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# TECHNOLOGY DISTRACTION AND THE LEARNING ENVIRONMENT

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## ABSTRACT

The past few years have seen many advances in personal information technology. People are busy, and technology that is intended to help facilitate our tasks often times only seems to increase our busyness, rather than alleviate it. Our lives move at Google speed, and we have become a society that wants and even needs to be entertained almost continuously. It is not unusual, particularly in computer classrooms, to glance in and see students surreptitiously texting on their cell phones, chatting with Facebook friends, and sometimes even boldly playing games while the professor is teaching the class. Many faculty bemoan these actions, and try to limit or prevent their use in the classroom. My observations at conferences and other faculty gatherings would suggest faculty do not behave differently. Understanding the dynamics involved will enable faculty to more effectively manage student technology use in the classroom, and prepare students for the workplace.

## Keywords

Technology, multitasking, technology addiction, divided attention, technology in the workplace

## INTRODUCTION

We are a busy society. Was it only a generation ago that we had time to visit with our neighbors, chat with our families, or enjoy the warm conversation of a family meal? What do we accomplish with our busyness?

Walk into a classroom in America today, and the sight that greets one is very different from what one would have observed only ten to fifteen years ago. Before class starts, students can be seen busily sending text messages, accessing Facebook, playing games, or checking email. Almost every student has an iPhone or a similar smart phone that brings the world to their fingertips. Some have laptops, and others tablets. Everyone is connected.

When the professor enters the classroom, students will be reminded to put away the restricted devices. Most will comply. As the class progresses, students will begin surreptitiously looking at their phones or surfing the web. They appear to think they are unseen as they smile at their book bag or into their lap. What is it about sitting and listening to a speaker for not even an hour that makes us want to suddenly start checking email, texting, or working on other things? Even in technology classrooms, where students are actively engaged in activities, one will note students switching between their task and some other web-based application or work for other classes.

This phenomenon is not limited to the classroom. Observe people in almost any scenario, and it's plain that we have a fascination with our devices. Riding in any type of vehicle, passengers are often more engaged with their devices than with other passengers. The pull of the device is so strong, that drivers will risk catastrophe in order to text while driving. Go to any restaurant, and one can observe families at dinner, each engaged with a cell phone instead of each other. Church is not immune. Kids might be playing hand-held games, watching DVD's, or text messaging while the minister is preaching. In one case, I even noted the pastor texting as the service was beginning. And then there are amusement parks. What used to be fun, exciting, family time has changed. It's not unusual to see mom or dad on their cell phone, while the children ride. I have even witnessed youth texting from a Ferris wheel!

Faculty are not exempt. In faculty meetings in many universities, it is not uncommon to see someone brazenly using their laptop during the meeting, or checking a smart phone or tablet, in a manner very similar to that of our students. Attendees at academic conferences do the same, or occasionally can be seen skipping a session to use their device. At one conference I attended recently, presenters were discussing Computer Engineer Barbie within the context of IT education. Within minutes, female attendees were online ordering the doll *during* the lecture.

When personal devices are used in the classroom or other group situation, what message is being sent to others, and what are the implications? This paper will first explore our obsession with our gadgets and technology. We will next look at how this obsession is related to multitasking and potential causes identified in the research. Third, we will identify the effects of this behavior on others in the classroom. Finally, we will examine the role of faculty and discuss methods for dealing with inappropriate technology use in the classroom in order to help students prepare for the future while improving the classroom environment.

Prior research on technology distraction in the classroom primarily focuses on its effects on learning. This paper combines findings from that research in conjunction with the effects of multitasking for two purposes. First, personal devices are not used in isolation. Others in the classroom are affected, despite the user's attempts to be discrete. Identification of how one's use of devices affects others is an important facet of developing awareness and empathy, and becoming business savvy. Second, today's college students will soon join the workforce, where business etiquette is still maintained and impressions are important.

