Digital Distractions in the Classroom

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Abstract

This paper examines the multitasking use of laptop computers in the classroom environment by students of Memorial University attending Sociology 2120 during the Fall 2014 semester under the instruction of Dr. Max Liboiron. The study includes a self reported use component through the use of "Technology Journals" and survey data as well as a research component based on previous studies. We focus on the frequency of the use of laptops for both course related and non-course related material as well as the duration of the use of laptops for both course related and non-course related material, a breakdown of this usage is seen in figure 1 below. We find that students have a tendency to be distracted and view non-course related windows on both their own or their peer's laptop. As well, we notice that a heavy use of laptops in the classroom is for social media such as facebook, twitter, and etc. Our recommendations to instructors for dealing with this issue are as follows:

- "Tech-Etiquette" - establishing set etiquette for using laptops in class, such as asking students using a laptop to move to the back of the room so as not to distract peers.
- Surveying Laptop Use - monitoring laptop usage in class for a better understanding of its impact on the classroom environment
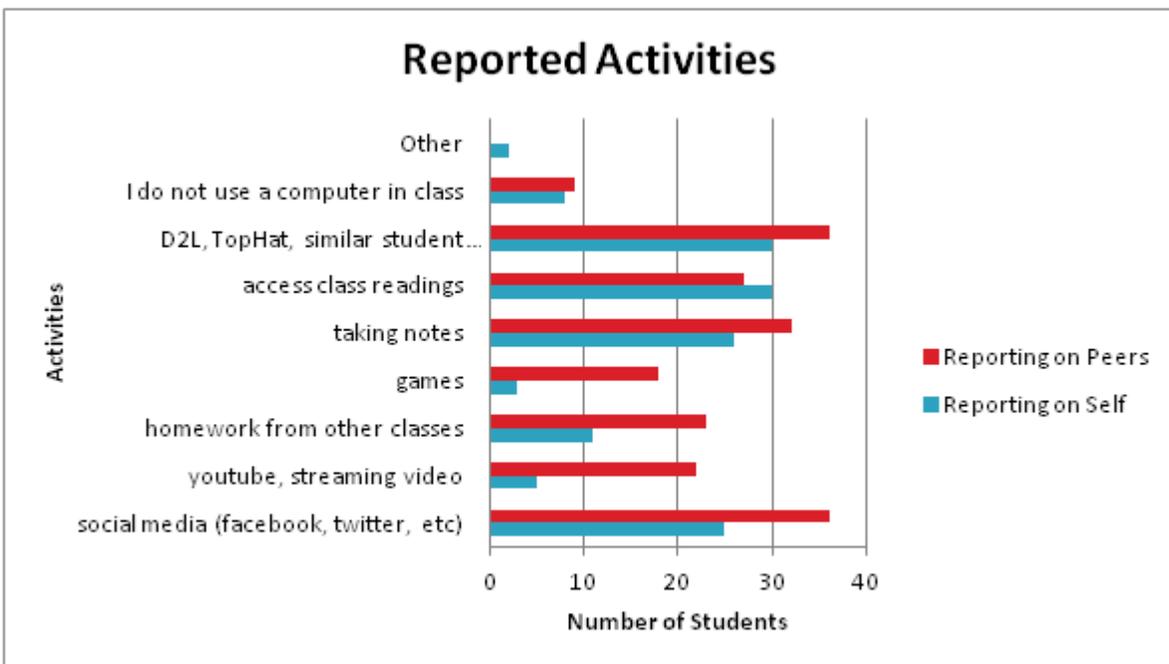- "Extremist" - Total Removal of Laptops in all non-essential Laptop classrooms

Figure 1. Multitasking Activities Reported
Source: Danielle Gillespie

1. Introduction

Laptops are quickly becoming common place in university classrooms, a research study by Carrie Fried showed 64% of students use laptops in class (2008). Research has also shown that not only do students use laptops in class for activities unrelated to class (Hembrooke & Gay, 2003) but that multitasking can be detrimental to the learning process (Fried, 2008). Since we could not gain access to our peers grades to directly study the effect on learning outcomes for this paper, we instead look to explore the effect of in class laptop multitasking on student concentration.

