



## Digital Culture & Education (DCE)

Publication details, including instructions for authors <http://www.digitalcultureandeducation.com/>

Switching between productive multitasking and distraction: A case study of how users adapt to mobile tablet devices

**Sora Park**

University of Canberra

Online Publication Date: 12<sup>th</sup>, August 2014

**To cite this Article:** Park, S (2014). Switching between productive multitasking and distraction: A case study of how users adapt to mobile tablet devices. *Digital Culture & Education*, 6:2, 120-132.

URL: <http://www.digitalcultureandeducation.com/cms/wp-content/uploads/2014/08/park.pdf>

PLEASE SCROLL DOWN FOR ARTICLE

# SWITCHING BETWEEN PRODUCTIVE MULTITASKING AND DISTRACTION: A CASE STUDY OF HOW USERS ADAPT TO MOBILE TABLET DEVICES

SORA PARK

## Abstract

*This study explores how new users of mobile tablet devices experience and learn to adapt to an environment in which there is a ubiquitous internet connection. A mixed methods study combining netnography and online surveys was conducted among 35 university students in Australia. The portable and mobile nature of tablets enabled participants to be engaged in continuous internet access throughout the day, expanding the situations in which they could engage in multiple tasks. This study focused on the way users prioritise tasks, particularly within the context of studying. Over the course of one year, participants developed their own methods of dealing with the new challenges they encountered. Most participants managed demands on their time and attention by switching between productive and distractive multitasking. Self-regulation strategies were developed through the process of managing the distraction, the main strategies being physical disconnection from the device and mental planning.*

**Keywords:** iPads; mobile tablet devices; digital media; multitasking; productivity; distraction; self-regulation; young adults

## Introduction

Mobile media have dramatically changed the media landscape by tethering users to their devices and changing the ways in which they behave around technology and other people (Scolari, Aguado & Feijóo, 2012; Turkle, 2008). Users connected to the network via mobile devices can choose the main space in which they function and interact with others without being physically present. They can switch between multiple realities, constantly realising ambient virtual copresence (Horst, Herr-Stephenson & Robinson, 2010). In the physical space, mobile media enables the state of absent presence, whereby they can be colocated with others without necessarily being copresent (Gergen, 2002). Tablets, mobile phones, and laptops are designed to increase mobility and enable users to access the internet anytime and anywhere. In particular, mobile tablet devices are designed as small, portable computers that can be used seamlessly in both private and public spaces. This ubiquity forces users to make continuous choices about when and where they are going to use the device and whether to apply existing norms or develop new ones.

In the context of learning, digital devices such as laptops and mobile tablet devices expand the potential of effective learning both in and out of the classroom. At the same time, digital devices can be a cause of distraction that diverts students, allowing them to stray from the main task. Although the true benefits of using technologies in learning have yet to be determined, mobile devices have become prevalent in classrooms and

learning spaces. This is a new challenge for educators and students alike, who are trying to embrace new technologies for effective learning. This paper discusses how the portability of mobile tablet devices creates new multitasking situations, and how users respond to the new challenges.

The challenges arise from the fact that tablets provide a gateway to the outside world via ubiquitous internet access. In this exploratory study, mobile tablet devices were distributed to students who had never used them before. Students were then observed for a period of one year. Although participants had prior experience with computers and mobile phones, tablets were regarded as unique in the sense that they could be used in any context and that continuous access to the internet was possible. This flexibility of use created situations in which users were challenged to exercise control over the way and the extent to which they used the device. Ubiquitous access to the internet increased both productivity and distraction. This paper reports on the way users responded to and devised new strategies to cope with this constant connectivity.

### **The experience of multitasking**

Multitasking has existed since long before digital technologies were introduced. Secondary activities such as passing notes in class while the teacher is not watching or listening to the radio while reading are good examples. With multifunctional digital devices, opportunities to multitask have increased significantly, and multitasking has become more of the norm than the exception. People are constantly engaged in “continuous partial attention,” whereby they simultaneously process multiple streams of information without fully committing to a single activity (Jones, 2005). Multitasking, in the context of digital media, usually describes the phenomena of dividing attention between simultaneous activities or rapidly switching between two or more tasks. There are two distinct areas in the literature, in which multitasking is usually regarded as a negative outcome of digital media: media multitasking and multitasking in the context of learning.

In media studies, media multitasking occurs when users engage in other activities while consuming media content. Due to the increase in the number of platforms and devices in the home, people can access multiple media sources simultaneously. The simultaneous use of multiple media increases overall exposure, but diminishes the quality of the information that is being processed (Jeong & Fishbein, 2007). Ophir, Nass and Wagner (2009) found that heavy media multitaskers are distracted more easily and are less efficient at switching tasks. Simultaneously performing two cognitive tasks result in less favorable responses (Bolls & Muehling, 2007). In advertising, multiple media consumption reduces the effects of commercial messages (Jeong & Fishbein, 2007; Petty & Cacioppo, 1986; Voorveld, 2011).

