

Increasing classroom focus by blocking distracting phone apps

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Introduction

This evidence-based practice, work-in-progress paper investigates the impact of phone use on focus levels in academic settings and aims to inform the development of a classroom intervention that provides students with strategies for reducing phone use, including built-in or third-party app-blocking features. In a world where smartphone ownership and social media use are ubiquitous, and phone addiction is increasingly common, students face high levels of distraction from their phones, both inside and outside the classroom, that can have detrimental impacts on learning. Between July 2021 and December 2023, 50.4% of U.S. teenagers aged 12-17 self-reported four hours or more of daily screen time, and this percentage is higher for teenagers who are Black, older (15-17), or have parents with lower education levels [1]. A meta-analysis showed that mobile phone distraction negatively affects students' recall of content from lectures and readings [2]. Even when not in use, the presence of one's phone can reduce cognitive capacity and negatively impact tasks that require attention [3]. Permitting the use of electronic devices for non-academic tasks in class resulted in decreased performance in subsequent exams, even for students who did not use electronic devices [4]. As a result, it is increasingly common for K-12 institutions to ban phone usage in classrooms. At the college level, it may not be practical or acceptable to impose or enforce bans on phone use, especially in large lecture classes. At the same time, authoritarian policies may not help students to develop their own ability and motivation to regulate their phone use, which may limit the effectiveness outside the classroom and in the long term.

Therefore, in this study, we explore strategies for reducing phone use that are voluntary and encourage students to take ownership of their decisions around phone use. There are several methods to limit phone use without the need to implement bans or confiscate devices. In recent years, a variety of mobile apps have been developed to help users limit their device usage, including built-in tools such as Apple's Screen Time and Android's Digital Wellbeing, as well as numerous third-party apps. One drawback of such apps is that they can often be bypassed, reducing their long-term adoption and effectiveness. Recognizing this issue, certain apps, such as Bloom [5] and Brick [6], require users to tap their phone on a physical device to start and stop the app restriction, creating a spatial barrier that discourages bypassing the block. In this study, we plan to leverage this design to reduce classroom phone use by integrating the tapping required to start and stop restrictions into the natural routine of entering and exiting the classroom. This takes advantage of the added barrier of requiring students to leave their seat to unblock their phones, helping them commit to their decision to avoid phone distractions during class. The goal of this study is to understand students' awareness and use of app-blocking products, provide students with strategies for controlling their phone use, and investigate the resulting impact on their focus levels and academic outcomes. We will investigate the following research questions:

1. Do undergraduate students' phone use habits in academic settings affect their focus levels?
2. Are strategies for reducing phone use effective for improving focus, and can their use be meaningfully encouraged by an instructor without making them a strict requirement?

Methods

This study involves two main components: (1) a survey completed by students to assess their phone use, focus levels, and awareness and use of strategies to reduce time spent on phones, and (2) an intervention that encourages, but does not require, students to employ strategies that reduce phone use. Participants are recruited voluntarily from undergraduate students in both lower- and upper-division undergraduate engineering courses in a four-year Hispanic-serving institution in the U.S. Pacific Southwest. Course enrollment ranged from approximately 40 for upper division senior classes to approximately 290 for introductory first-year courses.

Surveys include questions about phone use and habits, satisfaction with phone use, perceived focus, and learning. Questions addressed these items in a range of situations, including in lecture, while doing homework, and while studying. Participants were also asked about additional life factors that could potentially affect focus, such as sleep, employment hours, and other extracurricular responsibilities. For the preliminary results presented in this work-in-progress paper, the survey responses were collected anonymously, and no intervention was implemented. This allowed for baseline data to be collected to inform the implementation of the intervention. Future data collection will involve using the survey pre- and post-intervention to examine the effect of introducing the phone reduction strategies. In addition, future survey data collected will be linked to assignment scores, GPA, and demographic information. Linking such data would allow us to analyze any correlation between phone use and focus with student outcomes, and to identify any nonuniformity in effects based on students' background and identity.