### **FASCINATION WITH TECHNOLOGY**

Our need for ubiquitous technology is fed by our society. Many restaurants, waiting rooms, and bars have televisions going continuously. We even have televisions in our vehicles. Many places offer Wi-Fi hotspots for laptop and tablet access for those who crave connectivity. In addition, today's smart phones offer the equivalence of a computer, enabling users to be entertained and connected practically continuously. In the classroom, the primary personal devices used are smart phones, tablets, and laptops computers.

Fifteen students in one of my sophomore/junior level courses were given an assignment to go one-half day without using any information technology and then write a short paper reflecting on the experience. Most students were able to complete the assignment, but found it difficult. Several students mentioned that this experience was one of the most difficult they had faced, and that they had become overly dependent on their devices. In other comments students reported feeling lost, anxious, and like parts of them were missing. One student cited a benefit gained was being able to pay more attention in class. Only one student reported that the assignment was not difficult. Three students could not be away from their cell phones long enough to complete the assignment. For all students, the cell phone was the most problematic device. Similar results were found in 2010 when the International Center for Media & the Public Agenda (ICMPA) asked 200 students at the University of Maryland, College Park to abstain from using all media for 24 hours<sup>1</sup>.

Questioning students in an informal atmosphere about their frequent smart phone usage frequently receives the response "because it's there" or, "it's hard to sit without doing something," and sometimes, "I don't know." This is supported by a 2012 longitudinal study by Oulasvirta, Rattenbury, Ma, and Raita which found that habitual behaviors such as checking could be triggered by just seeing the phone, boredom, or a need for stimuli during down times. They found that although most users check their phones frequently for only a few seconds at a time, smart phone checking appears to trigger the temptation to access other applications on the device as well (Oulasvirta et al., 2012).

Statistics confirm that we are a culture obsessed with technology. According to Nielsen in 2011, the number of text messages exchanged monthly (both SMS and MMS) averaged 1,914 per user aged 18 – 24.<sup>2</sup> Likewise, the average number of minutes users spend on Facebook per visit (8/23/13) is 20 minutes, or 8.3 hours per month.<sup>3</sup>

### **MULTITASKING BEHAVIOR**

Compounding the issue of the ever-present cell phone, many people today engage in multitasking. The word "multitasking" originated in 1966 in computing, to reference the technique whereby an operating system could perform several jobs concurrently with one processor<sup>4</sup>. Today the term multitasking also refers to people who perform two or more activities simultaneously. Computers were designed for multitasking; however, it appears that people were not. Even so, many people today seem dissatisfied with doing one thing at a time. There many things potentially contributing to this phenomenon.

One factor is an inability to concentrate. Physiological factors such as insufficient sleep, anxiety, and depressive disorders can potentially lead to an inability to concentrate. Thinking becomes fuzzy when one is sleep deprived. Likewise, stress can lead to feelings of anxiety or depression. Diagnoses of Attention Deficit Hyperactivity Disorder (ADHD) are also on the rise. According to the Center for Disease Control, "approximately 11% of children 4-17 years of age (6.4 million) have been diagnosed with ADHD as of 2011."<sup>5</sup> People in their 30's, who have not previously been diagnosed, are also being diagnosed with ADHD. Are people having trouble concentrating because of the ADHD, or is technology use to blame for the ADHD?

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<sup>1</sup> <http://withoutmedia.wordpress.com/>

<sup>2</sup> <http://www.nielsen.com/us/en/newswire/2011/new-mobile-obsession-u-s-teens-triple-data-usage.html>

<sup>3</sup> <http://expandedramblings.com/index.php/by-the-numbers-17-amazing-facebook-stats/#.UtCuFLTBM8w>

<sup>4</sup> <http://www.dictionary.com>

<sup>5</sup> <http://www.cdc.gov/ncbddd/adhd/data.html>

Even with the vast array of tasks from which to choose, many of today's youth suffer from boredom. They have a want or need to be continuously entertained. They are a generation that grew up with 30-second sound bites and commercials every ten minutes during their television shows. We see the result of this today in our classrooms, as students are easily bored with long lectures. Young (2002) states that "19% of full-time freshmen say they spend only 1 to 5 hours per week preparing for classes." He suggests that part of this is that they have become accustomed to distractions, and have a short attention span.