Certain media activities are more suitable for multitasking. For example, a study by Pool, Koolstra and van der Voort (2003) showed that listening to music has less impact on students’ homework than viewing television. This is reflected in the activities people choose to engage in when they multitask. Preteens tend to engage in more multitasking when talking over the phone, communicating online, and listening to music (Pea et al., 2012).

Multitasking poses a more substantial problem in the context of learning. Many studies suggest that unless learning activities are built into the technology use, the technology is usually more of a distraction than a learning tool (Fried, 2008; Junco & Cotton, 2011; Kraushaar & Novak, 2010; Wainer et al., 2008; Wood et al., 2012; Wurst, Smarkola, & Gaffney, 2008). For example, computer use has been found to have a negative impact on learning, and this effect is greater among younger and poorer students (Wainer et al., 2008). Those who use laptops in class have lower overall

learning outcomes because of the distraction laptops entail (Fried, 2008). A study conducted among young students between the fifth and eighth grades found that numeracy and literacy skills decline when computers are introduced into the household (Vigdor & Ladd, 2010). Even when constructive learning does appear to occur through laptops, the overall satisfaction of student learning has been found to be lower among laptop users than non-laptop students (Wurst et al., 2008). Among older students, Wood et al. (2012) also found that attempting to multitask in lectures had a detrimental impact on learning outcomes.

Students are increasingly challenged by various multitasking activities unrelated to the task at hand, such as Facebook and MSN. Rosen, Carrier and Cheever's (2013) observational study confirmed that engaging in social media during study periods negatively affected students' grades. Junco and Cotten (2011) found that engaging simultaneously in schoolwork and instant messaging (IM) had a negative effect on studying; and, that student GPAs were negatively correlated with the social use of information and communication technology (ICT; Junco & Cotton, 2012). Bowman et al. (2010) tested whether the use of IM during reading hinders the reading process; they found that students took significantly longer to complete the reading task, even when subtracting IM time. Beentjes and Koolstra's (1996) survey of 8th to 10th graders revealed that student learning was impaired by background media use when studying at home.

Certain activities are more distracting than others. Kraushaar and Novak (2010) distinguished between productive and distractive multitasking, distractive being the non-course related activities performed on students' laptops during class, such as email, IM, and entertainment surfing. In their study, academic performance was lower when the proportion of distractive multitasking was higher. Learning is less effective when students engage in activities that are not related to the goals of the task. This is because off-task activities increase the extraneous cognitive load (Wood et al., 2012).

The problem with engaging in multiple tasks is that people cannot simultaneously process multiple messages centrally. Peripheral message processing is known to reduce the long-term effects of the messages (Jeong & Fishbein, 2007; Petty & Cacioppo, 1986; Srivastava, 2013). A response-selection bottleneck occurs because cognitive processes are limited in this capacity. When confronted with multiple tasks, the brain must choose among the many stimuli (Borst, Taatgen & van Rijn, 2010; Meyer et al., 1995). The way the brain handles multiple-task performance is to rely on adaptive executive control, which enables substantial amounts of temporal overlap among stimulus identification, response selection, and movement-production processes for concurrent tasks (Meyer & Kieras, 1997). The cognitive load imposed by engaging in multiple tasks negatively affects the learning process because there are limits to the quantity of information that can be retained (Lee, Lin & Robertson, 2012). Learning and storing information are two different activities, involving different areas of the brain. The learning that occurs during multitasking is less flexible and more specialised, which makes it harder to retrieve the information after learning (Rosen, 2008).

There may be a difference between dividing one's attention and switching rapidly between tasks (Posner, 1990). Multitasking divides the attention among activities, making the selection of information imperfect and resulting in delayed or slowed processes (Smith & Kosslyn, 2007). On the other hand, rapid attention switching occurs when a person rapidly shifts his or her attention among different activities. Since the individual is only attending to one stimulus at any given time, the multitasking doesn't necessarily compromise the quality of the process. However, when people engage in rapid attention switching, there is a time lag before full attention is restored to the new tasks (Butler, Arrington & Weywadt, 2011; Rubinstein, Meyer & Evans, 2001). In

contrast, one area of cognitive psychology suggests a potential benefit of multitasking, having found that training can improve multitasking skills (Meyer et al., 1995). According to scholars who suggest an adaptive view of the brain, information processing is considered to be “massively parallel” and “distributed” throughout components of interconnected neural networks (Anderson & Hinton, 1981). Multitasking in certain tasks can be trained or learned (Saunders & Klemming, 2003). Multitasking affects the type of learning that takes place in the brain and involves a different area of the brain than single-task activities (Foerde, Knowlton, & Poldrack, 2006). Constant multitasking by young people today may train them to juggle multiple activities and use time more efficiently (Carrier et al., 2009).