The planned intervention involves informing students of strategies to control phone use. Students will be encouraged, but not required, to use these strategies. These strategies include:

1. Passive control strategies, such as turning off notifications or silencing the phone
2. Active blocking strategies based on time, such as setting daily time limits or blocking the use of certain apps at certain times (e.g., Apple's Screen Time and Android's Digital Wellbeing, or other third-party apps)
3. Active blocking strategies based on physical barriers, such as requiring students to tap a physical device to block and unblock certain apps (e.g., Bloom, Brick, and other physical devices for blocking apps)

Engagement is voluntary with the goal of maintaining student agency and developing long-term phone habits based on intrinsic motivation. However, students will be informed of the benefits of lower phone use on student outcomes, including supporting scholarly evidence, and also provided with guidance on how to use the provided strategies. The goal of this intervention is to help students make intentional choices about their phone use during class and study time, improving their focus while also developing greater awareness of their relationship with their phones. Students can choose to implement passive and active time-based app-blocking strategies. During lectures, students will also be provided with the opportunity to block their choice of distracting apps by tapping on a provided physical device at the class entrance. Each lecture, students can choose to voluntarily block their choice of distracting apps by tapping the physical device as they enter and then unblock by tapping again on their way out. Students will not be able to unblock the apps without tapping the physical device. This deters students from bypassing the block by relying on the added barrier of having to get up from their seat. We will

then track the usage of these app-blocking devices, including how often students opt in to block distracting apps and their total time spent with their phone blocked. This will pair with pre- and post-survey data to understand students' willingness to voluntarily restrict their phone use during class, to analyze the impact it has on focus, and to understand what strategies students find most helpful in reducing their phone use.

Preliminary results

Baseline data was collected through administering the survey of phone use and focus, without any intervention (N = 32). Figure 1 shows the distribution of the average hours spent by respondents on their phone daily, along with their corresponding satisfaction levels. A majority (66%) of respondents use their phones on average for 3-6 hours daily, with the numbers falling off quickly for higher and lower phone use. Overall, 47% of respondents reported feeling very dissatisfied or somewhat dissatisfied with the amount of time they spend on their phones. This proportion varies depending on the number of hours spent on their phone. For instance, of the 38% of respondents who reported spending 4 or fewer hours on their phone, only 17% reported feeling very dissatisfied or somewhat dissatisfied with their phone use. However, among the 63% of respondents who reported spending 5 or more hours on their phone, 65% reported feeling very dissatisfied or somewhat dissatisfied. This indicates a threshold of around 5 hours or more where students are much more likely to be dissatisfied with their phone use.

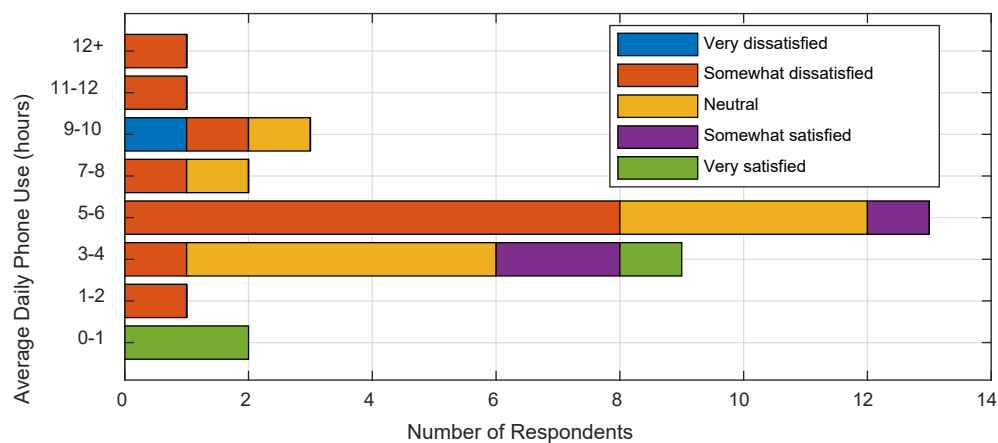


Figure 1: Students self-reported average daily phone use. Bars are divided based on the students' satisfaction with their phone use.

