

Put Your Phone Down, Please: Digital Devices and Student Performance

Angel R. Hoekstra, Douglas Duncan, Bethany R. Wilcox, Emilia Sperandeo



Interview Quotes

“When you go to class, it’s a time to sit down and text.”

“Sometimes people are texting all the time and it really gets annoying.”

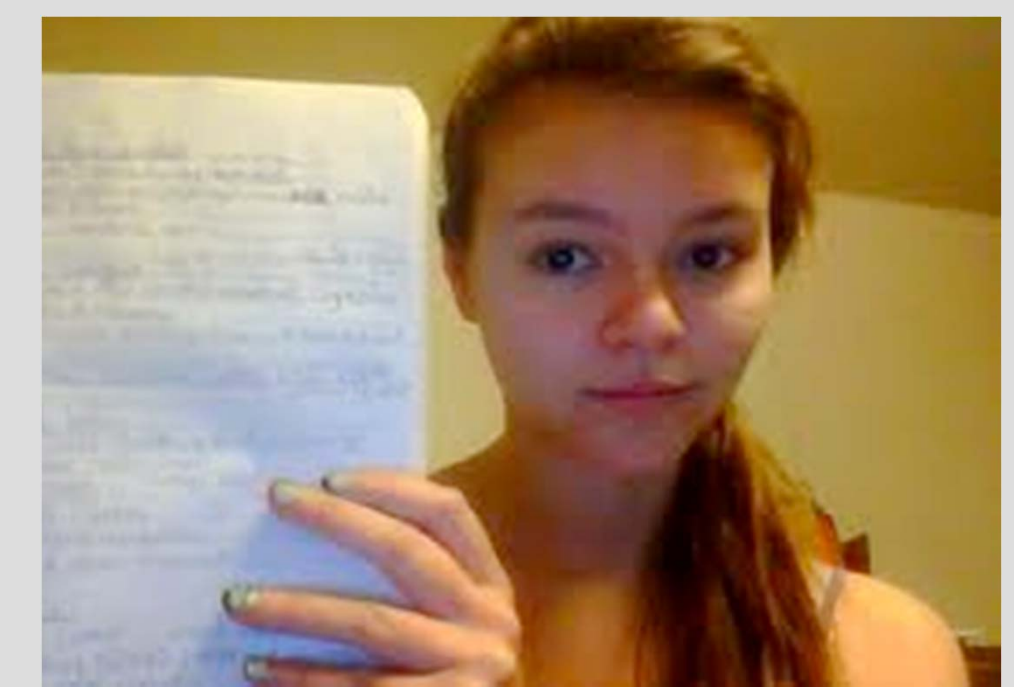
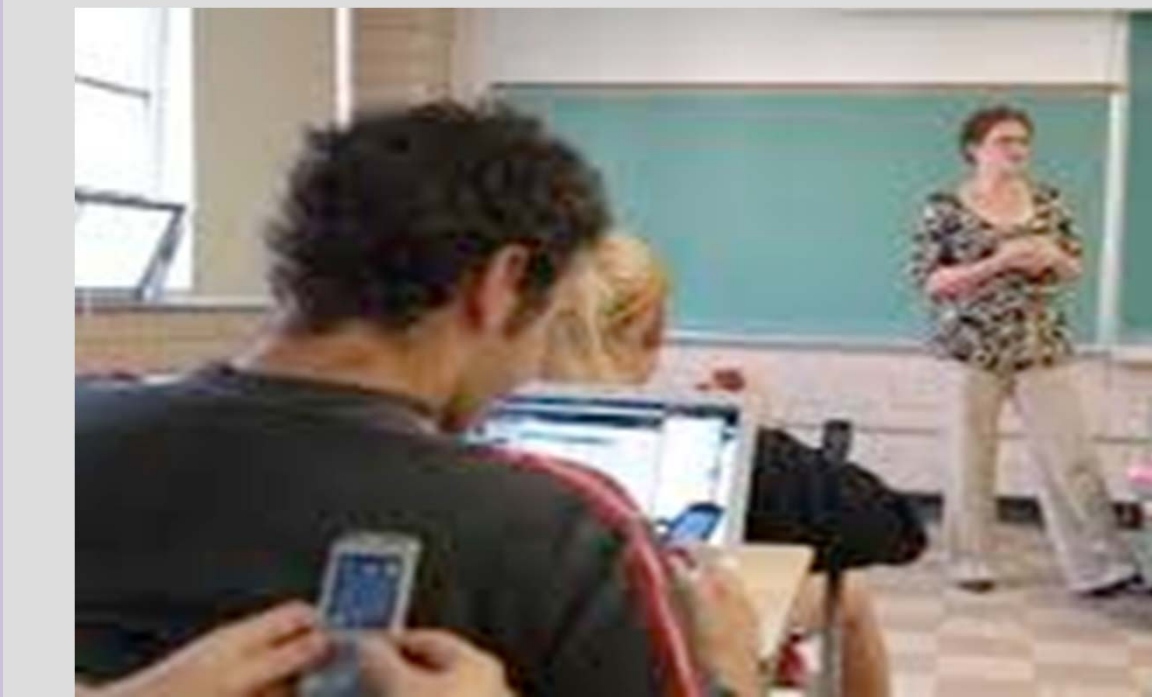
“I would say that I probably send sixteen text messages in a class, definitely.”

