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Make it our time: In class multitaskers have lower academic performance

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ABSTRACT

Young adults, especially college students, are consistently engaging in multiple tasks simultaneously. They are texting, reading, and using social media while studying and attending class. While there are a variety of contexts and relationships likely influenced by this, the present research project examines the influence of media multitasking in the context of students in technology-saturated classrooms and how this is impacting learning and academic performance. A survey of college students examined the impact of technology-based multitasking behaviors both within and outside classrooms. Data demonstrate that those who multitask frequently in-class have lower current college GPAs. This relationship remained significant even after controlling for perceived multitasking efficacy and time spent studying outside of class. Texting emerged as a dominant activity both while attending class and while doing homework. Females seem to use technologies more for maintaining mediated interpersonal interactions and social connections. Males seem to use technology more for online information seeking and for consuming online videos. Those who reported multitasking while doing homework spent more time spent studying outside of class, thereby contributing to inefficient study habits. Implications for technology use, best practices and policies in academic settings are discussed.

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1. Introduction

Education in many universities consists primarily of classroom instruction time followed by independent homework consisting of reading and studying. For this system to work, students must pay focused attention during class so they can take useful notes that they can later study. There were issues with attention during class long before the diffusion of hand held devices and digital messages provided potential distractions. Today, the media are filled with reports of young adults continually multitasking, or being engaged with different media devices at the same time they are also working, studying, walking, and even driving. Multiple sources have reported that young adults are being continuously connected and always "on," and they are engaged with more than one task at any given time, including during class (Duggan & Rainie, 2012; Foehr, 2006; Rideout, Foehr, & Roberts, 2010). In one study, 38% of students reported they were unable able to go beyond ten minutes without checking their phones, or other device (for e.g., laptop, e-reader) (Kessler, 2011).

There is no denying the importance of computer literacy for college students, and efficacy with technology provides benefits to the social lives and job opportunities for students familiar with technology. While there are pedagogical benefits to technology and students may bring a computer to class to allow them to take notes or look up course related information, the most common activities during class include texting, Facebook, tweeting, playing games, watching videos, and other activities that are not related to class (Kuznekoff & Titsworth, 2013). The limited in-class-time with an instructor should ideally be a focused time of attention with minimized distractions to foster greater engagement and learning. Pew report shows that nearly 64% of students admitted to regularly texting during class (Lenhart, Ling, Campbell, & Purcell, 2010), and close to three-fourths of college students surveyed acknowledged that they engage with some form of technology even while they are studying.

Parents and educators are increasingly concerned about the costs of the time and attention given to these devices and what is being missed during the lack of focus in the classroom. The goal of this study is to consider the potential impact of this constant technological connectedness from a cognitive capacity and information processing perspective, and to assess the impact of multitasking both within and outside the classroom on grades and learning.

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1.1. Factors promoting technology use in classrooms

There are many advantages available to those who can effectively use computers and associated technologies (Albion, 2001; Compeau, Higgins, & Huff, 1999). The use of digital technologies in class requires creative and intentional curriculum design by instructors as well as active involvement from students in the classroom (Hillman, 2014), making it critical for college students to use and learn appropriate technology functions to enhance their learning experience. Constant access to digital devices, ubiquitous connectivity and high speed Internet teach certain abilities, allow students to keep in touch with parents and friends from almost anywhere, and facilitate easy search of and access to information on any topic. Experience with technology leads to computer skills, and those without these skills are likely to be left behind, unable to obtain careers in many fields (Albion, 2001; Compeau et al., 1999). A majority of careers for college students will require computer and technology usage (Straubhaar, LaRose, & Davenport, 2014), so it is important to prepare students for careers that will require them to effectively use computers and technology. There is no denying that technology can enhance the presentation of topics, and engage students more interactively in the learning process and outcomes, but it must be done correctly, so that it can complement active learning behaviors.

Furthermore, some believe that the brains and cognitive capacity of those engaged in frequent multitasking will expand and adapt as a result of the behavior, which may help them become "nimble, quick-acting multitaskers" (Anderson & Rainie, 2012, p. 2), who are able to manage symbols from multiple sources at a time and are well prepared for careers in the information industry using technology. This would make them uniquely qualified for a variety of jobs and develop unique skills. Appropriate use of technologies in classrooms can be used to enhance instruction by engaging students with content, allow students to easily look up reference materials, and record notes for studying. This explains why institutions of higher learning are placing a large emphasis on the availability of state-of-the-art technologies in classrooms, which provide students unlimited access to high speed Internet during class and while completing homework. There is no doubt about the numerous advantages of access to technology, but access alone does not necessarily enhance learning. Hence, this project asks whether the use of technology interferes with classroom learning.

