Technology Over-Consumption: Helping Students Find Balance In A World Of Alluring Distractions

By: **George D. Shows, Pia A. Albinsson, Tatyana B. Ruseva,** and **Diane Marie Waryold**

Abstract

The last two decades has seen a fundamental shift in society with the growth in technology and the growth of social media. This shift has been embraced in the classroom as a tool to enhance the learning experience of the student. Students have experienced a fundamental shift in interaction with themselves and the world they inhabit with the exponential growth in technology and social media both inside and outside the classroom. The result is the multitasking student, who must constantly switch between growing numbers of interactions. Attention spans have a finite limit, and eventually students experience an over-consumption of technology, characterized by increasing levels of anxiety and stress. To better serve our students, marketing educators must reconsider the technology experience in the classroom. Further, marketing educators should educate students on the detrimental effects of technology over-consumption and solutions to relieve themselves from their over-stressed plugged-in world.

Shows, George D.; Albinsson, Pia A.; Ruseva, Tatyana B.; and **Waryold, Diane Marie** (2018) "Technology Over-Consumption: Helping Students Find Balance in a World of Alluring Distractions," Atlantic Marketing Journal: Vol. 7 : No. 1 , Article 1. Publisher version of record available at: https://digitalcommons.kennesaw.edu/amj/vol7/iss1/1

Atlantic Marketing Journal

Volume 7 | Number 1 Article 1

2018

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George D. Shows
Appalachian State University, showsgd@appstate.edu

Pia A. Albinsson
Appalachian State University, albinssonpa@appstate.edu

Tatyana B. Ruseva
Appalachian State University, rusevatb@appstate.edu

Diane Marie Waryold
Appalachian State University, waryolddm@appstate.edu

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G. David Shows, Appalachian State University
showsgd@appstate.edu*

Pia A. Albinsson, Appalachian State University
albinssonpa@appstate.edu

Tatyana B. Ruseva, Appalachian State University
rusevatb@appstate.edu

Diane M. Waryold, Appalachian State University
waryolddm@appstate.edu

Abstract – The last two decades has seen a fundamental shift in society with the growth in technology and the growth of social media. This shift has been embraced in the classroom as a tool to enhance the learning experience of the student. Students have experienced a fundamental shift in interaction with themselves and the world they inhabit with the exponential growth in technology and social media both inside and outside the classroom. The result is the multitasking student, who must constantly switch between growing numbers of interactions. Attention spans have a finite limit, and eventually students experience an over-consumption of technology, characterized by increasing levels of anxiety and stress. To better serve our students, marketing educators must reconsider the technology experience in the classroom. Further, marketing educators should educate students on the detrimental effects of technology over-consumption and solutions to relieve themselves from their over-stressed plugged-in world.

ISSN: 2165-3879 (print), 2165-3887electronic)

Keywords - multitasking, restoration, Directed Attention Fatigue, pedagogy, Attention Restoration Theory

Relevance to Marketing Educators, Researchers and/or Practitioners - This paper is useful in encouraging educators to discuss student technology use and begin conversations on how to assist students in navigating their possible overconsumption of technology to allow for some unplugged time.

Introduction

Perhaps the most dominant subject in marketing education today is the embrace of technology and social media. There is desire among both teachers and students to use a variety of digital technologies inside and outside the classroom (Buzzard et al., 2011). McCabe and Meuter (2011) note that when students see value in an electronic tool, faculty should more completely understand the tool and embed it in their courses. Understanding and effectively using modern technology is considered a marketing skill desired by employers (Veeck and Hoger, 2014). Although the marketing discipline has been defined as context driven (Sheth and Sisodia, 1999), the context in which marketing is taught has been changing dramatically.

