

## Effects of Faraday Phone Bags in Engineering Classrooms

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## Introduction

Mobile phones are now a regular part of students' academic and personal lives. They make it easy to access learning resources and stay in touch, but using them in class has raised concerns about distraction, lower engagement, and negative effects on learning. This is a particular issue in engineering classrooms, where students need to focus and take part in problem-solving, hands-on work, and group discussions.

Recent discussions in education and culture, motivated by Jonathan Haidt's best-selling book *The Anxious Generation* [1], have highlighted the cognitive, social, and emotional effects of constant digital connection for young adults. With these concerns in mind, the dean of Ohio Northern University's College of Engineering initiated an experiment in fall 2025 by purchasing two class sets of Faraday phone bags. These bags block wireless signals so phones cannot receive texts, notifications, or internet access. Students used the phone bags in two sections of a first-year engineering course ( $n = 62$ ) and one junior-level data communications course ( $n = 45$ ).

This paper describes a mixed-methods study that investigates the phone bags' effects on students in engineering classrooms. Student survey results about the perceived benefits and concerns are shared, and first-year vs. junior-level students' sentiments are compared. The study emphasizes gathering insights on students' self-reported ability to focus in class, classroom distractions, and the overall learning environment. By sharing these results, this work adds to the discussion about setting clear rules for technology use in engineering education and offers practical advice for instructors considering similar classroom restrictions.

## Background and Related Work

The wide-spread use of mobile phones and other personal digital devices has transformed higher education. While these technologies offer new educational opportunities, they introduce significant challenges to student attention, engagement, and communication skills [2] [3]. Several studies have discussed the negative effects of mobile phone use on student learning, including poor attention, decreased information retention, and lower exam performance [4] [5] [6]. Some studies have shown that even a brief interruption caused by mobile phone notifications can disturb cognitive processes, which are vital to comprehension and memory consolidation [7]. In addition, Sana et al. [8] found that a visible device use not only distracts users but also negatively affects peers' attention and learning, as observed in large lecture settings [9].

Well-defined strategies to limit technology in the classroom have been found to improve focus, note-taking accuracy, and overall academic performance [10] [11] [12]. A variety of approaches

have been explored to reduce digital distraction [13]. Brooks et al. suggested creating a device-free classroom [14], and the National Education Association article presents educators' perspectives advocating for removing cell phones from classrooms [15], while Campbell et al. studied the implementation of enforced bans [16]. On the other hand, Taneja et al. motivated students to voluntarily disconnect [17]. Limitations and restrictions on phone use in K-12 environments are becoming more common [18], and in fact, the state of Ohio [19] and a few other states have passed legislation to restrict cell phones in schools [20]. However, college professors may be hesitant to limit phone use in their classrooms.

Faraday phone bags offer a compromise that allows students to physically possess their devices while simultaneously blocking all wireless signals and notifications [21]. This method could alleviate students' anxieties about device security or emergency communication while still mitigating technological distractions. Faraday phone bags have recently emerged as a potential approach in K-12 environments to reduce distraction [22] [23]. However, application of these bags in higher education remains comparatively under-researched, despite the fact that engineering courses frequently require collaboration and focused attention [24]. This study attempts to contribute to this discussion through systematically investigating the effects of Faraday phone bags on student focus, classroom distractions, and perceptions in engineering courses.

## **Approach**

Students in a junior-level data communications course used the Faraday phone bags every day of the semester. As students entered the classroom, they immediately put their phones in the bags. At the end of each lecture, they removed their phones and dropped the bags off in a box by the door. They were in possession of their bags the entire class. This was a 4-credit lecture plus lab course, with three 50-minute lectures coupled with a 3-hour lab each week.

A 3-credit first-year course, which met three times each week for 50 minutes, was more nuanced. For the first two weeks of the semester, no phone bags were used. During this time frame, an average of 9 students were on their phones as class was set to begin (about one-third of each section). Phone bags were then used for 10 consecutive class periods. Similar to the upper-level course, students' phones were in the bags for the entire class (even if they arrived 5 minutes early, they were still expected to put their phones in the bags). This was a highly collaborative projects course, with students clustered into teams in the classroom.