### **Adapting to the challenges of multitasking**

Multitasking is more prevalent than ever before, especially among youth, and the trend is certainly growing. According to research by the Kaiser Family Foundation, the average amount of time that children aged 8 to 18 report media multitasking increased from 16% in 1999 to 29% in 2009 (Rideout, Foerher & Roberts, 2010). If multitasking is among the cognitive activities that can be learned, then we can assume that exposure to certain technologies will enhance users’ ability to multitask. Carrier et al. (2009) compared the Baby Boomers, X Generation, and Net Generation in their multitasking behaviour and found that the youngest generation exercised a greater amount of multitasking, but that the types of activities engaged in were similar across all generations. This implies that multitasking is an acquired skill and that people have to learn how to do it efficiently. Cognitive flexibility is a characteristic of the human brain that helps people pursue complex tasks, such as multitasking, and adapt to changing demands (Ionescu, 2012).

However, most studies about multitasking are cross-sectional and thus cannot identify long term changes over time. Furthermore, most studies that measure the distracting impact of new technologies do not acknowledge the novelty effect of a new device when it is introduced into the user’s existing digital environment. New digital devices are presumed to be inserted seamlessly into the users’ everyday context. Users adjust to the multi-platform, multi-device environment by devising their own strategies. Self-regulated learning can be used to manage multitasking with digital devices. Studies on self-regulation conclude that effective learning occurs when students block out distractions while engaged in learning activities (Sitzman & Ely, 2011). For example, Wei, Wang and Klausner (2012) tested the relationship between self-regulation, text messaging in class and cognitive learning. Students who have higher self-regulation levels are less likely to text in class and more likely to sustain their attention, and thus achieve better learning outcomes. The will to consciously sustain focus is a vital factor in self-regulated learning (Roeser & Peck, 2009).

### **Research Questions and Methodology**

Previous studies suggest that multitasking using digital devices compromises the overall quality of learning outcomes. However, less is known about the user experience during the multitasking process and the way they deal with the challenges that arise. This study examines how users of mobile tablet devices respond to the ubiquitous access to the internet, particularly in a learning environment, with a focus on their perception of their multitasking behaviour.

Drawing on previous studies, we can conclude that (1) multitasking behaviour is becoming more prevalent in the digital age; (2) certain activities impose less cognitive load and are thus easier to multitask; and, (3) human brains are adaptable to the environment, within limits. It is expected that, due to ubiquitous access to multiple

platforms, people are faced with an increased demand for multitasking and that they learn to adapt. The following exploratory research questions were developed to explore the experience of users while adapting to a new digital device.

**Research Question 1.** What are the perceived negative and positive effects of multitasking among young adults after they are given mobile tablet devices?

**Research Question 2.** How do young adults adapt to and balance productive and distractive multitasking after they are given mobile tablet devices?

The data analysed in this study was drawn from a larger longitudinal study of young adults conducted between August 2011 and August 2012. A total of 35 first and second-year full-time university students at an Australian university were recruited through on-campus bulletin boards and the university's online portal site. Voluntary participants were directed to a Web link, where they were asked to complete a short screening survey. Screening questions included age, gender, and ownership of digital devices, including mobile tablet devices. A quota sample was selected on the basis of the population's gender and age composition. Only those who did not already own a tablet device were invited to take part in the study. For a summary of participants' demographic profiles, see Table 1.

Table 1. Summary of participants

Variables		N	%
Gender	Male	15	43
	Female	20	57
Type of residence	Live with family	19	54.3
	Off campus residence	6	17.1
	On campus residence	10	28.6
Age	18-20	21	60
	21-25	14	40

In order to track changes throughout the course of one year, both quantitative and qualitative methods were used. Two sets of longitudinal surveys were conducted. The first set consisted of pre-study, mid-study, and post-study surveys. The second set was a monthly survey conducted from September to November 2011 and from February to July 2012. An online community discussion forum was open throughout the study, enabling researchers to engage in netnography. Netnography is a participant-observational research strategy conducted in online spaces (Kozinets, 2010). The researchers actively participated in the online environment by posting questions, prompting answers and engaging with the participants. This study reports mainly on the findings from the online discussions.

With the exception of the pre-study survey, all of the data were collected after students had been given their mobile table devices. The model that was given was the iPad II, with Wi-Fi and 3G access. Wi-Fi was available on campus at no extra cost. Students who wished to use 3G technology were required to purchase a SIM card and a subscription to a mobile 3G service. All names used in this study are pseudonyms. Prior to the study, appropriate ethics approval was obtained from the National Health and Research Council through their National Ethics Application Form (NEAF).