1.1 Multitasking and Distraction

Cognitive science has long been interested in the effect of multitasking on our ability to perform tasks and whether or not is has a negative effect. "[T]here is a long tradition of psychological and media communication research that indicates that our ability to multitask is, at best, limited" (Hembrooke & Gay, 2003, p. 47). While research into the detrimental effects of multitasking are mixed (Junco, 2012) some argue that cognitive resources are finite and overloading them with too much information can impede learning (Mayer & Moreno, 2003). Hembrooke and Gay add credence to this theory in their 2003 paper The Laptop and the Lecture, "when this channel is overloaded, such as in dichotic listening experiments, some of the information is filtered out, while other information is selected for further processing." (p. 48). Table 1 in Appendix A shows various assumptions made by Mayer and Moreno on the cognitive process, it is our assertion that concentration, like learning, requires "substantial cognitive process" and as such frequent multitasking on a laptop during class will be a distraction for the student as well as their peers. We saw this during an experiment performed in class, where we played a game called Stop and Go. We walked around the classroom until someone stopped, when someone stopped we all stopped with them, and didn't move again until someone started walking, the idea being that we functioned as a in sync as possible. To study the effect of multitasking and distraction on this game we all took out our phones and were asked to look at the screen while moving, the cohesiveness of the game quickly fell apart as our attention was divided, time between stopping and going lengthened considerably (Gillespie, 2014).

1.2 Multitasking and Laptops

"Computers, and especially laptops, have become standard equipment in higher education as the number of universities instituting laptop initiatives continues to grow" (Weaver & Nilson, 2005 as cited by Fried, 2008). However; it is difficult to determine whether this actually promotes and increases learning in students as it is commonly practised to multitask between course related and non course related tasks. (Hembrooke & Gay,2003). Studies have shown that laptops, when used inappropriately by students in the classroom result in a reduced learning from both students directly using their laptops and students surrounding them (Fried,

2008). Kraushaar and Novack argue this as well "even if students have course-related material 'open', switching back and forth between various tasks, and particularly between course-related and non course-related tasks may negatively impact learning." (p. 242). In their study they then found that students who engage with fewer "distractive windows" saw a higher average overall (p.248). Several professors try to backlash the tech revolution because of the negative effects that laptops pose on learning. This backlash is often in the form of a ban on laptops in the classroom.

2. Methods

2.1 Survey

As a class we decided that a survey was essential to the research for our final project, the survey was administered via an online form to the students in our Sociology 2120 class taught by Dr. Max Liboiron in the Fall 2014 semester. The survey was a combination of questions from each research group in class, correlated and edited for precision by our instructor. Out of a class of 52 we had a 42 respondents (n = 42) for a response rate of approximately 81%. We asked students to report on their laptop use in class as well as their fellow classmates using a list of options to choose from a open ended 'other' field. We also asked that they rate (on a 5 point scale) how much time they spent looking at their laptop screens or their neighbours, with the assumption that greater screen time equals greater distraction.

2.2 Auto Ethnography

Each day we kept a record of our personal experience of technology, comparing the different levels of technology used each class: technology free vs. normal technology vs. technology oriented. A fast and easy way to write and remember our lectures and how technology, or lack thereof, effects each day. It was also a useful way to track the progress we were making in the class. As our own personal knowledge of technology and its use in society increased the better we could all understand it and be able to critically analyze the use of technology in the classroom.

3. Discussion

3.1 Survey Results

With our survey we were concerned with two main questions: what were students using laptops for in class and for how long. Our hypothesis was that the more time spent on unrelated activities and more task switching the more distracted a student could become. We asked students what they and their peers used their laptop for in class, these results are shown in figure 1 above. We coded each of our options as related to class or unrelated to class, as our

questions didn't specify if email and web browsing were class related or not we left these out of our analysis. Our class reported 26% unrelated activities and 66% class related, while this does confirm Hembrooke and Gay's assertion that students will multitask, our small study showed far less unrelated activities (if we were to include internet and email these figures become nearly equal, still not a dramatic shift toward non class related activities). When reporting on their peers these numbers changed to 47% and 49% respectively. This is somewhat consistent with Kraushaar and Novak's findings in their 2010 study showing that 62% of the windows student viewed were distractive. Figures 2 and 3 in Appendix A show pie charts of our total number of responses from students, the graphic on the right denotes the overall categories of related vs. unrelated activities.

Interestingly, while students reported using a laptop in class for various activities, their time spent looking at their screens was lower than expected. When asked how many times they looked at their device 30 - 45% of students reported only spending 1-10 minutes per class (see figure 4, Appendix A). These results were consistent for both related and unrelated activities as well as time spent looking at a peers screens. This was lower than Fried's 2008 findings, where students in her study spent an average of 17 minutes multitasking per class. Only 2% of our classmates reported usage of 26+ minutes, which was our metric for significantly distracted. While we have confirmed that students will multitask in class - especially social media (57% of students self-reporting, 82% reporting on peers) we did not find any significant correlation between laptop use and distraction among our class. Fried's study concluded that laptop usage by fellow peers to be the number one distracter at 64% of responses (2008). One explanation for our findings is self-reporting bias, Kraushaar and Novak found that students under-reported some activities as high as 40% in a similar study (2010).