Overall, 75% of respondents reported that they wanted to decrease their phone use. Interestingly, respondents who were neutral or somewhat satisfied with their phone use still desired to decrease their phone use. About 50% of respondents who spend an average of 0-4 hours on their phone daily desire to decrease their phone use, while this increases significantly to 95% for respondents who spend an average of 5 or more hours on their phone daily (Figure 2).

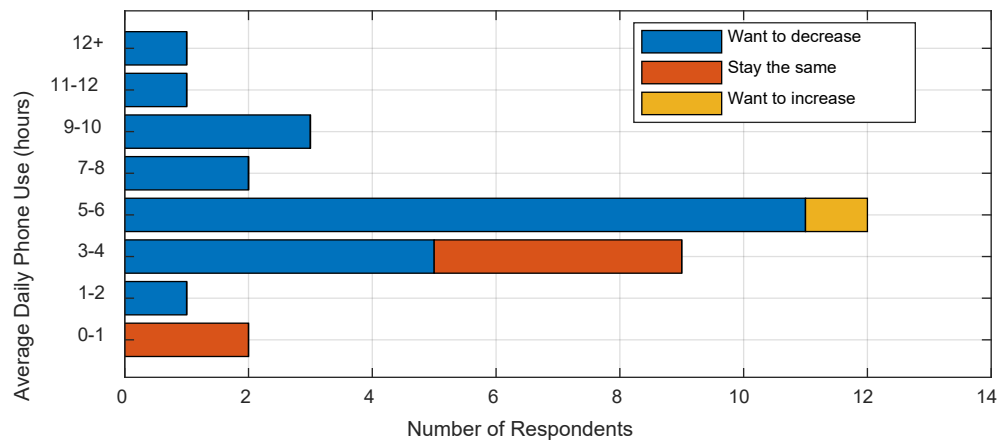


Figure 2: Students self-reported average daily phone use. Bars are divided based on students' desire to change their phone use.

When asked about strategies that they currently employ to control their phone use, students commonly reported silencing their phone (90%) or disabling notifications (76%), whereas fewer use their phone's built-in features for limiting screen time (48%). Only 14% of respondents used third-party apps with app-blocking features. 57% of respondents indicated that they would be somewhat likely or extremely likely to voluntarily limit their phone use during lectures while only 19% were somewhat unlikely (24% were neutral or omitted a response).

In terms of students' self-reported impact of their phone on their attention, 32% of respondents reported finding their phone somewhat distracting, distracting, or very distracting during lectures, compared to 68% while doing homework and while studying. Open-ended comments provided more nuanced perspectives, with several students noting both positives, such as phones aiding in communication and looking up information, and negatives, such as social media being distracting.

Conclusions and Discussion

In summary, although limited by a small sample size, the preliminary results presented here suggest that the majority of students using their phones for 5 or more hours daily are dissatisfied with their phone use. There is a strong desire to decrease phone use. Students generally are already making use of built-in features in their phones, but use of more specialized third-party apps is limited. As such, the planned interventions could help students to discover and experiment with additional strategies for regulating their phone use that may be effective. Further study is also needed to explore the effect of different classroom formats, such as lecture-heavy versus high active-learning classroom environments. As a next step, we plan to implement the intervention in various engineering classrooms to help us understand the effectiveness and feasibility of various app-blocking interventions. In particular, the preliminary results suggest that interventions that could be used beyond the classroom, for example while studying, may be most beneficial for students where they report their highest levels of distraction. In turn, this may help inform methods for developing students' agency in self-regulating their phone use for both academic success and long-term focus beyond the academic environment.

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