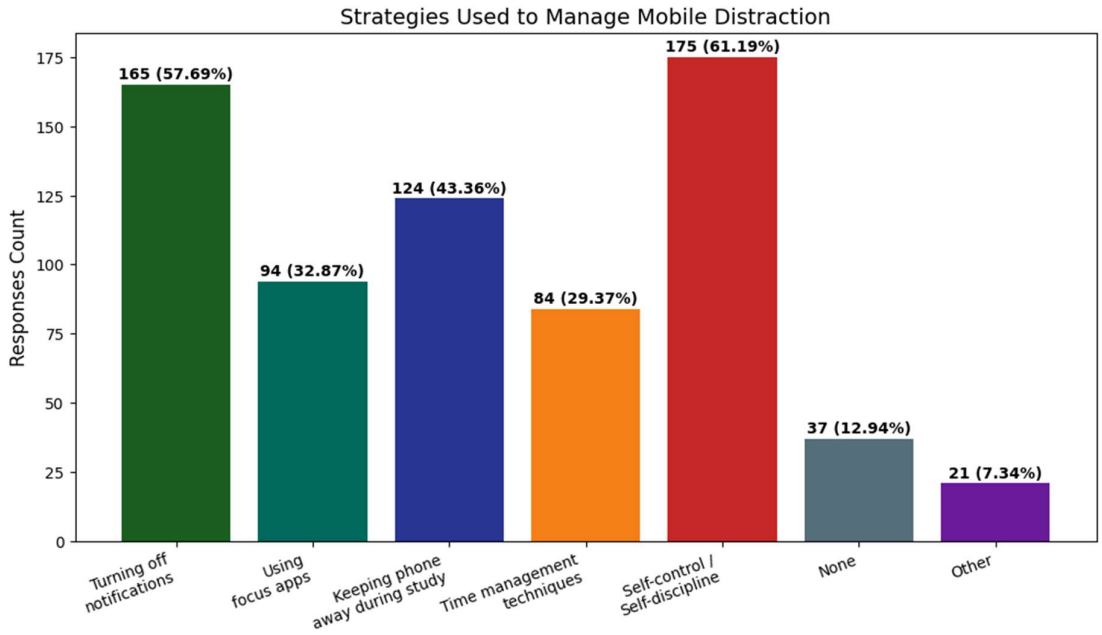
Section E: Coping Strategies and Solutions

Figure 15: *Respondents' Attempts to Limit or Reduce Smartphone Use*



A large majority of respondents, 76.57% (219 students), have made efforts to limit or reduce their smartphone usage, reflecting a strong level of awareness among students regarding the potential negative effects of excessive smartphone use. In contrast, 23.43% (67 students) reported not attempting to reduce their usage, which may indicate either a lower level of concern, lack of awareness, or difficulty in managing their smartphone habits. This data suggests that most students recognize the importance of maintaining control over their smartphone use, emphasizing the need for effective strategies to reduce digital distractions.

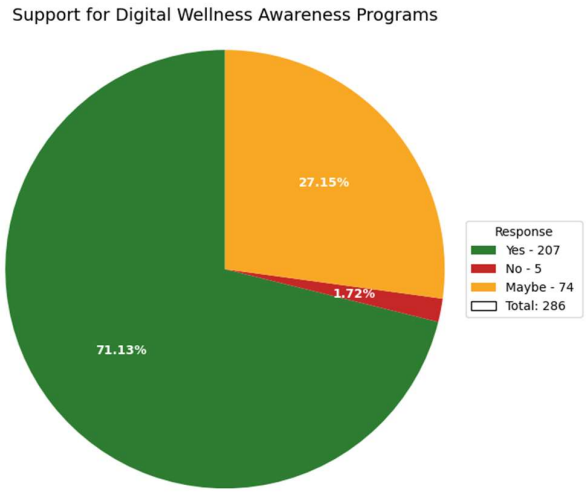
Figure 16: *Strategies Used by Respondents to Manage Mobile Distraction*



To manage mobile distractions, the most common strategies among students were self-control or self-discipline (175 responses) and turning off notifications (165 responses). Keeping the phone away during study (124 responses) and using focus apps (94 responses) were also fairly popular methods. Time management techniques (84 responses) were used by fewer students, while 37 respondents admitted to using no strategies at all. A small number (21 responses) mentioned other personalized methods like family interaction, deactivating social media, or turning off Wi-Fi.