The change in marketing education reflects changes in society. In North America 95% of adults between the ages of 18 and 33 report some form of online activity (Zickuhr, 2010), and 72 % of those ages 18 to 29 who use the Internet also use social network sites, such as Facebook (Lenhart et al, 2010). In marketing classes across the country, it is common to allow laptops and other electronic devices into the classroom and provide online content activity. Marketing education embraced classroom innovation because of the underlying assumption that information technology (IT) does have a positive impact (Hunt, Eagle and Kitchen, 2004). While technology and marketing education are linked (Atwong and Hustad, 1997), is IT the most sensible step for effective student learning? Do we, as educators, have an obligation to teach students about the impact that excessive technology consumption can have on their ability to focus, if such an impact exists?

The purpose of this study is to reconsider the integration of technology into the marketing classroom and its effects on student learning. We live in a plugged-in world, and our students live, work, and study while being bombarded by communications from friends, family, and the world around them. The pressure to respond to this constant stream of stimuli leads to multitasking behavior, which in turn leads to shortened attention spans, stress, and fatigue (Lee, Lin and Robertson, 2012). We propose a possible response to the problems associated with fatigue brought upon by split attention. We advance the idea that to better serve students, educators should discuss the advantages and disadvantages of technology consumption with students. Encouraging students to look at personal consumptive patterns and providing activities that allow students to "unplug" from their electronic devices, and to enjoy recreational activities, preferably in natural surroundings, ought to be integrated into the curriculum; an example would be a picnic experience in some natural setting for a department or school. We further contend that a better learning environment is one undistracted from laptops, phones, or other media devices. To support this contention, the authors, provide two experiments on the effects of being unplugged. The first involves a university sponsored event where students are encouraged to leave their devices at home and participate in outdoor leisure activities. The second involves using

a cognitive test of spatial and secondary memory in different environments in both a plugged and unplugged situation.

Literature Review

Multitasking, or the running of multiple cognitive 'threads' requires both attention and inhibition, which can exacerbate attention and contribute to fatigue (De Young, 2010). According to the Theory of Directed Attention Fatigue (DAF), individuals who expend effort on concentration are subject to stress and fatigue, because cognitive focus is a limited resource (James 1892/2001). DAF is purported to instigate decrements in attention and reduce the ability to plan effectively (Korpela et al., 2001; Hartig et al., 2003).

Research on fragmented attention provides evidence that an individual's ability to engage in two or more tasks simultaneously is imperfect (Lang, 2000; Fisch, 2000). Multitasking is a misnomer. While we define multitasking as performing two or more cognitive tasks simultaneously, only one task can have the full concentration of the conscious mind at one time (Pashler, 2000). The process known as *inhibition* helps to allow the mind to switch from one task to another by directly limiting the secondary task's exposure. As the brain switches back and forth to determine which task to perform, a "bottleneck" occurs resulting in a loss of efficiency (Marois et al., 2005).

Multitasking in the classroom, while becoming commonplace, has resulted in less-than ideal impact on student learning. Fried (2008) found that use of laptops in class is negatively related to several measures of learning, including test scores. Test scores were also negatively affected by texting during class (Clayson and Haley, 2012; Ellis, Daniels, and Jauregui, 2010). Clayson and Haley (2012) report that 94% of students received a text during class and 86% texted while in class. About half (47%) of the students believed they can text and follow a lecture at the same time (Clayson and Haley, 2012). Burak (2012) found a correlation between multitasking in the classroom and lower GPA scores. Bowman et al. (2010) confirmed that a student group texting during a reading assignment took 59% longer to complete the task than a control group, even when the texting time was subtracted from the reading time. Sana, Weston, and Cepeda (2013) further established that classroom use of laptops not only lowered comprehensive test scores, but also lowered scores of students who were in view of a multi-tasking peer. Thus, laptops lowered scores for both students who used them and students who were in view of them.

Further, researchers have found a positive relationship between the daily amount of time students spent on computers and their levels of stress (Mark, Wang, and Niiya, 2014). Evidence links stress and learning to the amount of multitasking performed by students. The stress is correlated with the amount of "cognitive load" that a student allows themselves during their work. Multitasking also creates cognitive loads that burden students' working memory and learning (Lee, Lin and Robertson, 2012). While listening to music is considered a "low cognitive load", combining tasks leads students to reach their attentional resource limit, and once that threshold is exceeded, stress is likely to occur. The current generation of traditional age college students is what Levine and Dean (2012) refer to as "digital natives." This generation has grown up with technology and digital media. College students are interacting with a constant stream of stimuli from the Internet and mobile devices. This barrage of information challenges one's ability to focus and learn. Giedd (2012) notes that the brain, and in particular, the pre-frontal cortex in

young adults is still developing. The highly plastic nature of brain development in college students may create some challenges for those students who live hyper connected lives.

