Smartphone Use And Academic Performance

Abstract

A conflict many professors in universities all over the world face today is students' cell phone use in their classes. Whether it's "checking the time", responding to texts, or browsing social media, students everywhere are glued to their smartphones at all times of the day. The question that remains is, how does this excessive use of smartphones in the classroom affect students' academic performance? This experiment measures students' performances on exams and comprehension of lecture material. Firstly, it is reported that students who frequently use their smartphones during lectures are less likely to comprehend lecture material. Secondly, those students who frequented on their smartphones during classroom times were more likely to perform poorer than those who did not frequently use their phones while being instructed. The purpose of this experiment is to see how using a smartphone during lecture instruction will affect a student's comprehension of class material, and ultimately their exam performance. Many studies have shown that students who divide their attention in the classroom indeed see a reduced performance on subsequent exams and assignments.

Smartphone Use in Class: A Student's Demise

With the introduction of new technology comes the introduction of new responsibility in the classroom. The share of Americans that own smartphones is now 77%, up from just 35% in 2011. The percentage of young adults who own smartphones has skyrocketed as well, with 92% of those in this demographic claiming to own one (Pew Research Center report, 2017). As a result of this increasing availability and access to technology, the use of these smartphones in classrooms during class time has increased substantially. Even though the use of technology, especially portable devices, may provide a set of tools that potentially leverage learning, research (e.g., Barkley & Lepp, 2013) has shown that these technologies are primarily perceived as a leisure tool, not as an educational one (Felisoni & Godoi, 2018). Therefore, if cellphones are commonly used in class for purposes unrelated to the discipline, it is likely that students may be distracted during lectures or activities, as they often overestimate their ability to multitask (Ophir, Nass, & Wagner, 2009), which could eventually lead to academic underperformance.

In recent years, there has been a multitude of research done on the effects of cell phone use, more specifically smartphone use, during classroom time. Since technology only increases in prominence and utility in our lives each year, it is important to study its negative effects to draw conclusions as to how these devices are putting students in jeopardy. Researchers Arnold Glass and Mengxue Kang and their study "Dividing Attention in the Classroom Reduces Exam Performance" are just one example citing this negative correlation. They discuss that several classroom studies have found a negative correlation between the amount of time spent using an electronic device for non-academic purposes during class and subsequent exam performance (Glass & Kang, 2018). The study goes on to discuss the consequences of this divided attention in the classroom. The first effect is the selection effect. The selection effect is when multiple people are speaking, the subject hears the speech of one speaker, but absolutely nothing of the other speaker (Cherry, 1953; Wood & Cowan, 1995). The second effect is the switching effect.

When two tasks are being performed, there is a “buffer time” when switching to the next task, during that short period when neither task is being performed (Jersild, 1927; Rogers & Monsell, 1995; Ruthruff, Pashler, & Klaassen, 2001; Spector & Biederman, 1976). Both selection and switching have a great negative impact on performance on at least one, and often both tasks, causing an immediate effect of divided attention. However, there is a third, delayed effect of divided attention on retention. When attention is divided between two tasks, fewer targets of a study task are subsequently remembered (Mulligan & Picklesimer, 2016). Essentially, students who are using their phones during class rather than engaging with lecture material do not even process what the speaker is conveying to them and thus retain less information and suffer from reduced academic performance. To prove this, Glass and Kang conducted in experiment with 118 college students taking upper-level psychology courses. Two sections of a college course on cognitive psychology were taught by the same instructor back-to-back. Both sections were taught on the same days (Tuesday and Thursday) for the same duration of 80 minutes, and received the same lecture content, quizzes, and exams during the 28-week period (Glass & Kang, 2018). There were three large scale exams during the class sessions of the semester and a cumulative final exam during the university’s finals week. During the course of the semester, students answered 100 + multiple-choice questions in class on just-presented content using personal response software which allowed them to use any electronic device (Glass & Kang, 2018). The question appeared on a following slide. Sections 1 and 2 received the same lessons and questions back-to-back. However, as was stated on the syllabus and at the start of each class, the students were only allowed to use electronic devices for half of the lectures. This rule was enforced by an outside proctor for the classes that were not permitted to use electronic devices during class time (Glass & Kang, 2018). Results showed that divided attention in the classroom did not affect classroom performance but did affect subsequent exam performance. Exam performance was poorer for material taught in 6 classes that permitted electronic device use both for students who did and did not direct attention to an electronic device for a non-academic purpose during those classes (Glass & Kang, 2018). This is just one study example that proves the hypothesis that students who divide their attention with their smartphones during classroom time will suffer in their academic performance thereafter.