This indicates that although students are making efforts to manage mobile distraction, self-discipline remains the most commonly relied upon strategy, followed closely by disabling notifications and physically distancing themselves from their phones.

Figure 17: *Respondents' Support for Digital Wellness Awareness Programs in College*



A significant majority of respondents, 72.4% (207 out of 286), expressed support for awareness programs on digital wellness in their college, highlighting a strong interest in addressing smartphone-related distractions and promoting healthier digital habits. 25.9% (74 respondents) were uncertain, indicating that while they are open to the idea, they may not yet see the need or relevance of such programs. Only a small percentage, 1.7% (5 respondents), opposed the idea, suggesting that the majority of students acknowledge the importance of digital wellness initiatives in fostering better balance and focus in academic settings.

3.1 Chi-squared Test Results

Table 1: *Chi-Squared Test*

Column Variable	P-value	Message
Daily Smartphone Usage	0.000012	Reject the null hypothesis: Significant association with academic performance.
Frequency of Checking Smartphone While Studying	0.000087	Reject the null hypothesis: Significant association with academic performance.
Causes for Using Smartphone During Class	0.437	Fail to reject the null hypothesis: No significant association with academic performance.
Anxiety About Not Checking Smartphone	0.0000031	Reject the null hypothesis: Significant association with academic performance.
Perception of Smartphone Addiction	0.000291	Reject the null hypothesis: Significant association with academic performance.
Procrastination Due to Smartphone Use	0.000065	Reject the null hypothesis: Significant association with academic performance.
Impact on Sleep and Mental Health	0.000148	Reject the null hypothesis: Significant association with academic performance.
Strategies to Manage Mobile Distraction	0.529	Fail to reject the null hypothesis: No significant association with academic performance.

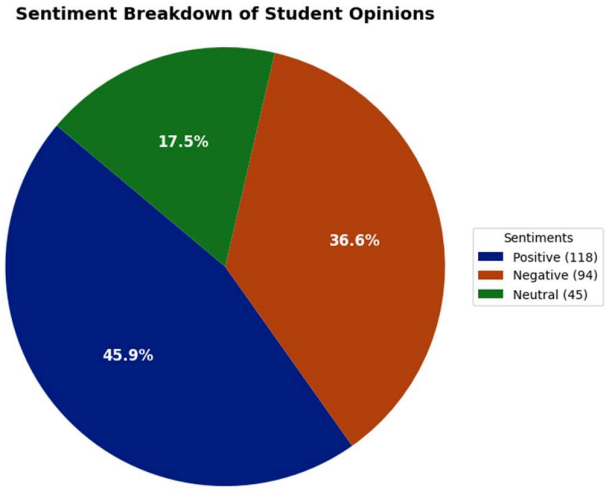
The chi-squared test analysis demonstrates that daily smartphone usage, frequency of checking smartphones while studying, anxiety about not being able to check the smartphone, perception of smartphone addiction, procrastination due to smartphone use, and the impact of smartphone usage on sleep and mental health are all significantly associated with academic performance. Students exhibiting higher smartphone engagement and emotional dependency reported greater academic difficulties. However, the analysis revealed no significant association between the use of mobile distraction management strategies and academic performance, suggesting that while practices such as turning off notifications or using focus applications are adopted, they may not be sufficiently effective on their own to produce measurable improvements in academic outcomes without deeper behavioral adjustments and sustained self-regulation. These findings highlight the substantial influence of smartphone habits on academic achievement and emphasize the need for comprehensive behavioral interventions.

The Null Hypothesis (H_0) for this analysis was: *There is no significant association between smartphone usage behaviors (such as daily usage time, frequency of checking during study, anxiety about checking, perception of addiction, procrastination, impact on sleep/mental health, and use of distraction management strategies) and students' academic performance.* The results of the chi-squared tests largely led to the rejection of the null hypothesis across most variables, confirming that smartphone usage behaviors significantly impact academic performance.

3.2 Sentiment Analysis

To explore students' perceptions of smartphone use, the open-ended question *"In your opinion, how does smartphone use impact your academic performance and concentration?"* was included in the questionnaire. After initial data collection, a total of 286 responses were received. Following data cleaning procedures—specifically, the removal of null, blank, and non-informative responses—the final dataset comprised 257 valid responses. These responses were analyzed using the VADER sentiment analysis technique, categorizing them into Positive, Negative, or Neutral based on their compound sentiment scores.