3.2 Recommendations

Research demonstrates that laptop usage in class has both positive and negative effects on learning such as a increased desire to learn and willingness to participate (Trimmel & Bachmann, 2004). While we weren't able to replicate the findings that others saw, evidence does still indicate that laptop use in class is distracting. Hembrooke and Gay (2003) suggest that there is a need for boundary setting and establishing what they term "tech-etiquette" for using technologies such as laptops in class. As well, Junco and Cotten (2011) suggest that faculty members be aware of how students are using technologies and creating dialogues with students to assess factors affecting their performance. It is our suggestion that combining these two efforts might best combat in class distraction. Establishing clear rules for technology use in class to minimize distraction while also keeping abreast of students technology use and how distracting it may be to individual students when addressing poor grades. As an example, one professor at Memorial asked any student using a laptop or similar device in class to sit near

the back of the room so as not to distract others. This type of regulation can have the potential to increase the benefit of laptop based learning.

Kraushaar and Novak point out that students are possibly unaware of the full extent of the negative impacts that recreational multitasking have on the students ability to learn. Research shows that "more students are bringing new and sophisticated technologies to the lecture with advanced multitasking skills to match" (Kraushaar & Novak, 2010.). From this, as well as other research obtained from other articles and our own research, a possible solution would be for the professor, faculty or even the institution to survey and "measure multitasking laptop use in the classroom to identify new empirically tested learning strategies" (Kraushaar & Novak, 2010). This will improve the understanding of laptop use that professors have and how to combat the negative effects that multitasking laptop use can have on the learning environment.

Another recommendation would be an extremist method of removing all laptops from all non essential classroom environments. Essentiality to be limited to classroom's that require a laptop or computer, such as computer programming, or in a case where a laptop was necessary for disability reasons. Sana et al. recommended a similar option in their 2013 study. This recommendation however, will most likely cause controversy in the school environment. Putting rules or restrictions of this magnitude normally do, as well as deeming which classroom's are laptop essential. Although this recommendation solves the distraction problem with laptops. It in turn could cause equal or worse problems for students and professors alike.

References

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Appendix A: Tables and Figures

Assumption	Definition
Dual Channel	Human possess separate information processing channels for verbal and visual material
Limited Capacity	There is only a limited amount of processing capacity available in the verbal and visual channels
Active Processing	Learning requires substantial cognitive processing in the verbal and visual channels

