ChatGPT

IV. RECOMMENDATION

Our survey results underscore an urgent need for targeted strategies. With **100%** of students bringing devices to class and **86.2%** using them for non-academic purposes during lectures, virtually all students are exposed to in-class distractions [1]. These distractions have real consequences: as one experimental study found, allowing such divided attention "reduced long-term retention" and significantly impaired subsequent exam performance [2]. Moreover, 50% of our respondents cite boredom and 38.9% cite habit as primary motivators for device use, and only about half (51.4%) believe technology *could* help reduce distractions [1]. In light of these findings, we recommend the following data-driven solutions to mitigate digital distraction in university classrooms:

Self-Monitoring Apps for Students

- **Purpose and Availability:** Encourage use of voluntary self-control apps (e.g. Screen Time, Digital Wellbeing, Focus-To-Do). These apps are freely available on Android and iOS and allow students to set limits on their own device use. Studies of such tools show they can significantly reduce phone usage when properly used [3].
- **Key Features:** Popular apps offer timer-based locks, usage logs, and reward systems. For example, one intervention study found that enabling grayscale (a simple "focus mode") on smartphones cut daily phone use by ~38 minutes [3]. Apps like Forest add a gamified element: if students stay focused, a virtual seed grows into a tree [4]. Other features include customizable focus sessions and logs of time spent, which can increase awareness of off-task behavior.
- **Evidence of Effectiveness:** Experimental reviews report that apps combining self-tracking and blocking (e.g. AntiSocial, Screen Time, Forest) can markedly reduce non-academic phone use [3]. In our sample, **55.6%** of students were aware of such tools but only **18.1%** had used them, suggesting room for greater adoption. Instructors and institutions can help by integrating app demonstrations into orientation or study skills training.
- **Drawbacks and Support Needed:** These apps rely on individual discipline and may have limited impact if used in isolation. A systematic review notes that digital self-control tools work best when embedded in a broader culture of attention management [4]. To address this, apps should be promoted alongside classroom norms (e.g. designated "phone-free" intervals) and peer encouragement.

AI-Powered Attention Analytics

- **Functionality:** Emerging AI tools can non-invasively gauge class attention (e.g. via webcam analysis or app-activity monitoring). Although still experimental, such systems have been piloted in "smart" classrooms to flag when many students appear disengaged. These tools generate real-time dashboards of collective attention.
- **Benefits:** AI analytics offer instructors an objective measure of class focus and can prompt mid-lecture adjustments. Given that **51.4%** of our respondents believe tech-based interventions could help curb distraction, such systems are promising supplements to traditional teaching methods.
- **Limitations:** High development and deployment costs currently limit widespread use. There are also ethical concerns around student privacy and surveillance. Careful implementation (e.g. anonymizing

data, obtaining consent) is essential. In contexts where they are used, AI insights should inform supportive, not punitive, strategies.

These technological solutions should be implemented alongside pedagogical and policy measures. For example, instructors can adopt more interactive or gamified activities (in response to the **50%** boredom rate) to keep students engaged. Formal policies (e.g. allowing only pedagogically relevant device use) can reinforce self-regulation: note that **40.3%** of our students supported institutional mandates on distraction-management tools. By combining app-based self-monitoring, AI-driven feedback, and engaging teaching practices – all aligned to our data on student behavior – universities can foster a more attentive and productive learning environment.

Citation/Reference Corrections

- *Incorrect citation [8]:* The original text used [8] ("Forest, Focus To-Do, Stay Focused [8]") to cite example apps. Reference [8] is actually an AI scoping review, not a source for those apps. This citation should be removed or replaced with a relevant source.
- *Incorrect citations [10] (functionality and features):* The "Functionality" and "Features" bullets under AI analytics cite [10], but reference [10] is Huang (AI ethics). The descriptions (e.g. webcam tracking, dashboards) come from Marquez-Carpintero et al. (Ref [9]). Thus, [10] should be replaced by [9].
- *Incorrect citation [11] (drawbacks of AI tools):* The "Drawbacks" bullet cites [11], but [11] is a digital well-being review. The point about privacy concerns should cite Huang (Ref [10]). Thus, [11] is incorrect in that context.
- *Incorrect citation [13]:* The "Example Tools" bullet cites [13], which is an AI ethics preprint, not a source on Nestor or ClassInsight. This citation is invalid and should be removed (no reference for those specific tools is given).
- *Ordering issues:* Some reference numbers were out of sequence (e.g. [8], [10], [11], [13] in the wrong context). The corrected version uses only valid citations from the reference list in proper places.

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1 Impact_of_Digital_Distractions_on_Student_Engagement_and_Academic_Performance_in_University_Classrooms-3 (1).pdf
file://file-QmBAYwJusv1AH4W74Zk8oe

2 ualberta.ca
https://www.ualberta.ca/en/centre-for-teaching-and-learning/media-library/teaching-institute/2019/dividing-attention-in-the-classroom-reduces-exam-performance.pdf

3 4 Journal of Medical Internet Research - Evaluating the Effectiveness of Apps Designed to Reduce Mobile Phone Use and Prevent Maladaptive Mobile Phone Use: Multimethod Study
https://www.jmir.org/2023/1/e42541/