One other study that focuses on the effect we are studying would be the study titled Cell phone usage and academic performance: An experiment., conducted by Daniel Felisoni and Alexandra Godoi in February, 2018, as highlighted prior in this manuscript. Their purpose for their experiment was a little different from ours, but still holds valid. Their purpose was to test the relationship between the actual average time students spend using their smartphones per day and academic performance (Felisoni & Godoi, 2018). What sets this experiment apart from others like it is that the researchers relied entirely on smartphone use data itself, rather than self-report data from the students. They used applications called “Moment” and “app Usage Tracker” to measure actual smartphone usage and the durations they were used for (Felisoni & Godoi, 2018). They collected this data from 250 students from Funacao Getulio Vargas (aka “FGV), a business school in the Brazilian city of Sao Paulo. Their analysis found a “significant negative relationship between total time spent using smartphones and academic performance,” (Felisoni & Godoi, 2018). The researchers concluded that significant time spent on smartphones per day (around 100 minutes daily) led to a reduction of 6.3 points in a student’s ranking in the school on a scale from 0-100 (Felisoni & Godoi, 2018). Their structure of the experiment was complex and well put together. The authors decided to implement the study in the school’s fourth semester (out of five) and gathered data during individual class times. To avoid any bias, the final purpose of their study was never revealed to the students (Felisoni & Godoi, 2018). Out of the 250 students polled, only 43 of those students sent their full cell phone data usage for the

required two-week span to the investigators. Upon receiving the data, differences were tested between gender, age, class ranking, etc. There were no statistically significant differences found in any of the listed categories. However, their findings on the amount of time students spent on their phones per day was staggering. Students spent as little as 38.4 minutes per day with their smartphones, and as many as 396.5 minutes per day (Felisoni & Godoi, 2018). That is a maximum value of nearly four hours of the day just on their phones alone. The authors also analyzed their data in regards to smartphone use during class time and during students' free time. Their results found that student's spent a considerable amount of time on their phones during class, but most of their phone usage came during their "free time" or when they were in school (Felisoni & Godoi, 2018). It is compelling to see this issue on the rise in countries around the world, not just in our native United States. Not only is this a problem for the students, but it impacts the educators as well. According to Felisoni and Godoi, professors can be "distracted by students' extensive use of cellphones, computers, and tablets," which can seriously harm the quality of instruction they are receiving, at least for the ones who are paying attention. Perhaps a reduction in screen-time outside of school can bring these numbers down and boost academic performance ratings. It is clear from this experiment that this issue is becoming worldwide, it is no longer domestic.

For this study, the question to be answered remains obvious: Does smartphone using during classroom time affect exam/academic performance? But we also want to know how badly academic performance is affected and ways to limit distraction in the classroom. The hypothesis in this study was that smartphone use during lectures does indeed effect subsequent exam and academic performance. Following suit of these prior studies, a proper result should be established.

Methods

Design

My experiment was designed to test how students performed on exams while using their smartphones during prior lecture times. My experimental design will be similar to that of the study conducted by Glass and Kang in 2018. 100+ psychology undergraduate students in an introduction-level psychology course were split into two groups: the control group (not permitted to use cell phones) and the experimental group (those who used their cell phones during class). Students were observed over the course of one academic semester and were subjected to three exams during that time period. The control group students remained attentive during the lecture without distraction from smartphones, while the experimental group divided their attention between their smartphones and the lecture material. Participation in this experiment will be voluntary and all exam results from students are going to be kept confidential.

Participants

There were over 100 students (male and female) that participated in this experiment. Students in the first section were assigned to the control group, and students in the second section were assigned to the experimental group. All lecture content, material, curriculum, and exams were consistent in both sections.

Measures

This experiment is going to measure how well students perform on exams while having additional interference from smartphone use. The independent variable(s) of this study is going to be whether or not students were using smartphones during their given lecture times, while the dependent variable is going to be their performance on subsequent exams. These will be measured by taking all students' exam scores from both the control and experimental groups and running descriptive statistic tests to determine differences in data.

Procedure

Two sections of an undergraduate introduction psychology level course are planned to be taught back-to-back. Both sections met twice a week for 85 minutes lectures and received the identical examinations throughout the semester. There will be two midterm examinations and one cumulative final exam at the conclusion of the semester. Students in the control group gave their sole attention to the professor and the lecture material, while those in the experimental group will be permitted to use their phones freely throughout class time. Students in the control group caught using their phones during lecture will be immediately asked to put their devices away to comply with the experiment's parameters. At the conclusion of each class, the experimental group students will be asked if they had used their phones at all during class time. Time intervals between lecture and exam administered was typically 28 days. The final exam is designated to be administered during the university's "finals week."