The participant recruitment procedure resulted in a cohort of students who owned various digital devices and were regular users of the internet. In all, 74.3% of participants owned a smart phone and 94.3% owned their own laptops or computers (see Table 2).

Table 2. Device ownership prior to the study

Type of device	Ownership before study	N	%
Mobile phone	Smart phone	26	74.3
	Regular mobile phone	8	22.9
	Do not own	1	2.9
Laptop or PC	Personally own	33	94.3
	Do not own*	2	5.7

\*Students who did not own their own computer/laptop were still able to get access to a home computer/laptop

### Multitasking behaviour in continuum

Multitasking behaviour is not new to the digital era. In modernity, time is a basic unit of measurement used to determine value. High productivity is regarded as the completion of a certain process in a reduced amount of time. According to Southerton and Tomlinson (2005), “time squeeze” is a general characteristic of contemporary suburban households and people are expected to manage multiple tasks within a limited timeframe.

Media multitasking was already prevalent among study participants before the study. In the pre-study survey, participants reported that they frequently engaged in an additional activity, such as using the computer, playing games or text messaging, while watching TV or listening to music. Among the participants, 14.3% reported doing so every time they watched TV, and 31.4% did so every time they listened to music. This pattern did not change significantly after using mobile tablet devices for a year. For most participants, adding one more device did not significantly increase the amount of media multitasking.

However, new situations emerged in which they could engage in both media and non-media multitasking. For example, chatting with friends online while watching television was reported as a new advantage of having a portable device that they could carry around within the home. During classes, they frequently used their iPads to multitask. During lectures, 91.2% of participants searched for information on their iPads. A total of 82.4% said they shared information with others outside of the lecture through tweeting, posting, and emailing. Similarly, 85.3% reported reading on their iPads during lectures and 91.2% engaged in iPad activities that were not related to the lecture.

### The co-existence of distractive and productive multitasking

After receiving their iPad, participants reported identifying new situations in which they could multitask. These included using their iPads on public transportation, in classrooms, while engaging in conversations with others, and at home while watching television. Most multitasking activities were accepted as natural, efficient and “becoming the normal trend” (Neil). Using their iPads for social network sites, emails, and browsing during a conversation with other people was not regarded negatively, but was rather considered complementary to the primary activity and “fantastic for time management” (Jean). When Heather was in Peru, for instance, she was able to engage in a conversation with the locals using her iPad for translation. Other examples of

complementary multitasking included tweeting during a television program that invites audiences to participate via Twitter (Aiden), and seeking information related to the main task (Mia).

While consuming media content, iPads were used not only to search for information related to the media content, such as visiting the homepage of the broadcaster (Elizabeth), but also to use time efficiently, such as browsing for used cars while watching TV and “looking up other spur of the moment ideas” (Jacob). At times, it was used to co-view a television program with a remote friend. “The *Friday night AFL* game was on and whilst watching the game at home on my couch I had my iPad out having a conversation with a friend from home about the game that was unfolding in front of my eyes” (Donald). “Using my iPad, I accessed the SBS website that was rating Australia’s vote for *Eurovision*, which added another angle to watching the show” (Rita). Many participants found multitasking to be a positive experience, whether it was during a conversation or watching television.

*“I think it is natural to try to multitask in today’s society and the dual conversation is an element of that. Today, I was setting up my mother on Facebook and teaching her how to use it, when my work rang. I continued to teach mum [the] technology while on the phone... Technology has given me the ability to hold these multiple conversations for longer and more stealthily.”* (Patrick)

*“I feel that since I got the iPad I tend to engage in technology multitasking because while I’m watching Foxtel on the one hand, I’m also reading lectures on my laptop, while flicking through Facebook on my iPad.”* (Mary)

At the same time, participants were aware of the distraction that iPads presented to them due to this capacity to multitask.

*“When watching Q&A on ABC, I would engage in a Twitter conversation using the hashtag for the television show with other viewers... Though this is encouraged by the producers of the show itself, it would at times distract [me] from the actual show itself because of the enormity of the online conversation.”*(Henry)

The cause of distraction was the continuous access to the internet through the iPads. This led participants to procrastinate on their main task in lieu of the various applications that caught their attention.

*“[The] ease of carrying around the iPad also has contributed to its ability to distract. I also find the iPad not only a distraction, but a good option for a form of procrastination—always better to be playing games or chatting on Facebook than working on an assignment.”* (Rene)

iPad users easily tune out because it is “too easy to access information quickly, whether it be relevant or not” (Jacob). The push service was found to be distracting because “messages from Facebook pop up at the top of the screen when working on something else” (Rene). In most cases, the additional tasks were habitual behaviours that they engaged in without purposely thinking or planning. Elizabeth suggested that the distraction was due to the ubiquity. “Checking Facebook and email whenever logged on to the internet is habitual” (Elizabeth). The constant accessibility of the internet is the source of distraction and iPads have made it easier to tap into that opportunity.