Giedd (2012) notes that developing brains leave more room for forming habituated behaviors, such as an addiction to technology. Furthermore, college students place importance on their sense of connectedness to others. Although students are more virtually connected, they can experience feelings of isolation from the lack of face-to face interactions (Levine and Dean, 2012). Changes in communication patterns and predominantly cyber-world peer relationships have the potential to erode interpersonal skills and delay developmental growth.

The 2014 National College Health Assessment – a study of over 120,000 students from across the United States – found that internet use/computer games were an impediment to student learning for 11.6% of respondents. Furthermore, 30.3% of student respondents attributed poor academic performance to stress, while 21.8% identified anxiety as the culprit. Adams and Kisler (2013) explored the relationship between use of technology, sleep quality, and anxiety. Their results show that 47% of students reported night-time waking to answer text messages and 40% to answer phone calls. Since poor sleep quality is symptomatic of anxiety, perhaps the increase in psychological issues in students noted above can be due in part to technology consumption.

Despite these issues with unstructured use of technology in the classroom (Fried, 2008; Hembrooke and Gay, 2003; Sana, Weston, and Cepeda, 2013; Mark, Wang, and Niiya, 2014), faculties remain at a loss as to how to approach this issue. Technology is clearly here to stay. As digital natives, students are accustomed to communicating with others in a virtual world in which they have grown to know hyper connectivity as the norm.

Researchers have begun to study students' self-awareness of their media use and habits. Moeller, Powers, and Roberts' (2012) examined students' experiences of being without media for 24 hours, as part of a larger global study 'The World Unplugged.' Their findings show that some students feel depressed, lonely and lost when being disconnected from their media devices. Others realized that their usual multitasking may not be that beneficial to perform quality tasks after all, and that there were some benefits of being media-free. Some students stated that they felt more 'a sense of liberation, a feeling of peace and contentment, better communication with closer friends and family, and more time to do things they had been neglecting' (Moeller, Powers, and Roberts, 2012:p.49).

Attention Restoration

Attention Restoration Theory (ART) proposes to overcome fatigue by exposing the student to environments that are restorative in nature (Kaplan and Kaplan, 1989; Kaplan, 1995). According to ART, restorative settings promote recovery from mental fatigue through four mechanisms, two of which are escape and fascination (Kaplan, 1995). *Escape* is the distancing of one's self from the activities that produce the fatigue. Escape in a restorative experience is having a psychological distance from an individual's usual routines (Korpela et al., 2001). Hirschman (1983) discussed the value of escapism in helping people avoid unhappy events or get away from their anxieties. *Fascination* is an involuntary attention, which requires no effort or the inhibition of competing stimuli and environments. The conditions for fascination are that the environment be interesting, simple, direct, and effortlessly understood.

Fascination brings about an increase in cognitive effectiveness, reduction in stress, and a greater relaxation. Fascination will increase arousal by opening up avenues of stimulation and activity in the situation, pleasure by increasing the degree in which an individual feels good, as well as stress and anxiety alleviation. While these qualities have been found in built environments such as third places (Rosenbaum, 2010), their greater effect is posited to be in outdoor settings such as forests, parks, and lakes. Mehrabian and Russell (1974) describe *approach/avoidance* behaviors as those activities that are the result of the mediating variables of affect, including physical approach, exploration, social affiliation, performance, positive evaluation, and others. Approach behavior, or *attractiveness*, is the resultant of positive affect, such as pleasurable surroundings creating the desire to investigate the environment further. Avoidance behavior, or *aversiveness*, on the other hand, is the result of negative affect, such as loud sounds or undesirable distractions (Shows, 2013). Both natural and artificial environments can promote attractiveness or averseness, and depending on a subject's evaluation, can induce motivational behaviors.