One faculty member
One post doc
One graduate student
One undergraduate.
Multiple generations,
working together.

“I think [the iClickers are] really effective. They do have a positive effect on my willingness to attend a class [and] they make you actively participate in the class. You have to know what’s going on in order to answer the question, as opposed to going on Facebook during class, text messaging, or whatever.
And it’s a good way to meet people, too.”



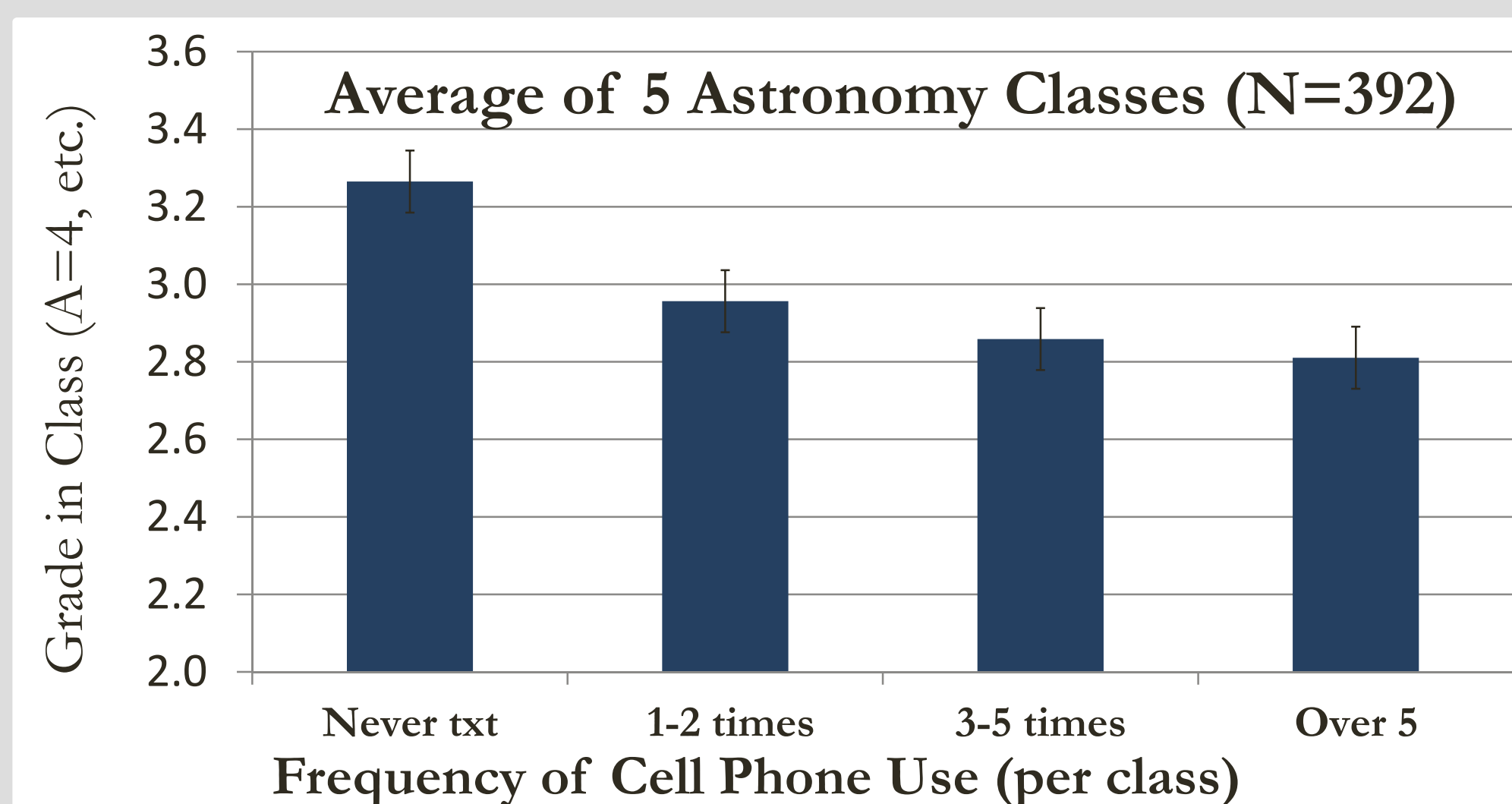
A recent increase in contemporary students’ use of digital devices (e.g., laptops, iPads, smart phones) has generated concern by faculty and staff about how technologies may affect student performance. This study, a multi-year project by an interdisciplinary research team, presents the first quantitative evidence of how students’ in-class use of digital devices affects learning. Specifically, the research focuses on the nexus between technologies designed to engage (e.g., clickers) and others that can result in disengagement (e.g., cell phones). Should we be asking students and colleagues to turn off their phones?