*“Being connected to the internet constantly, especially in lectures, makes it very tempting and very easy to tune out.” (Jacob)*

The escapist notion of media can be applied to such situations. iPads provide users the opportunity to avoid activities that occur in confined spaces. Instead of engaging in the main task, participants often shift their attention into their own virtual spaces.

*“[It is] quite easy to take it to [class] and every now and then stray from what we are doing to look at my Facebook.” (Elizabeth)*

It is, in a way, leaving the physical space to be elsewhere—in the online space. Noah often “tunes out” when the “class becomes boring.” Similarly Aiden “constantly refreshes Facebook and Twitter, hoping something interesting might appear during dry lectures.” However, the purpose of their multitasking extended beyond simply trying to avoid a task. Participants were feeling a constant need to be connected to their virtual world.

*“While studying for my final exams last semester, I got into the habit of keeping Facebook open on my iPad, which was sitting in front of me. This allowed me to look at the flow of information coming in from the Facebook news feed while studying.” (Aiden)*

Participants considered their iPads to be an efficient tool to maximise their use of time, but also a playful device that distracts them when they have to engage in serious tasks such as studying or attending lectures. Both sides of this duality of distraction and efficient multitasking were well accepted among the students. They did not consider the two concepts to be mutually exclusive; both behaviours co-existed in their everyday context.

*“It has taken procrastination to a whole new level! Also, it has taken productivity to a new level.” (Brian)*

Most participants grew up in media-rich environments. They had had their own mobile phones since approximately the age of 12 and had computers in their houses before the age of five. As such, it is not surprising that they have practiced backchannelling or experienced ambient virtual copresence (Horst et al., 2010) in classrooms. The difference is that in secondary schools, there were rules at school that prohibited or banned such activities, but in a university setting, there are no explicit rules governing their behaviour in class; they are left to decide for themselves.

The survey results confirm the participants’ duality in their perception of multitasking. In the post-study survey, 29.4% of participants thought that iPads had made them better learners, and 88.2% thought that iPads were useful in the classroom during lectures or tutorials. On the other hand, 58.8% admitted that when they were using the iPad, they were easily distracted by other functions or apps. Most students reflected on how distracting, yet helpful, the device was during their studies. In all, 20.6% of the participants thought that even though the iPad has some features that help in studying, the overall impact was distraction. A full 73.5% reported that even though it was a distraction at times, the iPad had helped them to study more efficiently. Only 5.9% thought it helped without any distraction.

## **Negotiating multitasking by adopting self-regulation strategies**

Tablet users encountered situations in which they had to process multiple threads of conversation. Learning to manage time across various activities was one of the challenges many of them mentioned.

*“I was once in a lecture taking notes on the given subject. While this was happening, I was receiving notifications from Facebook that someone was trying to contact me about a group project for another subject. I have then had to answer these questions on the group project, which has prohibited me from taking any more notes on the given lecture. I was trying to still listen to what was being presented, yet it was too difficult to maintain this attention while trying to organise a meeting with my group for a different subject.”* (Anna)

When this happened, they had to devise their own rules and boundaries by experimenting and negotiating with themselves to find an optimal solution. The way they coped with this can be described as a self-regulation process whereby they acquired appropriate “skills” to control their use of the device. Self-regulation is a process that guides an individual through a goal-oriented task over time when circumstances are changeable. This usually occurs when a routine is disrupted (Karoly, 1993).

Similar to the findings reported by Quan-Haase (2010) in a study on instant messaging (IM), participants in this study adopted physical disconnection strategies when coping with distraction. Disconnection is the act of banning physical access to the device altogether, either by “leaving the iPad behind” (Diana), “not using it in lectures” (Kathryn), or “banishing the iPad to the lounge room” (Jean). Simply not leaving it on the desk when they needed to study was one of the banning methods (Jean). Another method was to customise the iPads during certain periods so that they would be less tempted to use it for off-task activities. Anna reported deleting distracting apps during the exam period and re-installing them afterwards. Andres exerted self-control by closing all apps that were not relevant to the main task and deleting some until after the work had been completed. In contrast, Elizabeth’s strategy was to open useful applications that were directly related to the main task so that she would not be tempted to visit Facebook. Additional effective ways of minimising distraction, included turning the volume down so that they would not be distracted by the noise (Donald), or in other cases, turning the volume up so that they would not feel inclined to play games in the presence of others (Brian).