Method

Study 1

From the above literature review, it is proposed that stress-reducing restorative environments that reduce our 'plugged-in' existence is not only therapeutic but desirable. They are likely to induce approach behaviors and to encourage subjects to return and repeat the experience. This study contends that students who are removed from their current 'plugged-in' existence and normal locations, and given activities separate from their daily schedule will experience escape and fascination, the precursors of a restorative experience. The restorative qualities of such experiences are greater when the subjects are 'unplugged' from technology. Along with the increase in fascination and escape, an increase in approach/avoidance behavior is expected, a higher attractiveness to unplugged environments and experiences than their routine existence.

H1: An unplugged experience has greater escape than a routine experience.

H2: An unplugged experience has greater fascination than a routine experience.

H3: An unplugged experience has greater approach/avoidance than a routine experience.

Study 2

The Unplugged study considered the effects of unplugging outside and enjoying a restorative experience. However, in the classroom the effects of unplugging have only been studied insofar as testing for knowledge after performing multitasking tasks. While significant, it would be helpful to measure the cognitive processing capacity of students in both a multitasking and unplugged situation. Study 2 examines multitasking as an inhibiting factor when students are required to process cognitively.

While study 1 examines unplugging activities and the resulting increase in restoration, study 2 focuses on multitasking under different environments (a classroom vs. a room with a natural setting) and under different technology exposure (unplugged/ plugged frame). Given these two

environments we should expect some differences in both the multitasking/unplugged frame, and the classroom/natural setting.

H4: Subjects engaged in multitasking behaviors will have lower Corsi-block scores than those in those engaged in unplugged behaviors.

H5: Subjects taking the Corsi-block test in the natural setting will have higher scores than those in the classroom setting.

Procedure Study 1

We conducted two Unplugged events at a Southeastern university in the United States during spring semesters 2012 and 2013 (referred to as Year One and Two below). Study 1 focused on activities around campus both active and passive, with the one requirement that all electronic devices were turned off during participation in the events. The events were promoted on flyers and tabletops around campus and the local community, TV monitors in the student union, through faculty involved in the event, and through student clubs who participated in the event.

Year One activities consisted of orienteering, juggling, field games, group fitness class, dress (School mascot) relay, Yoga, Hiking, climbing outdoor real rocks (learn the basics), henna tattooing. Year Two activities consisted of a Bird walk, Leave No Trace workshop (enjoy the outdoors responsibly), slacklining, four different hikes in the area, garden prepping, biology greenhouse tours, silly stuff and games, outdoor climbing wall, Yoga, Disk Golf, Lawn and board games, Hammocking (relaxing), Zumba, and an Acapella singing performance. Students filled out a questionnaire after completing one or several activities and were asked to reflect on their experiences (while still being at the event). The paper survey took about ten minutes to complete and students used pens/ pencils in the outdoor environment. As an incentive to take the survey, students were entered into a raffle to win various prizes.

In Year One, 50 surveys were collected for the study of which 39 were kept for analysis, 11 were deemed unfit to include in the sample as they were incomplete. The unplugged group included 15 males and 24 females, of which 32 were between the ages of 18-24, 3 between 25-30, 3 between 31-34, and 1 between the ages of 35-40. A control group took the same questionnaire based upon their regular activities during the same time the *Unplugged* event was being held. Of the 92 surveys collected for the control group, 88 were deemed fit for analysis: 87 were between the ages of 18-24 and one between the ages of 25-30.