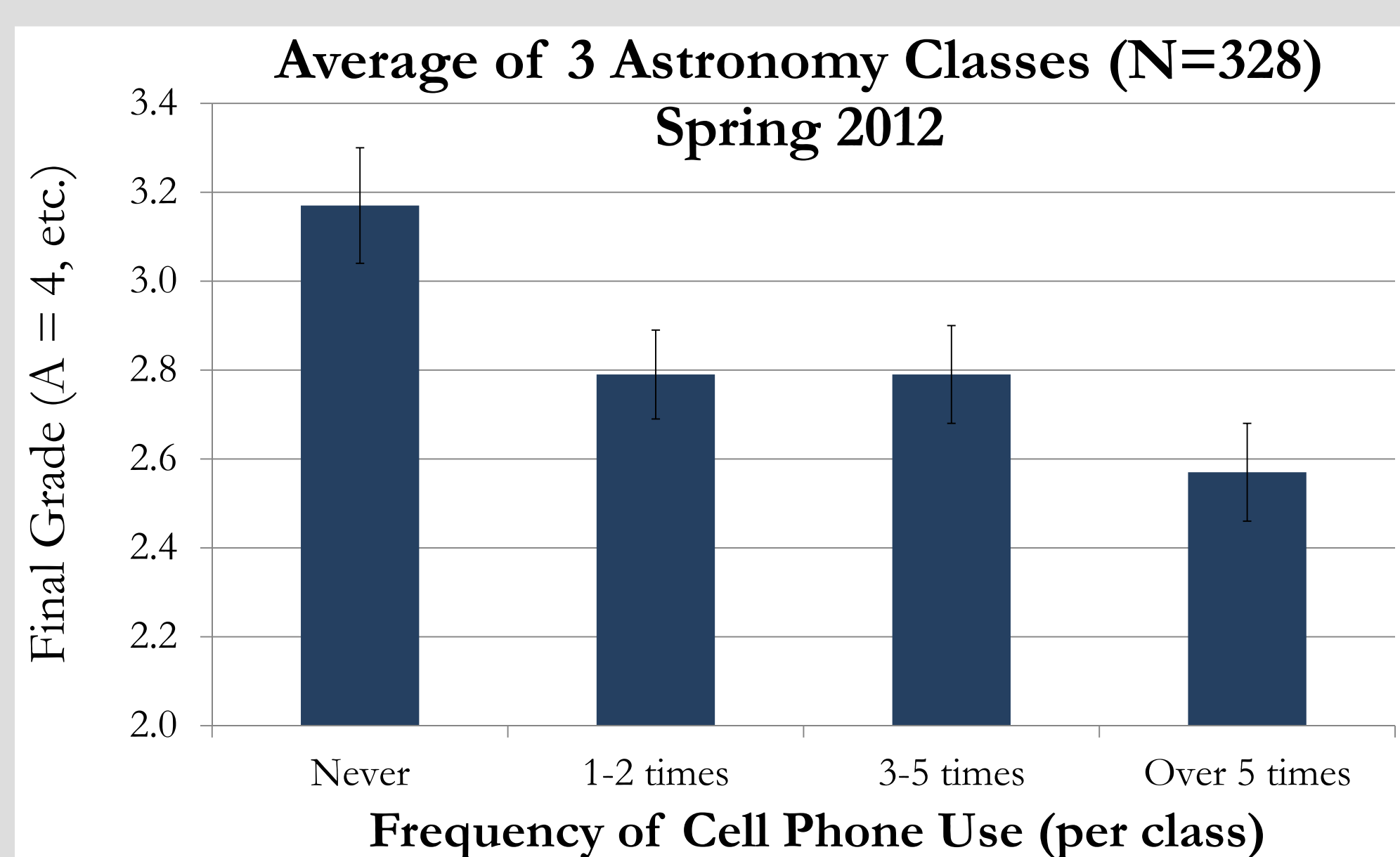
“There was a time I was getting 200 text messages a day, so every time I’d look at my phone there was something to look at...When the semester started, I remember trying to make a pledge to go through one class without looking at my phone. I did it once, and it’s tough. I had to keep pulling my hand out of my bag because...it’s just staying connected. I know if I look at my phone, there’s a good chance that someone’s gonna want to know if I want to go get a beer after class. There’s an email... I could be doing something else right now.” -- Female Geology student