Figure 18: *Sentiment Breakdown of Student Opinions*



The sentiment breakdown revealed that 45.9% of the responses were classified as Positive, 36.6% as Negative, and 17.5% as Neutral. A significant portion of students expressed positive perceptions, emphasizing that smartphones, when used wisely, enhance academic productivity by offering immediate access to study materials, online courses, and educational tools. Students also noted that smartphones support efficient organization and communication, making academic tasks more manageable and collaborative.

On the other hand, a notable 36.6% of responses reflected negative sentiments, where students highlighted the detrimental effects of excessive smartphone use on their academic performance and concentration. Frequent distractions from notifications, social media, and the habit of checking smartphones during study time were identified as major barriers to effective learning. Some students further reported that smartphone overuse contributed to procrastination, stress, and sleep disturbances, ultimately impacting their overall academic outcomes.

The presence of 17.5% Neutral responses indicated a balanced viewpoint among some students, recognizing that the impact of smartphone use largely depends on individual habits and context. These students acknowledged both the advantages and disadvantages of smartphones in academic life, suggesting that responsible and mindful usage plays a critical role in determining whether smartphones serve as tools for support or sources of distraction.

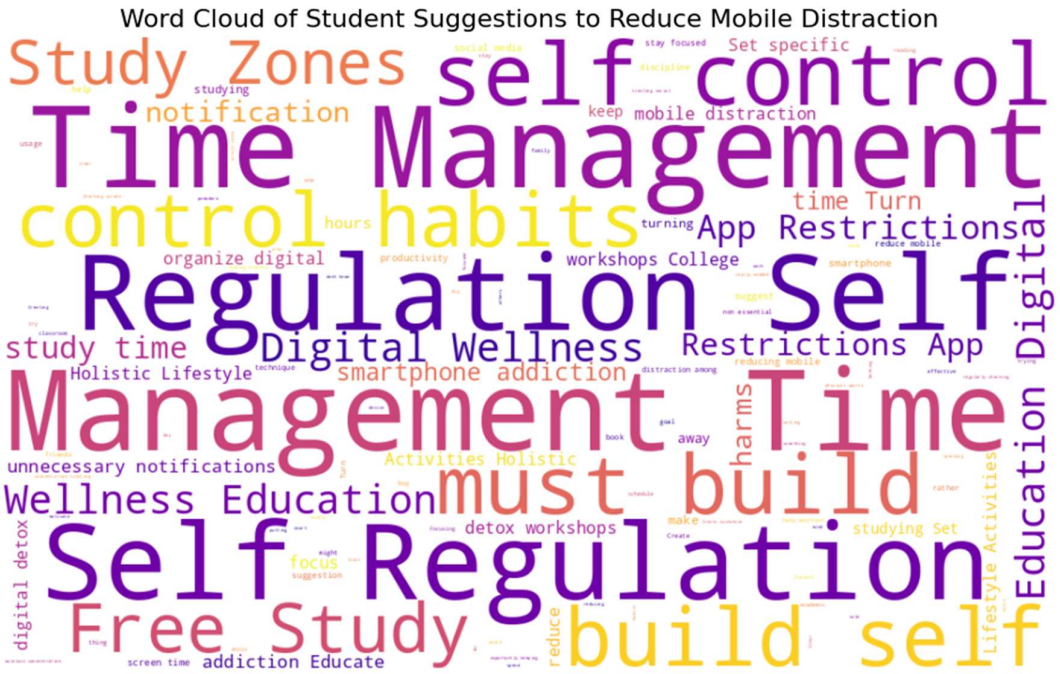
Overall, the sentiment analysis reveals a fine understanding among students regarding smartphone use in academic contexts. While many appreciate the potential academic benefits, a substantial number also recognize the risks associated with excessive use. These findings highlight the importance of promoting digital wellness initiatives, encouraging balanced smartphone usage, and developing strategies aimed at minimizing mobile distractions to foster better academic performance and mental well-being in higher education settings.

3.3 Thematic Analysis

In response to the open-ended question, *"What suggestions do you have for reducing mobile distraction among students?"*, a thematic analysis was conducted to systematically identify recurring patterns and strategies proposed by colleges students.