Cognitive overload could be a third factor (Fried, 2008). For many of us, life moves at "Google speed." We want to accomplish more and more, faster and faster, similar to the results we expect from the Google search engine. We are overloaded with technological tasks, and thus bounce from task to task on a multitude of devices. We have our desktop computer, a laptop for portability, a tablet for even more portability, a smart phone, plus other assorted devices. We can theoretically be using different applications on each device simultaneously to do homework, play games, listen to music, do email, and chat or text. In higher education, this translates into students being committed to too many activities, and not seeing college as a full time endeavor (Young, 2002). Such students may also be unorganized, contributing to the overload.

The fourth factor that could explain our obsession with multitasking is that of technology addiction (Bugeja, 2007; Gitlin, 2008; Young, 1996). Addiction can be defined as the state of being enslaved to a habit or practice or to something that is psychologically or physically habit-forming<sup>6</sup>. A more apt definition for technology addiction might be "an extreme preoccupation with a substance or behavior, followed by an increased tolerance and the presence of withdrawal symptoms if the addict loses access to the substance or isn't able to indulge the behavior."<sup>7</sup> An alternative theory is that computer addiction could be habit-driven behavior in which the user is not able to control their actions (Oulasvirta et al., 2012). Cellphoneaddiction.org lists several behaviors that suggest possible technology addiction, including a preference for texting rather than face-to-face communication, the sharing of minutiae about oneself, and risky behavior. In the classroom, symptoms of potential addiction may be:

- Students finding it difficult to concentrate on basic tasks, classroom activities, or face-to-face conversations because of a desperate need to check Facebook, text messages, or some other application
- Finding it difficult to put away the smart phone or device despite knowing the consequences for its use in the classroom
- Becoming rude and insulting to the people in the class, leading to broken relationships and isolation

Although many people who multitask feel more productive and accomplished, the research does not support this. One study has found that people who frequently multitask do not fully pay attention, control their memory, or switch from task to task as well as someone who completes one task before starting another (Gorlick, 2009). His research found that multitaskers are not able to ignore things that are not relevant to what they are doing. A new message, an email, essentially anything can divert them from the task at hand. In addition, Gorlick found that the memory of a multitasker is not better than that of a non-multitasker. His research suggests that people could do less, yet accomplish more by not multitasking (Gorlick, 2009).

### **EFFECTS OF MULTITASKING IN THE CLASSROOM**

There has been a plethora of research in recent years on the use of laptops and cell phones in the classroom with mixed findings. As prices have been dropping, more students are able to afford a laptop or tablet, in addition to their smart phone. Usage of the devices increases the number of stimuli to which students are exposed.

#### **Benefits**

While most of the research appears to cite the negatives of student use of technology in the classroom, there are some positive findings. Kay and Lauricella (2011,1) found that students thought that the use of laptops in the classroom facilitated note taking, while allowing them to more easily follow the professor's lecture notes and share their notes with others. This in turn helped them to become more focused, contributing to their academic success. Several disciplines have found that student access to laptops during class allows for animating and demonstrating various concepts, exercises using interactive software, collaborative learning exercises, instant feedback, and evaluation and testing (Campbell and Pargas, 2003).

Other studies assessed the type of access students were given to laptops and other devices. Truman (2005) suggested that restricting access is beneficial rather than allowing students to always use their devices. He cited benefits such as the ability to use software as tools, to establish virtual learning communities, and the ability to have instruction that is concurrent rather

<sup>6</sup> <http://www.dictionary.com>

<sup>7</sup> <http://cellphoneaddiction.org/>

than consecutive. A structured, not necessarily restricted, usage of technology will keep students more on task (Kay and Lauricella, 2011, 2).