Midway through the semester, the first-year students were polled informally, with 42% indicating that they would like to continue using the bags for every future class, 32% indicating they would like to use the bags in some future classes, and only 26% indicating that they would not like to use the bags moving forward. One student noted: "I enjoy this experiment as I think it

is rude when people are on their phones too much and having the bags helps me to not think about my phone during class.”

After these 10 consecutive classes, the phone bags were used for about half of the remaining first-year classes. On days when there was already a lot of equipment on the students’ desks (e.g., soldering, laptops), the phone bags were not used.

In both courses, students were explicitly told why they were being asked to use the phone bags. In the first-year classroom, for example, the instructor read a paragraph from Jonathan Haidt’s *The Anxious Generation* to highlight the connection between social media and anxiety. Students were told that the college dean wanted to conduct an experiment to explore the effect of using phone bags in class.

At the end of the semester, students in both courses were surveyed via an anonymous Google form. The survey was completed by  $n = 52/62$  first-year students (84%) and  $n = 35/45$  third-year students (78%). This survey instrument included both Likert-style and open-response questions to gauge student insights and the value they placed on the intervention. As part of the analysis, Likert-style questions were compared between the first-year and third-year students. Answers to open-response questions were coded into common themes to quantify the students’ perspectives. Individual quotes are included in the sections below to highlight common perceptions.

## Data and Results

According to the post-course survey, students indicated that in general, they rarely or occasionally checked their phones during class. On average, they felt they were a little distracted or moderately distracted by their phones during class. There was little difference between the first-year and third-year students. These data are displayed in Table 1 below.

Table 1: Survey results about phone checking and personal distraction

| Q1: Prior to using the phone bag, how often did you check your phone during your classes in general? |            |            | Q2: How often do you feel your phone distracts you during academic tasks (inside or outside the classroom)? |            |            |
|------------------------------------------------------------------------------------------------------|------------|------------|-------------------------------------------------------------------------------------------------------------|------------|------------|
|                                                                                                      | Freshmen   | Juniors    |                                                                                                             | Freshmen   | Juniors    |
| Never (1)                                                                                            | 6          | 1          | Not at all (1)                                                                                              | 5          | 4          |
| Rarely (2)                                                                                           | 25         | 19         | A little (2)                                                                                                | 16         | 16         |
| Occasionally (3)                                                                                     | 15         | 10         | Moderately (3)                                                                                              | 21         | 7          |
| Frequently (4)                                                                                       | 6          | 5          | Quite a bit (4)                                                                                             | 9          | 5          |
| Constantly (5)                                                                                       | 0          | 0          | Extremely (5)                                                                                               | 1          | 3          |
| <b>Average</b>                                                                                       | <b>2.4</b> | <b>2.5</b> | <b>Average</b>                                                                                              | <b>2.7</b> | <b>2.6</b> |

The remaining five Likert-style questions indicated notable differences between the two courses. These questions asked students to indicate their ability to stay focused, overall classroom distractions, anxiety, classroom improvements, and continued use of the phone bags. These results are shown in Tables 2-3.

Table 2: Survey results about ability to focus, classroom distractions, and anxiety  
Strongly disagree (1) / Slightly disagree (2) / Neither agree nor disagree (3) / Slightly agree (4) / Strongly agree (5)

|            | Q3: The phone bag helped me stay more focused on lectures, labs, activities, and/or discussions. |            | Q4: The phone bags helped reduce overall classroom distraction from others. |            | Q5: I felt less stressed or anxious about notifications while my phone was in the bag. |            |
|------------|--------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------|------------|----------------------------------------------------------------------------------------|------------|
|            | Freshmen                                                                                         | Juniors    | Freshmen                                                                    | Juniors    | Freshmen                                                                               | Juniors    |
| 1          | 2                                                                                                | 7          | 1                                                                           | 8          | 6                                                                                      | 12         |
| 2          | 6                                                                                                | 6          | 1                                                                           | 3          | 7                                                                                      | 4          |
| 3          | 13                                                                                               | 14         | 12                                                                          | 12         | 16                                                                                     | 13         |
| 4          | 14                                                                                               | 6          | 14                                                                          | 9          | 12                                                                                     | 5          |
| 5          | 17                                                                                               | 2          | 24                                                                          | 3          | 11                                                                                     | 1          |
| <b>Avg</b> | <b>3.7</b>                                                                                       | <b>2.7</b> | <b>4.1</b>                                                                  | <b>2.9</b> | <b>3.3</b>                                                                             | <b>2.4</b> |

These results indicate that the first-year students viewed the phone bags much more favorably than the third-year students. While the first-year students felt relatively neutral about any increased levels of anxiety, they indicated higher levels of agreement about their ability to stay focused and, importantly, less overall distractions in the classroom.