Operationalization of Escape, Fascination, and Approach/Avoidance

Using the 29-item Perceived Restorative Scale by Hartig, Kaiser, and Bowler (1997) a five-item Escape scale and an eight-item Fascination scale were extracted (see Appendix). The restoration scale includes the dimensions of Extant, the 'depth' of a restorative environment, and Compatibility, the extent to which the restorative environment is similar to the subject's regular environment. Fascination and Escape are recognized for their significance in relief of stress and are more pertinent to this study; thus extant and compatibility were collected but not reported. The items used a 7-point Likert scale anchored by strongly agree/ disagree. Summated scales were created for both Escape and Fascination. We adapted Donovan and Rossiter's (1982) 8-item approach/ avoidance scale from a shopping context to our outdoor context to measure the valence (i.e., the attractiveness or averseness) of the event (see Appendix). These items were also a 7-point Likert scale anchored by strongly agree/ disagree. To control for students' technology usage and that the students were unplugged during the event, we asked questions on the time spent at the

event and if they had used any electronic gadgets during this time. We also collected demographic information such as gender, age, major, college, ethnicity and family income.

The unplugged participants and the non-participants were tested using a means comparison and the significance was tested using univariate analysis. The control group was asked about their activities during the study time and their responses were separated as outdoor activities or indoor activities. Response to this question was voluntary. Where the control subject response included both inside and outside activities, the response was omitted. Means comparison was performed by creating summated scales for fascination, escape and approach/ avoidance. Summated scales were chosen over factor scores because of its generalizability and the difficulty of replicating factor scores across studies (Hair et al., 2010). Negatively worded question scores were reversed to more accurately reflect scale effect. The unplugged participants and the non-participants were tested using univariate analysis. Further, the control group was separated between those who reported outdoor activities and those reporting indoor activities. Each one of these groups were tested to determine if general outdoor activities in the control group were significantly different in escape, fascination and valence than an outdoor event where unplugging was required.

The second year, we repeated the event and data collection, 115 surveys were collected at the Unplugged event, with 10 removed due to incompleteness, leaving 105 acceptable survey responses. The unplugged group included 42 males and 63 females, of which 98 were between the ages of 18-24, 5 between 25-30, 1 between 31-34, and 1 over the age of 60. There were 102 non-participants who were used as a control group, with 13 removed leaving 89 surveys used. The control group included 42 males and 47 females, of which 86 were between the ages of 18-24, 2 between the ages of 25-30, and one between the ages of 35 and 50. technology to allow for some unplugged time.

Results Study 1

A reliability analysis was performed on the constructs of fascination, escape and approach/avoidance for years one and two (see Table 1). The Cronbach's *alpha* coefficients for Approach/Avoidance (.841), Escape (.919) and Fascination (.941) were all in the acceptable range of scale reliability of .70 or greater (Hair et al., 2010). For year two, the Cronbach's *alpha* for Approach/Avoidance (.917), Escape (.934) and Fascination (.928) were also well within the acceptable measure of construct reliability. Item testing for each scale revealed only a few items that would improve reliability if deleted, and then only marginally. For year one Approach/Avoidance, items AA4 (.845) and AA7 (846) improved the overall Cronbach's *alpha* (.841) marginally if deleted.

Table 1

Reliability Analysis

Year 1 Item-Total Statistics			Year 2 Item-Total Statistics		
AA Cronbach Alpha = .841	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	AA Cronbach Alpha = .917	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
AA1	.766	.800		.793	.901
AA2	.598	.818		.775	.902
AA3	.609	.817		.746	.905
AA4	.387	.845		.681	.910
AA5	.543	.825		.720	.907
AA6	.780	.798		.815	.901
AA7	.373	.846		.665	.911
AA8	.590	.820		.655	.913
Escape Cronbach Alpha = .919			Escape Cronbach Alpha = .934		
E1	0.819	0.896		0.843	0.916
E2	0.779	0.904		0.840	0.917
E3	0.855	0.888		0.878	0.909
E4	0.697	0.921		0.778	0.929
E5	0.815	0.897		0.795	0.925
Fascination Cronbach Alpha = .941			Fascination Cronbach Alpha = .928		
F1	0.830	0.930		0.853	0.911
F2	0.804	0.932		0.788	0.916
F3	0.803	0.932		0.774	0.917
F4	0.855	0.928		0.850	0.911
F5	0.739	0.936		0.788	0.916
F6	0.726	0.937		0.584	0.931
F7	0.834	0.930		0.854	0.911
F8	0.717	0.937		0.563	0.934

For year one Escape, deletion of E4 (.921) slightly improved the overall Cronbach's *alpha* (.919). For year two Fascination Cronbach's *alpha* (.928) would be improved if F8 (.934) were deleted. All of these items were left in the overall construct because: 1) they improved only minimally the reliability measures, 2) all alpha coefficients were above the minimum threshold for reliability (.70), and 3) the larger number of acceptable items in the scale provided greater explanation of the overall construct.