In contrast, some users chose to mentally plan ahead for the distracting activities in order to exercise greater control when the situation presented itself. For example, one method was to pre-schedule the distraction so that they could minimise the temptation when they were engaged in the main task. By anticipating the distraction, users could proactively deal with it before it actually occurred.

*“When I do a day of study I generally give myself set breaks for 10–15 minutes and will play on my iPad in those breaks, but I rarely spend longer on it than I’ve given myself.”* (Evelyn)

Time management and self-control skills were both necessary to implement this strategy. Evelyn used “technology breaks” to address her internal needs. She reported spending about 20 minutes on studying, allowing herself to be distracted for a few minutes, and then returning to her studying. In Heather’s case, she would reduce the temptation to be distracted during her main activity by engaging in all of the distracting activities first, and then focus on her studies.

Both placing a physical ban on the use of the device and pre-scheduling distraction can be characterized as self-regulatory techniques employed when acquiring digital media literacy. Being able to access, use, critically understand and appropriate the device

are important aspects of digital media literacy (Park, 2012). Digital media literacy is a multidimensional concept that includes not only the device literacy, but also the ability to engage and exercise social norms. These strategies were adopted once users were comfortable using the device, after several months of exploring it. The time it takes to become digitally literate is reflected in the fact the method of self-regulation was not always effective. Participants reported that it required a lot of “self-control” (Rita) and the user must be “strong” (Chloe). Some reported difficulty with this self-regulation: “If [distraction] is going to happen, it usually does” (Mason); and, “no matter what I do, I always find myself on Facebook, and it is so easy to just tune out of the lecture or tutorial” (Noah). Coping with distraction is an ongoing process of negotiation. Dylan deleted all of his distracting apps from his iPad, but found himself pulling out his phone with the same apps.

Rather than attempting to increase the ability to multitask across all activities, participants closely monitored their use and limited their multitasking activities that were distracting. For example, when they were studying, they chose not to engage in multitasking, but rather to manage their time so that they would not have to multitask. It may be that one year was not sufficient time for them to train themselves in effective multitasking during focused activities. Nevertheless, participants quickly learned how to switch between productive multitasking and regulating distraction depending on the context and the task at hand.

Unless learning is motivated and directed by goals and positive outcomes, using digital technologies may not be an immediately rewarding experience. According to Bandura (2001), intentionality is the power to originate actions for a given purpose. Self-reactiveness suggests that an agent “has to be not only a planner and forethinker, but a motivator and self-regulator as well” (p.8). Considering how a person acts, reacts and reflects upon his or her own behaviour is a useful way to analyse the manner in which mobile tablet users cope with and negotiate their device usage practices.

Self-regulated learning is a general disposition that students bring into the classroom in an engaged and motivated manner (Boekaerts, 2005). It defines the way students learn the subject matter. In this case, self-regulated learning was used as a strategy for dealing with distraction. In an era in which multiple digital devices are being introduced into and used in the classroom, the effectiveness of learning is increasingly dependent on students’ abilities to exert self-regulation. This involves the process of learning how to use new devices per se, but also devising rules and routines of appropriate usage from the user’s standpoint. The process of self-regulation when learning how to use mobile tablet devices in the context of studying illustrates how young people acquire digital media literacy.

## Conclusion

This study observed young adults over a period of one year and examined how they learned to manage and address the new challenges posed by adding another digital device to their digital environment. Young adults who had never owned a mobile tablet device were given iPads and observed over the course of one year. Mobile tablets, while similar to laptops and smart phones, presented the participants with a novel situation, i.e., continuous connection to the internet. The ubiquity of internet access was regarded as an added convenience in most settings. In many situations, multitasking was regarded as productive and helpful in improving time management. However, multitasking posed a challenge in the context of studying.

Participants struggled to balance their studies as they faced intensified multitasking situations. Despite the fact that they all had prior experience with multitasking to some extent, they encountered new situations in which they were now habitually engaging in

multiple tasks. Situations emerged in which they needed to devise coping strategies to focus on one task. The main methods of dealing with such challenges were either to physically disconnect themselves from the device or to plan ahead and manage the anticipated distractions.

Learning to use a new device requires not only technical skills, but also an understanding of the broader social meaning of using devices in various contexts. Due to the portability, students were able to carry their tablets everywhere. Participants explored, experimented, and negotiated various uses of the device according to the different contexts in which they found themselves. At first, participants went through a novelty period. This is when they experimented with the device and spent enormous amounts of time using it. After this phase passed, they were able to reflect upon their usage patterns and establish what they thought to be optimal use. During the process, self-regulatory strategies were adopted, whereby they eventually found a place for the new device amongst the various digital devices they used.