### **Drawbacks**

The drawbacks to student use of laptops and other devices in the classroom are numerous and well-documented. In 2007, Lohnes and Kinzer found that most students did not want to use a laptop in the classroom. The classroom is perceived as an important area, and is governed by norms, and as such, cell phones should not be ringing or vibrating (Campbell, 2006). Cell phones rings have been found to be detrimental to cognitive performance of other students, especially when they are unexpected, as in a classroom environment (Shelton, Elliott, Lynn, and Exner 2009). In addition, classrooms make no allowance for privacy and it is expected that rules of decorum will be followed (Campbell, 2006).

Many studies find that the use of laptops and smart phones by some students in a class room is a distraction not only to the student using the device, but to others as well (Fried, 2008). The distraction is both physical and audible (Kay and Lauricella, 2011; Lohnes and Kinzer, 2007). The temptation to do things other than classwork is great, and some students can be seen looking at email, pornography, surfing the web, using IM, or playing games (Kay and Lauricella, 2011).

While there have always been distractions in class, technology seems to be more distracting, possibly due to its visual attraction and motion. Kulesza, Dehondt, and Nezek (2010) found participation decreased by students using a laptop, which in turn affects the professor's control of classroom, ultimately reducing the professor's efficiency and effectiveness. A substantial decline in instructional effectiveness has been documented as students gain experience with tablet PCs (Moran, Christoph, Puetz, and Walters, 2007). Student use of laptops places a barrier between the student and the professor (Bugeja, 2007; Reddick, 2011). Also, student use of laptops and cell phones negatively affects how professors view those students, since it usually tends to be the weak students who use cell phones and laptops (Galluch, Long, Bratton, Gee, and Groeber, 2009).

There are also many negative effects on student learning. Use of technology in class *requires* multitasking, which in addition to other effects, dulls a student's interest in learning (Kulesza et al. (2010). Use of technology affects one's ability to pay attention and comprehend the material, leading to lower test scores and grades (Bugeja, 2007; Fried, 2008; Lepp, Barkley, and Karpinski, 2014; Truman, 2005). Hembrooke and Gay (2003) had mixed findings. They found that students using laptops performed worse when tested for memory of lecture content, and those students performing multiple tasks performed significantly poorer. However, they also found that as students become more experienced at browsing, their grades are not as negatively affected (Hembrooke and Gay, 2003). Distractions are causing students to have skill deficits in reading, writing, and cognition (Tesch, Coelho, and Drozdenko, 2011). Of course, technology is not the only distraction. Being ill, sleepy, too hot/cold, an instructor who is difficult to understand, and others' hygiene are also major distractors (Tesch et al., 2011).

### **What is the Message Being Sent to Others?**

What is the message the technology user is sending to others in the classroom? First, it's all about "me." I'm important. The internet provides a vast space for the projection of self in sites such as Facebook, MySpace, Twitter, Pinterest, Tumblr, Snapchat, Instagram, Reddit, and Second Life. These sites allow us to merge our virtual life with our real life, giving us the illusion of companionship without the demands (Turkle, 2007). Technology has decreased our down time. We now have always on/always on you technology where our devices seem like an extension of our minds, and so they are hard to turn off (Turkle, 2007). In a meeting or in the classroom, people demonstrate their importance by ignoring those they are meeting with to give priority to online others who are more relevant. This means that their colleague or classmate is "put on hold" while their companion checks an email or takes a phone call or text (Turkle, 2007).