Table 1. Three Assumptions About How the Mind Works in Multimedia Learning
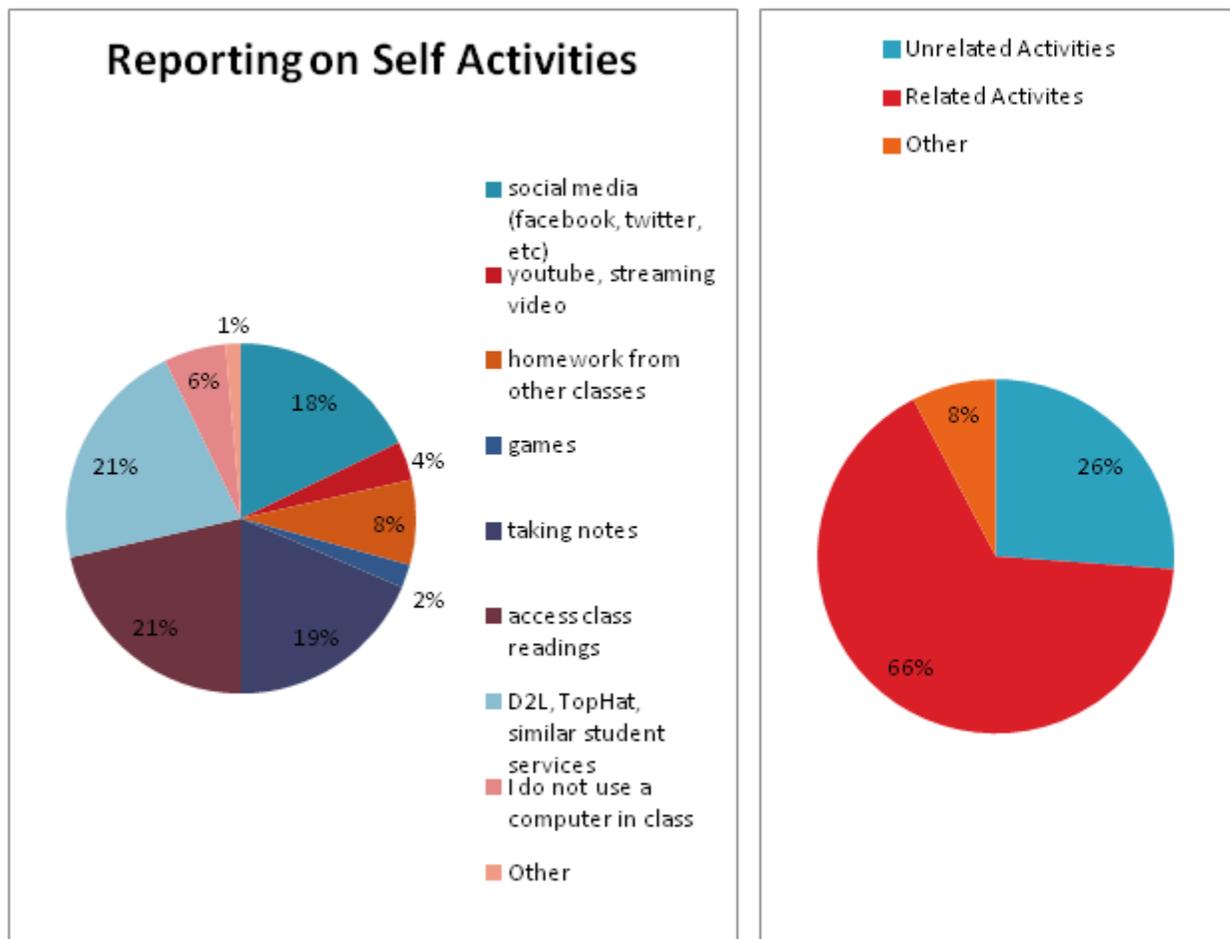Source: Mayer & Moreno, 2003

Figure 2. Percentage of Activities Self Reported
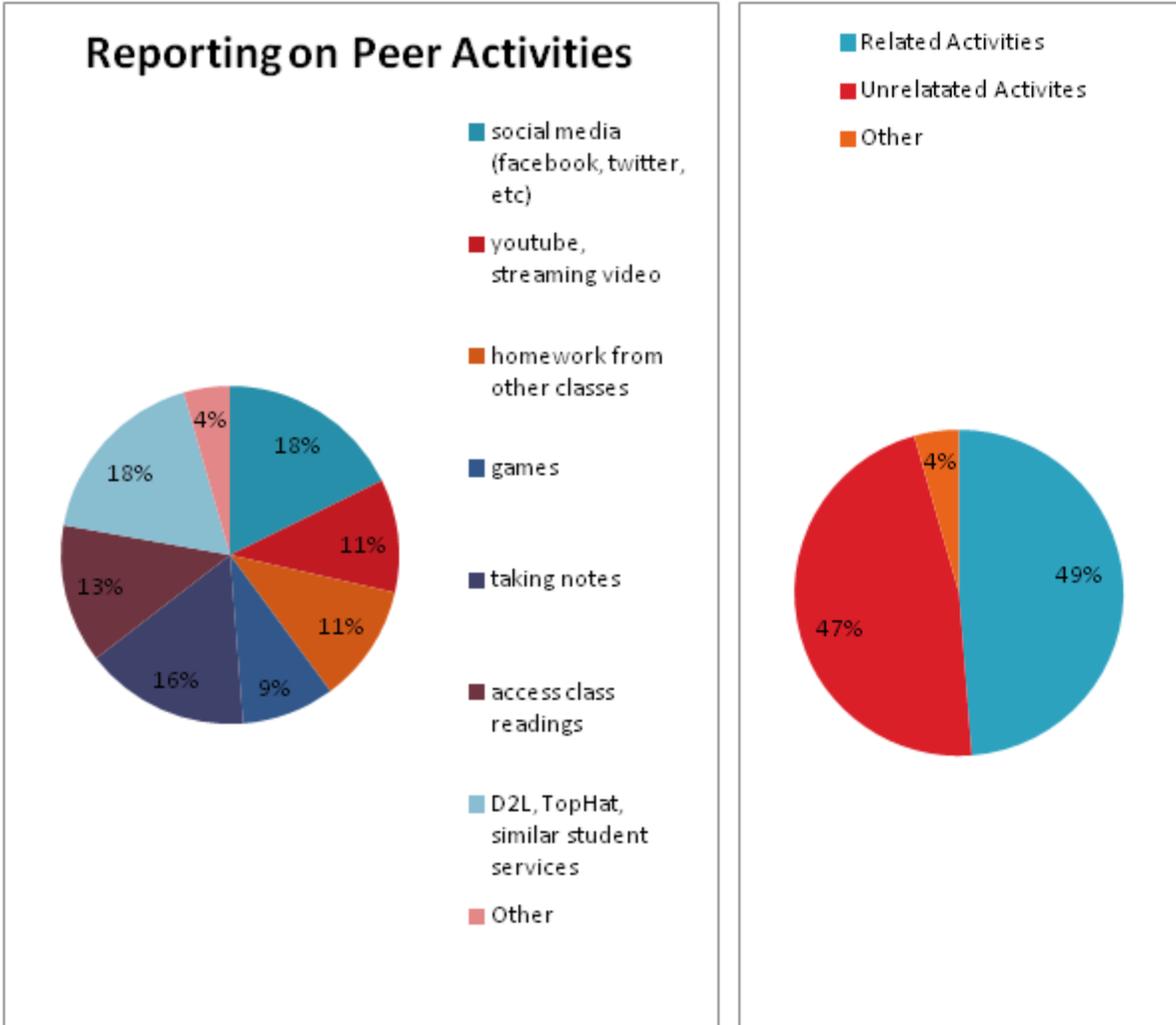Source: Danielle Gillespie