### Acknowledgements

This research was supported by the Public Communication Research Cluster at the Faculty of Arts & Design and the Information and Technology Management at the University of Canberra (2011-2012). An earlier version of the paper was presented at the 14th annual conference of the Association of Internet Researchers.

### References

- Anderson, J. A. & Hinton, G. E. (1981). Models of information processing in the brain. In Hinton, G. E. & Anderson, J. A. (eds). *Parallel Models of Associative Memory*, Hillsdale, NJ: Erlbaum.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1.
- Beentjes, J. W. J., & Koolstra, C. M. (1996). Combining background media with doing homework: Incidence of background media use and perceived. *Communication Education*, 45(1), 59.
- Boekaerts, M. L. (2005). Self-regulation in the classroom: A perspective on assessment and intervention. *Applied Psychology: An International Review*, 54(2), 199-231.
- Bolls, P. D., & Muehling, D. D. (2007). The effects of dual-task processing on consumers' responses to high- and low-imagery radio advertisements. *Journal of Advertising*, 36(4), 35-47.
- Borst, J. P., Taatgen, N. A., & van Rijn, H. (2010). The problem state: A cognitive bottleneck in multitasking. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 36(2), 363-382.
- Bowmann, L. L., Levine, L. E., Waite, B. M., & Gendron, M. (2010). Can students really multitask? An experimental study of instant messaging while reading. *Computers & Education*, 54(4), 927-931.
- Butler, K. M., Arrington, C. M., & Weywadt, C. (2011). Working memory capacity modulates task performance but has little influence on task choice. *Memory and Cognition*, 39, 708-724.
- Carrier, L. M., Cheever, N. A., Rosen, L. D., Benitez, S., & Chang, J. (2009). Multitasking across generations: Multitasking choices and difficulty ratings in three generations of Americans. *Computers in Human Behavior*, 25(2), 483-489.

- Foerde, K., Knowlton, B. J., & Poldrack, R. A. (2006). Modulation of competing memory systems by distraction. *Proceedings of the National Academy of Sciences*, *103*(31), 11778-11783.
- Fried, C. B. (2008). In-class laptop use and its effects on student learning. *Computers & Education*, *50*(3), 906-914.
- Gergen, K. J. (2002). The challenge of absent presence. In J. Katz & M. Aakhus (Eds.), *Perpetual Contact* (pp. 227-241). NY, NY: Cambridge University Press.
- Horst, H. A., Herr-Stephenson, B., & Robinson, L. (2010). Media ecologies. In M. Ito (Ed.), *Hanging Out, Messing Around, and Geeking Out: Kids Living and Learning with New Media*. Cambridge, Massachusetts: The MIT Press.
- Ionescu, T. (2012). Exploring the nature of cognitive flexibility. *New Ideas in Psychology*, *30*, 190-200.
- Jeong, S.H., & Fishbein, M. (2007). Predictors of multitasking with media: Media factors and audience factors. *Media Psychology*, *10*(3), 364-384.
- Jones, S. (2005). *Everything Bad Is Good for You: How Today's Popular Culture Is Actually Making Us Smarter*. NY, NY: Riverhead Books.
- Junco, R., & Cotten, S. R. (2012). No A 4 U: The relationship between multitasking and academic performance. *Computers & Education*, *59*(2), 505-514.
- Junco, R., & Cotten, S. R. (2011). Perceived academic effects of instant messaging use. *Computers & Education*, *56*(2), 370-378.
- Karoly, P. (1993). Mechanisms of self-regulation: A systems view. *Annual Review of Psychology*, *44*(1), 23.
- Kozinets, R. (2010). *Netnography: Doing Ethnographic Research Online*. SAGE Publications Ltd.
- Kraushaar, J. M., & Novak, D. C. (2010). Examining the affects of student multitasking with laptops during the lecture. *Journal of Information Systems Education*, *21*(2), 241-251.
- Lee, J., Lin, L., & Robertson, T. (2012). The impact of media multitasking on learning. *Learning, Media and Technology*, *37*(1), 94-104.
- Meyer, D. E., & Kieras, D. E. (1997). A computational theory of executive cognitive processes and multiple-task performance: Part 2. Accounts of psychological refractory-period phenomena. *Psychological Review*, *104*(4), 749-791.
- Meyer, D. E., Kieras, D. E., Lauber, E., Schumacher, E. H., Glass, J., Zurbriggen, E., et al. (1995). Adaptive executive control: Flexible multiple-task performance without pervasive immutable response-selection bottlenecks. *Acta Psychologica*, *90*(1-3), 163-190.
- Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences*, *106*(37), 15583-15587.
- Park, S. (2012). Dimensions of digital media literacy and the relationship to social exclusion. *Media International Australia*, *142*(1), 87-100.
- Pea, R., Nass, C., Meheula, L., Rance, M., Kumar, A., Bamford, H., et al. (2012). Media use, face-to-face communication, media multitasking, and social well-being among 8- to 12-year-old girls. *Developmental Psychology*, *48*(2), 327-336.
- Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer-Verlag.
- Pool, M. M., Koolstra, C. M., & van der Voort, T. H. A. (2003). The impact of background radio and television on high school students' homework performance. *Journal of Communication*, *53*(1), 74-87.