Reddick (2011) defines etiquette as "how you behave when considering the impact your actions have on others". Using technology in the classroom or meetings to carry on unsanctioned activities sends a message of lack of respect for the speaker and for others in the class (Reddick, 2011). It displays rudeness and a lack of civility, business savvy, professionalism and concern for others in the class, similar to a verbal side conversation (Reddick, 2011). Bugeja (2007) suggests that we are creating a society of very rude computer users. There is also a lack of empathy for the speaker. How does one feel when the audience is "tuning out?"

### **DISCUSSION**

There are several issues here. One thing to consider is the current trend that most students should go to college, even though many are unprepared and ill-suited for an academic environment. In my observation, these are the same weak students that are likely to be multitasking in our classrooms, and setting themselves up for failure.

From a teaching perspective, more discussion and elements of active learning can dissuade device use. Lectures can be broken down into smaller chunks to fit our students' learning paradigm, and other activities can be inserted to engage students (Bonwell and Eison, 1991; Galluch, et al., 2009). If appropriate to the course, meaningful laptop-based activities can be initiated to discourage non-class activities (Kay and Lauricella, 2011). Walking around the classroom throughout the class, or teaching from the back of the classroom can also serve to keep students on task. These techniques are not fool-proof of course, but will reduce the amount of inappropriate activity.

From a technology perspective, the professor can ban device usage in the classroom. If they choose to allow laptops, the professor can restrict their usage, and require students to close them periodically (McWilliams, 2005). Many faculty add a clause to their syllabus to address technology usage, complete with warnings for infringement (Bugeja, 2007). In addition, some schools have experimented with blocking the wireless to classrooms, although that can be difficult (McWilliams, 2005).

As faculty, we should be alert to those students who cannot put away their devices despite knowing the consequences. Self-monitoring the amount of time students actually use their cell phone or computer can be eye-opening. We can suggest to them that their technology usage is problematic, and that they seek counseling. There are twelve-step programs and cognitive behavioral therapy for internet and technology addictions.

Faculty should be role models to our students, and model the behavior we expect from them. In any environment, we should give others the respect that we expect for ourselves. Our role is to educate our students and prepare them for the work environment, which is not as forgiving as academia. A 2013 survey of more than 2,300 CIOs in the U.S. by Robert Half Technology found that most believe that the use of personal devices in the workplace is causing a decline in workplace etiquette (Ballenstedt, 2013). Two examples of problematic technology usage cited are multitasking during meetings and ringing cell phones, both applicable to academia.

Langland (2009) suggests that in the workplace, cell phones be turned off when in meetings. Employees (and students) should not text under the table (Budman, 2013; Langland, 2009) or leave the cell phone sitting on the desk during a meeting. Budman (2013) suggests that this sends a message that you're waiting on something other than the task at hand. For students, a cell phone on the desk also invites checking behavior identified earlier.

New graduates today have always known the Internet, and many have had personal cell phones since they were young. With portable technology, most students are not used to having their online time restricted. Many businesses have restrictions on computer use and prohibit access to sites such as Facebook, Twitter, shopping sites or any site deemed undesirable (Langland, 2009). Theft of time is a serious crime, and includes using work computers for personal things, making personal telephone calls, or spending time texting. Some companies scan server log files and read employee emails to ensure employee compliance with policies. New graduates will need to learn their company's policies for technology usage and abide by them.

## CONCLUSION

Students will soon be in the workplace along with their technology. How will their technology usage affect their future employment? Will their employer find it acceptable that they are multitasking on Facebook, texting with their friends, or playing games during work hours? This is unlikely, as many employers have strict guidelines about employee use of time. We are doing our students a disservice if we don't prepare them for this future.

Our students need to be taught awareness and self-control now, while they are in a learning environment. They are paying, in most cases, a substantial amount of money for the privilege of attending college. Unrelated multitasking during class deprives them and others of the education for which they have paid. Students are not receiving the full value of a quality education to which they are entitled. As faculty, we must address the issue in a manner that teaches students how to achieve a balance of technology usage in both their personal and academic lives in order to prepare them for the workforce.

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