This latter point is likely influenced by the expected collaboration in the first-year course, with furniture arranged to promote student interactions. Because it is reasonable to assume that one phone might distract several nearby students, it is unsurprising that this was the highest rated survey item.

It is worth pointing out the large fraction of first-year students that slightly agreed or strongly agreed with statements about: Q3) an ability to stay focused (60% vs. 23% juniors), Q4) reduced classroom distraction (73% vs. 34%), and Q5) feelings of stress or anxiety (44% vs. 17%). This evidence suggests that the collaborative and less-experienced nature of the first-year learning environment can significantly benefit from phone bags. This claim is further supported by the results shown in Table 3.

Table 3: Survey results about classroom improvements and continued use of phone bags  
Strongly disagree (1) / Slightly disagree (2) / Neither agree nor disagree (3) / Slightly agree (4) / Strongly agree (5)

|            | Q6: I believe using phone bags improved the overall quality of class. |            | Q7: I support the idea of limiting phone usage in university classrooms. |            |
|------------|-----------------------------------------------------------------------|------------|--------------------------------------------------------------------------|------------|
|            | Freshmen                                                              | Juniors    | Freshmen                                                                 | Juniors    |
| 1          | 0                                                                     | 7          | 0                                                                        | 5          |
| 2          | 4                                                                     | 6          | 6                                                                        | 6          |
| 3          | 16                                                                    | 11         | 11                                                                       | 4          |
| 4          | 15                                                                    | 9          | 17                                                                       | 12         |
| 5          | 17                                                                    | 2          | 18                                                                       | 8          |
| <b>Avg</b> | <b>3.9</b>                                                            | <b>2.8</b> | <b>3.9</b>                                                               | <b>3.3</b> |

Here, it is noteworthy that not a single student among the 52 first-year respondents strongly disagreed with these statements. Third-year students were less supportive of these ideas. While the percentage of first-year students that slightly agreed or strongly agreed with Q6) improvements to the overall class quality doubled that of third-year students (62% vs. 31%), it is interesting to see that the majority of both courses supported Q7) limiting phone usage in university classrooms (67% vs. 57%).

Open-response questions were posed in the end-of-semester survey. For brevity, differences among first-year and third-year student responses are not compared in this paper. Instead, these qualitative responses were coded to capture a clearer picture of students' feelings about *why* the phone bags were useful, annoying, unnecessary, etc.

From a logistical standpoint, students were asked about challenges they encountered when using the bags: Q8) "What challenges or concerns did you experience while using the phone bag?"

While 4 in 10 students did not experience any challenges, 2 in 10 were concerned about their inability to receive important text messages and notifications (e.g., from family members). Similarly, about 2 in 10 did not like that they had to temporarily remove their phones from the bags when using their laptops to log into an online application that required dual-factor authentication. Other individuals voiced concerns about:

- Not being able to see the time (our classrooms do not have clocks)
- Forgetting to put in / take out their phones
- Not being able to look things up quickly in class

- Velcro on the bags being distracting (non-Velcro bags are available)
- Difficulties reconnecting to Wi-Fi after class
- Not being able to use their phone as a fidget tool
- Not being able to take photos of diagrams drawn on the whiteboard
- Could deter visiting prospective students

When asked Q9) “What changes, if any, would you suggest for implementing phone bags in future classes?” slightly more than half of respondents suggested no changes were necessary. About 2 in 10 students suggested that the phone bags should be used only for certain classes (e.g., during lecture-heavy classes or during classes when collaboration was important).

Student comments often highlighted the benefits of the phone bags, as illustrated by the selected comments below. These comments largely came from the first-year students.

“I think it’s necessary in collaborative classes like this”

“It helped me a lot to realize how much it distracted me”

“Phones are super addictive and interrupt the learning process”

“It only takes one student to be disruptive”

“They make everyone actually talk instead of just sitting on their phones awkwardly”

“I’ve seen lots of students just sit on their phones during class and aren’t engaged”

“While I found them odd I did find myself worrying less about my phone later on, and even without them I tend to still put my phone out away from me”

On the other hand, several comments highlighted a preference for more autonomy and an authentic environment that models expectations in professional industry. These selected comments largely came from the junior-level students.