Discussion

As stated earlier, the purpose of this experiment was to see if students who constantly divide their attention with their smartphones during lecture time suffer from reduced academic performance. My hypothesis was that students who did use their smartphones during lecture time would receive lower exam scores than those who did not, and numerous studies prove that hypothesis to be correct. The hypothesis was based on prior research and my own instincts and knowledge of being an undergraduate level student as well. Had the experiment actually been run and the hypothesis tested, there are many results I would have anticipated to find. First and foremost, the result I am anticipating most from this study would be that those students in the experimental group who used their smartphones during their lectures did indeed perform worse on examinations and retain less curriculum content compared to those in the control group who did not use their smartphones. Researchers Andrew Lepp, Jacob Barkley, and Aryn Karpinski ran a similar experiment and found similar results as well in 2015. Their study discusses how students frequent to their cell phones during class because of low attention spans, which only decrease further through prolonged electronics use. On average, students reported spending 300 min per day using their cell phones (Lepp et al., 2015). At that rate, there is no stopping students from using their phones during class. Their study also studied smartphone use outside of the classroom as well, and found that total cell phone use was found to be a significant negative predictor of GPA (Lepp et al., 2015). The results in my experiment would more than likely resemble those listed above.

With any experiment, this one came with limitations. One limitation would be the setting of the experiment. Recent studies have attempted investigate whether there is any adverse implication of high cellphone usage in learning (Junco, 2012a, Junco, 2012b, Junco and Cotton, 2012, Murphy and Manzanares, 2008, Mayer and Moreno, 2003, Rosen et al., 2013; and Wood et al., 2012), finding evidence that there is indeed a negative correlation between digital

portable devices usage and academic performance (Felisoni & Godoi, 2018). Instead of only observing smartphone habits during classroom lecture time, a limitation could be to study daily cell phone use to monitor study habits outside of the classroom, rather than just in the classroom. Worse academic performance may be caused by cellphone usage but it could also be that students who are worse off academically spend more time on their cellphones (Felisoni & Godoi, 2018). Another limitation would be the group of students chosen. For my experiment, I chose a group of specifically undergraduate psychology students. A possible way to avoid this limitation would be to expand this study to students of different majors, and possibly even graduate level students to see if this stigma still exists in post-undergraduate life. One final limitation that was observed would be the duration of the experiment. A typical college semester is roughly 15 weeks. While that is a durable amount of time, perhaps an increased experiment duration, to perhaps a full academic year, could yield more sufficient results.

With technology on the rise in our society today, is in crucial those in the education field take proper action to ensure the success of students. However, it is not solely their responsibility. It is up to the students to be more responsible with their smartphone usage during classroom time if they want to succeed in any type of educational setting. Perhaps, at the same time, educators can enforce stricter rules in the classroom such as having a bin in the front of the room to collect phones at the beginning of class, and students can take their phones back once the class/lecture has ended. There is a plethora of options to be taken, but ultimately students and educators must work together to ensure the success of everyone and so this trend of downward academic performance comes to a halt soon.

References

1. Buchin, Z. L., & Mulligan, N. W. (2017). The testing effect under divided attention. Journal of Experimental Psychology: Learning, Memory, and Cognition, 43(12), 1934–1947. https://doi-org.ezproxy.hofstra.edu/10.1037/xlm0000427
2. Felisoni, D. D., & Godoi, A. S. (2018). Cell phone usage and academic performance: An experiment. Computers & Education, 117, 175–187. https://doi-org.ezproxy.hofstra.edu/10.1016/j.compedu.2017.10.006
3. Glass, A. L., & Kang, M. (2018). Dividing attention in the classroom reduces exam performance. Educational Psychology. https://doi-org.ezproxy.hofstra.edu/10.1080/01443410.2018.1489046
4. Kates, A. W., Wu, H., & Coryn, C. L. S. (2018). The effects of mobile phone use on academic performance: A meta-analysis. Computers & Education, 127, 107–112. https://doi-org.ezproxy.hofstra.edu/10.1016/j.compedu.2018.08.01
5. Kemp, W. M., Jr. (2019). The relationship between smartphone addiction risk, anxiety, self-control, and GPA in college students. Dissertation Abstracts International Section A: Humanities and Social Sciences. ProQuest Information & Learning. Retrieved from https://search-ebscohost-com.ezproxy.hofstra.edu/login.aspx?direct=true&db=psyh&AN=2018-65232-067&site=ehost-live
6. Lepp, A., Barkley, J. E., Sanders, G. J., Rebold, M., & Gates, P. (2013). The relationship between cell phone use, physical and sedentary activity, and cardiorespiratory fitness in a sample of US college students. The International Journal of Behavioral Nutrition and Physical Activity, 10. https://doi-org.ezproxy.hofstra.edu/10.1186/1479-5868-10-79