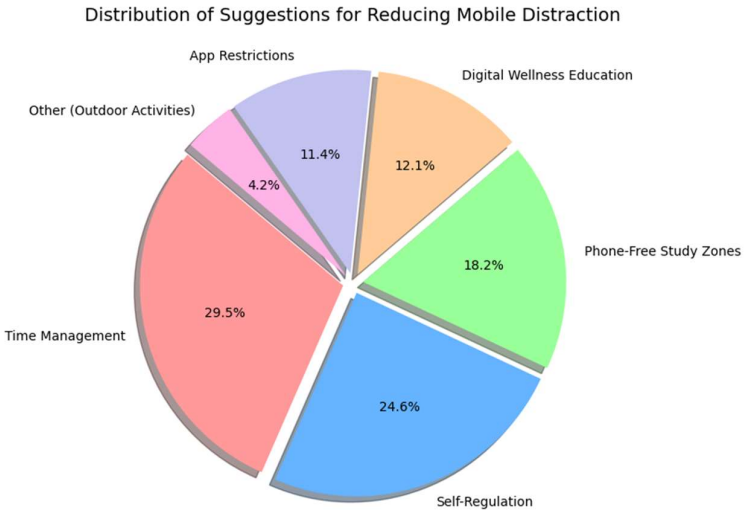
Initially, Count Vectorizer was applied to extract frequent keywords from the students' responses. These keywords were visualized using a Word Cloud, providing an intuitive overview of common suggestions. Following this, a manual thematic grouping was performed to organize related ideas into broader themes.

Figure 19: *Word cloud of student suggestions to reduce mobile distraction*



The responses were classified into six major themes:

Figure 20: *Distribution of Suggestions for reducing mobile distraction*



- **Time Management** strategies such as scheduling study periods and planning phone-free blocks were the most frequently suggested.

- **Self-Regulation** was also highly emphasized, with students mentioning techniques like enabling focus modes, using monochrome displays, and strengthening personal discipline.
- **Phone-Free Study Zones** were recommended to create distraction-free environments, particularly in libraries and classrooms.
- Students also highlighted the need for Digital Wellness Education, suggesting workshops and awareness campaigns to promote healthier digital habits.
- **App Restrictions** using focus apps, timers, and "Do Not Disturb" modes were proposed as practical tools.
- A smaller portion suggested engaging in outdoor activities to naturally shift attention away from smartphones.

These findings show that students are highly aware of mobile distraction and propose both personal and institutional strategies to overcome it.

While personal responsibility (time management, self-regulation) was most prominent, students also showed openness to technological solutions and institutional support.

The diversity of suggestions indicates that a combination of behavioral changes, environmental adjustments, and technological aids would be most effective in reducing mobile distraction in higher education.

4. Conclusion

This study shows the impact of smartphone use and mobile distraction on the academic performance and well-being of college students. Drawing on responses from 286 participants, the findings reveal that smartphone usage is deeply integrated into students' daily routines, with a significant portion spending 4–6 hours or more on their devices primarily for social media, entertainment, and communication. Although smartphones also support academic activities, their non-academic use often results in frequent distractions, reduced focus, and procrastination during study or class time.

The data indicates a clear link between smartphone habits and academic challenges. Chi-squared analysis confirmed significant associations between academic performance and variables such as daily usage, checking frequency, anxiety about disconnection, perceived addiction, procrastination, and negative effects on sleep and mental health. Notably, smartphone dependency and emotional attachment were found to be strong predictors of academic difficulties, underscoring the behavioral and psychological dimensions of mobile distraction.

While many students acknowledged the adverse effects of smartphones, a majority also reported taking steps to manage their usage—primarily through self-discipline and notification control. However, these strategies alone did not show a statistically significant association with improved academic performance, suggesting that more comprehensive behavioral interventions are needed.

Sentiment and thematic analyses of students' qualitative responses revealed a nuanced understanding of smartphone use: students recognize both the benefits and the risks. The most commonly suggested strategies to reduce distraction included better time management, self-

regulation techniques, creating phone-free study zones, and implementing digital wellness programs.

Overall, this study concludes that while smartphones offer academic advantages, their unregulated use poses substantial challenges to concentration, academic performance, and student well-being. Therefore, managing mobile distraction requires a balanced approach combining personal responsibility, technological tools, and institutional support.

5. Recommendations

Based on the findings, it is recommended that institutions promote digital wellness through workshops on healthy smartphone use, encourage time management and self-regulation skills, and create phone-free study zones to support focused learning. Students should be guided to use technology features like "Do Not Disturb" for better concentration, while colleges should enhance access to mental health support to address emotional impacts of smartphone overuse. Faculty should prioritize digital mindfulness during lectures, and further research is needed to track long-term trends and tailor interventions based on student demographics and usage patterns. These steps can help create a healthier, more productive academic environment.

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