Reporting on Peer Activities

- social media (facebook, twitter, etc)
- youtube, streaming video
- homework from other classes
- games
- taking notes
- access class readings
- D2L, TopHat, similar student services
- Other

18%
4%
18%
11%
13%
11%
16%
9%

- Related Activities
- Unrelatated Activites
- Other

4%
49%
47%

Figure 3. Percentage of Activities Reporting on Peers
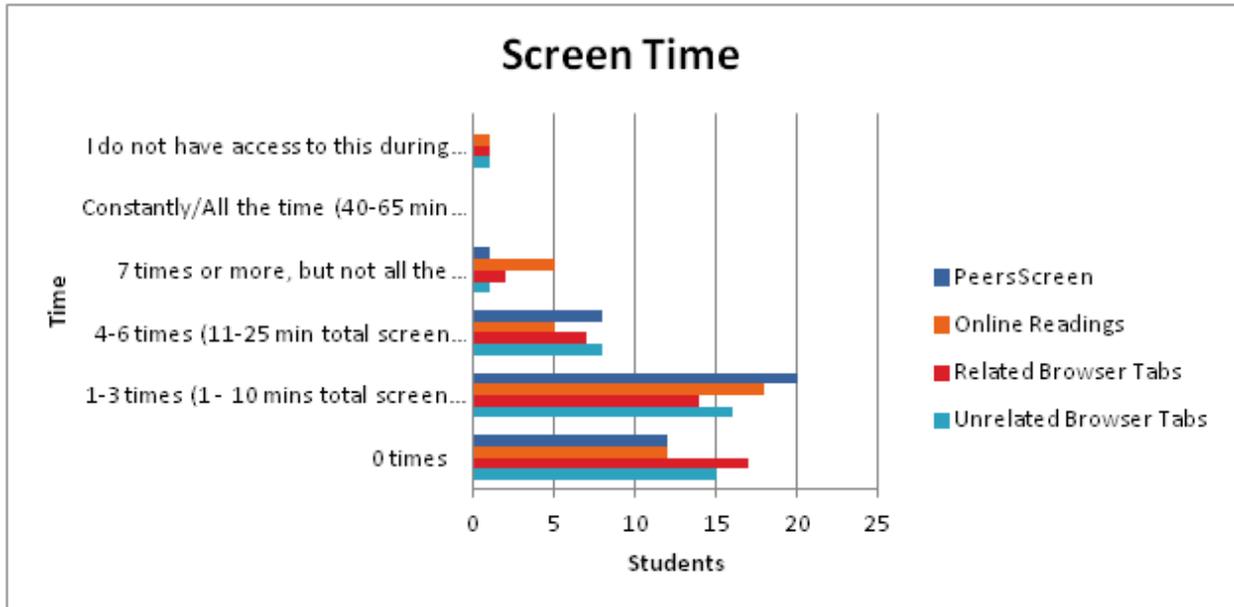Source: Danielle Gillespie

Figure 4. Student vs. Time Spent Looking at Screens

Source: Danielle Gillespie