1.2. Concerns surrounding technology use in classrooms

There is little debate that students are using various forms of technology (laptops and mobile phones) within classrooms, and discussions of the benefits of such technology are plentiful, as outlined above (Burns & Lohenry, 2010; Ransford, 2009). Even so, there is some disagreement about the effect of this trend and the extent to which it should be celebrated, regulated, or both. There is a growing concern among the press, parents, and media effects researchers that relentless media multitasking is distracting adolescents from tasks requiring deep thinking, taking time away from family, harming their social connections, cognitive performance, and socio-emotional well-being (Ophir, Nass, & Wagner, 2009; Pea et al., 2012). It is possible that being constantly connected through and with technologies results in a continuous stream of distractions that make it difficult to pay close attention to complicated topics, as would be expected in a classroom setting. Studies have shown that students in classrooms continuously shift their attention from work to non-work tasks, diminishing focus on the course specific information being presented (Fried, 2008).

1.3. Information processing, multitasking and divided attention

The instructional format in most academic institutions is still based on a traditional lecture format where students are expected to pay close attention to the instructor, take active notes and participate in classroom discussions (Sana, Weston, & Cepeda, 2013). Students temporarily "checking-out" to focus on another task may miss critical information being given in the lecture that will be difficult to make up. When this set of primary tasks is interrupted via several secondary tasks that are not related (or relevant) to the primary task, it will hinder the learning process by impairing the extent to which they pay attention to material presented. Active attention and processing are required for information to be transferred from short-term to long-term memory. Multitasking impairs attention and processing by a phenomenon described as task-set inertia (Wickens & McCarley, 2008 as cited in Wei, Wang, & Klausner, 2012). Once attention is diverted from the primary task, apart from the costs involved (such as greater response time, more delays) in switching between tasks, there is also a tendency to remain with the secondary (distraction) task. In the classroom, this means that the student would take time to switch focus from the lecture to a text message. They would read that message, think of a response and then possibly respond. They may then read or send other messages, possibly checking Facebook, Twitter, or other social media. By the time they are ready to return attention back to the primary task, they may have missed 15 min or more of a 50-min lecture. Essentially, when students are doing things not related to class, they are not paying attention, and are less likely to learn from the lesson. This will likely require them to learn the material independently, meaning they have to spend more time studying outside of class to learn the content and maintain their grades.

Wood et al. (2012) define multitasking as "the inability to simultaneously perform two or more overlapping tasks when each requires selecting a response (i.e., a decision task) due to a general slowing in the performance of the second task" (p. 366). This defines multitasking in terms of the inability to focus on one or the other task because of the divided attention between two or more tasks. People can only process information when they pay attention to it. This means that attention is the main "gateway" (Craik & Lockhart, 1976) or the key "gatekeeper" (Wei et al., 2012) of the information processing approach. Cognitive theories based on information-processing (Mayer, 1996) and multimedia learning (Mayer & Moreno, 2003) argue that for "meaningful learning" to occur, individuals must actively process information, focus their attention on new information and actively arrange and integrate new information into preexisting knowledge structures. These theories would predict that when individuals are constantly engaged in multiple tasks, or multitasking, they are only partially engaged with each task as they switch back and forth. This in turn results in less attention to information and poor performance and learning outcomes (Bailey & Konstan, 2006; Kraushaar & Novak, 2010).

Use of technological devices within classrooms has been shown to lower academic performance. Research in education has shown the importance of attentive listening and active note-taking as important classroom skills for their contribution to higher grades/scores in exams (Titsworth & Kiewra, 2004). Activities such as multitasking on laptops (Sana et al., 2013), texting, and posting comments to social networking sites, reduce attention to course content (Wei et al., 2012), the amount and usefulness of notes that are taken, and generally negatively impact learning when done during class (Kuznekoff & Titsworth, 2013).

Because information is not learned in class, students would need to learn it on their own some other time to avoid a negative influence on their academic performance. Thus, the use of