“If someone wants to pay for class and not pay attention they should be allowed to do so”

“We’re all adults. If we can’t pay attention then it’s on us. Our problem to fix, not the university’s.”

“People need to learn self-control”

“It’s college, not high school. Students should be able to do what they want and if that is being on their phone during class then they will have the consequences of bad grades.”

“We are adults, if we can’t manage ourselves then it’s a personal problem”

“I don’t want to feel like a child”

“I agree that students using their phones during the class is an issue. However, I think that is up to the student to figure out. It is better to struggle and eventually figure it out in college than at a job.”

“The point of college as I see it is to learn about a career and prepare for that career. In the work force there will be no phone bags, so it seems almost counterproductive to use them, especially for Juniors and Seniors who are 21, 22, and 23 years old.”

“I think for first year students it is a good thing to have for select classes, but for 3rd year students I do not think is a good idea. Most of us are 20/21 years of age if we can not be trusted with self control how are we going to have self control after school while working a job.”

## **Discussion and Future Work**

The quantitative survey data indicates that students are generally neutral or in favor of classroom phone bags. Proponents for continued use of the phone bags are much more prevalent among the first-year students, supported by open-response statements about collaborative benefits and limited distraction.

While the third-year students were less emphatic about their support for phone bags, more than half of these respondents indicated at least some support of limiting classroom phone use. The primary concerns among these students is the perception of not being treated as adults, and a disconnect with professional practice.

Among both sets of students, there were concerns about an ability to receive important messages during class and frustrations when logging into apps that required dual-factor authentication. The latter can be overcome by having students log in to apps at the start of class, before putting their phones in bags. Concerns about receiving important texts and notifications, however, have no easy answer. Wrote one student: “I actually felt MORE stressed because there were occasionally days where I was awaiting important messages or emails. Sometimes having to put the phone in the bag would just worsen anxiety around it.”

Aside from these two key concerns, an argument can be made that while the phone bags necessitate an extra step in classroom setup, their potential benefits far outweigh their limited inconvenience. This trade-off is deemed worthwhile to minimize classroom distractions and support collaborative learning.

Anecdotally, the instructors for these two courses viewed the phone bags exceedingly positively. The first-year course instructor noticed that the students could not “hide” behind their phones during the few minutes leading up to the start of class, and project teammates seemed more likely to socialize with each other face-to-face. Unfortunately, on days when the phone bags were not used, many first-year students reverted back to their initial habits of using their phones in the classroom before class formally began, and several continued to check their phones during class. This implies that phone bag enforcement over a longer duration may be necessary to compel some individuals to resist their phones during class. It is also worth noting that when covering for colleagues in other first-year classes (those that never used the phone bags), this instructor was distracted by the number of students on their phones.

The junior-level course instructor noted that the students appeared to be more attentive and engaged, and student performance on a key assessment was markedly higher than the last course offering. Also, the college dean mentioned that he expected to receive several complaints from students about the phone bags, but no complaints were voiced to the dean’s office.

When preliminary results of this intervention were announced at a faculty meeting, about one-third of the college’s faculty expressed interest in using phone bags in spring 2026. Moving forward, it will be insightful to evaluate phone bag impacts more comprehensively. This could include evaluating any differences among males and females, comparing low-achieving students vs. high-achieving students, and determining if there is any impact on assessment scores. Inquiries could also be made to see if students adopted phone bags (or limited phone usage) outside of class as well, for example, while studying and working with project teammates.

Yet it may be that the most critical impacts are much more difficult to measure: collaboration on coursework and social connections outside of class. From Stanford communication experts Konrad and Abrahams, “Communication skills are essential for creating healthy relationships, maintaining mental health, fostering civic engagement, and building a successful career. And, while teenagers today are the most connected generation in history, they are also the least prepared to communicate with depth, confidence, and empathy.” [25]

For instructors that view their roles as more than broadcasters of technical content, phone bags may be worth considering. Providing a learning environment with fewer distractions, compelling face-to-face interactions, and modeling appropriate professional phone use for young adults can have far-reaching benefits.

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