Methods & Findings

Two years of data show a drop in grades among cell phone users...



Yes: In-class phone use is significantly correlated with reduced learning outcomes. Students who self-report using their phones in class score on average 0.36 ± 0.08 points below (on a 4 point scale) those who report never using their phones. This is about half of a letter grade drop in final grade.



Yes: In the three large introductory astronomy courses that matched the original study, in-class cell phone use was again significantly correlated with reduced learning outcomes. Students who report using their phones in class scored on average 0.47 ± 0.14 grade points below those who report never using their phone in class.

- **2010-2011: Observation** (N=31 days), **surveys** (N=345), and **interviews with students** (N=24) were conducted in 8 large courses (Astronomy, Geology) that used student response systems (clickers) and Think-Pair-Share exercises to engage students.
- **2011-2012:** Observation (N=34 days) and surveys (N=541) were used to assess the effects of clickers and digital devices for learning outcomes in 6 courses. Analysis is ongoing; we are comparing effects of digital devices for learning in 5 large courses (Biology, Sociology, Astronomy) with that in a small Physics course where students did not use clickers.
- In contemporary classrooms, students are potentially distracted by cell phones much more often than laptops (laptop use has declined as smart phones have gained in popularity).
- Observational evidence of off-task digital device use includes, but is not limited to: social networking, texting, emailing, shopping, and playing games (on phones or on laptops).

Policy Implications, Key Questions:

- If faculty do not set explicit policies for technology use, students assume the instructor's attitude is permissive.
- Faculty members see only a small fraction of phone use, even when looking for it.
- Do colleges need to establish campus-wide policies for digital device use?
- Can cell phones and other digital devices be put to productive use such that they engage? Or is it safe to assume internet access will always result in disengagement?
- How often do clicker questions bring disengaged students, “back on board?”
- Can effective implementation of clickers offset distraction by other digital devices?

Frequency of Cell Phone Use (per class)	Never	1-2 times	3-5 times	Over 5 times
Self-reported (N=445, Spring 2012)	22% (N=97)	38% (N=167)	21% (N=95)	18% (N=80)
Observed (N=178, Spring 2012)	53% (N=94)	19% (N=34)	12% (N=21)	16% (N=29)



This research was funded by the Center for the Integration of Research, Teaching and Learning (CIRTL), President’s Teaching and Learning Collaborative (PTLC), and the United Government of Graduate Students at CU Boulder.