- Posner, M. I. (1990). Hierarchical distributed networks in the neuropsychology of selective attention. In A. Caramazza (Ed.), *Cognitive Neuropsychology and Neurolinguistics* (Hillsdale, NJ: Lawrence Erlbaum Associates, 187–210).
- Quan-Haase, A. (2010). Self-regulation in instant messaging (IM): Failures, strategies, and negative consequences. *International Journal of e-Collaboration*, 6(3), 22-42.
- Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). *Generation M2: Media in the Lives of 8 to 18 year olds*. Menlo Park, California: Henry J. Kaiser Family Foundation.
- Roeser, R. W., & Peck, S. C. (2009). An education in awareness: Self, motivation, and self-regulated learning in contemplative perspective. *Educational Psychologist*, 44(2), 119–136.
- Rosen, C. (2008). The myth of multitasking. *New Atlantis: A Journal of Technology & Society*, 20, 105-110.
- Rosen, L. D., Carrier, M. L., & Cheever, N. A. (2013). Facebook and texting made me do it: Media-induced task-switching while studying. *Computers in Human Behavior*, 29(3), 948-958.
- Rubinstein, J. S., Meyer, D. E., & Evans, J. E. (2001). Executive control of cognitive processes in task switching. *Journal of Experimental Psychology: Human Perception and Performance*, 27(4), 763-797.
- Saunders, G., & Klemming, F. (2003). Integrating technology into a traditional learning environment. *Active Learning in Higher Education*, 4(1), 74-86.
- Scolari, C. A., Aguado, J. M., & Feijóo, C. (2012). Mobile media: Towards a definition and taxonomy of contents and applications. *International Journal of Interactive Mobile Technologies* 6(2), 29-38.
- Sitzmann, T., & Ely, K. (2011). A meta-analysis of self-regulated learning in work-related training and educational attainment: What we know and where we need to go. *Psychological Bulletin*, 137(3), 421-442.
- Smith, E., & Kosslyn, S. (2007). *Cognitive Psychology: Mind and Brain*. Pearson.
- Southerton, D., & Tomlinson, M. (2005). 'Pressed for time'– the differential impacts of a 'time squeeze'. *The Sociological Review*, 53(2), 215-239.
- Srivastava, J. (2013). Media multitasking performance: Role of message relevance and formatting cues in online environments. *Computers in Human Behavior*, 29(3), 888-895
- Turkle, S. (2008). Always-on/always-on-you: The tethered self. In J. Katz (Ed.), *Handbook of Mobile Communication Studies*: MIT Press.
- Vigdor, J., & Ladd, H. (2010). *Scaling the Digital Divide: Home Computer Technology and Student Achievement*. Washington, D.C.: National Center for Analysis of Longitudinal Data in Education Research (CALDER).
- Voorveld, H. A. M. (2011). Media multitasking and the effectiveness of combining online and radio advertising. *Computers in Human Behavior*, 27(6), 2200-2206.
- Wainer, J., Dwyer, T., Dutra, R. S., Covic, A., Magalhaes, V. B., Ferreira, L. R. R., et al. (2008). Too much computer and Internet use is bad for your grades, especially if you are young and poor: Results from the 2001 Brazilian SAEB. *Computers & Education*, 51(4), 1417-1429.
- Wei, F.-Y. F., Wang, Y. K., & Klausner, M. (2012). Rethinking college students' self-regulation and sustained attention: Does text messaging during class influence cognitive learning? *Communication Education*, 61(3), 185-204
- Wood, E., Zivcakova, L., Gentile, P., Archer, K., De Pasquale, D., & Nosko, A. (2012). Examining the impact of off-task multi-tasking with technology on real-time classroom learning. *Computers & Education*, 58(1), 365-374.

Wurst, C., Smarkola, C., & Gaffney, M. A. (2008). Ubiquitous laptop usage in higher education: Effects on student achievement, student satisfaction, and constructivist measures in honors and traditional classrooms. *Computers & Education*, 51(4), 1766-1783.

## **Biographical Statement**

**Sora Park** is Associate Professor and Course Convener of Media and Public Affairs at the University of Canberra. She is an inaugural member of the News & Media Research Centre. Her research focuses on digital media users and implications for media policy.

**Contact:** [sora.park@canberra.edu.au](mailto:sora.park@canberra.edu.au) +61-2-6201-5423