The univariate analysis yielded interesting results. Escape in year one had a greater effect in the Unplugged event than in the overall control group (mean 27.46 vs. 23.25) as well as fascination (mean 41.00 vs. 33.61) and approach/avoidance (mean 44.77 vs. 41.45) (Table 2a). The univariate test confirms the difference between the Unplugged participants and the non-participants to be significant for escape (F= 9.492, p=.003) as well as fascination (F=12.312, p=.001) and approach/avoidance (F=8.742, p=.004).

Table 2a

Descriptive Statistics and Between-Subjects Effects

	Year 1						
	Descriptive Statistics			Test of Between-Subjects Effects		T-Test Equality of Means	
	Mean	Std. Dev.	N	F	Sig.	T	Sig.
Summated Scale Escape							
Unplugged Participants	27.46	6.517	39				
Non-Participants	23.25	7.349	88	9.492	.003	3.369	.001
Involved w/Outdoor Activities	28.74	4.541	39	0.709	.403	-0.808	.410
Involved w/Indoor Activities	20.91	6.960	47	25.930	.000	5.319	.000
Summated Scale Fascination							
Unplugged Participants	41.00	8.802	39				
Non-Participants	33.61	11.757	88	12.312	.001	3.764	.000
Involved w/Outdoor Activities	43.24	9.379	39	0.746	.391	-1.111	.270
Involved w/Indoor Activities	28.86	9.241	47	46.484	.000	6.762	.000
Summated Scale Approach/Avoidance							
Unplugged Participants	44.77	6.776	39				
Non-Participants	41.45	8.680	88	8.742	.004	3.493	.001
Involved w/Outdoor Activities	45.39	7.263	39	0.130	.720	-0.276	.786
Involved w/Indoor Activities	37.34	7.865	47	24.530	.000	5.227	.000

There were similar results for year two. Escape in year two had a greater effect in the Unplugged event than in the control group (mean 29.78 vs. 23.94). The same holds true for as well as fascination (mean 44.66 vs. 37.06) and approach/avoidance (mean 47.78 vs. 40.53) (Table 2b). We also found a strong, significant difference between the Unplugged participants and the non-participants for escape (F= 43.934, p=.000), fascination (F=33.462, p=.000), and approach/avoidance (F=37.796, p=.000).

In splitting the control group between those that performed outside activities and inside activities, results were mixed. In the year one group, there was no significant difference between the unplugged participants and the control group involved in outdoor activities for escape (F= .709, p=.403), fascination (F= .746, p=.391), and approach/avoidance (F= .130, p=.720). There was

Table 2b
Descriptive Statistics and Between-Subjects Effects

	Year 2						
	Descriptive Statistics			Test of Between-Subjects Effects		T-Test Equality of Means	
	Mean	Std. Dev	N	F	Sig.	T	Sig.
Summated Scale Escape							
Unplugged Participants	29.78	4.19	105				
Non-Participants	23.94	7.795	89	43.934	.000	6.327	.000
Involved w/Outdoor Activities	26.34	6.957	38	12.864	.000	2.793	.007
Involved w/Indoor Activities	21.32	8.894	26	50.746	.000	4.854	.000
Summated Scale Fascination							
Unplugged Participants	44.66	7.529	105				
Non-Participants	37.06	10.669	89	33.462	.000	5.901	.000
Involved w/Outdoor Activities	40.11	12.214	38	7.141	.008	2.088	.042
Involved w/Indoor Activities	33.65	9.74	26	39.369	.000	5.944	.000
Summated Scale Approach/Avoidance							
Unplugged Participants	47.78	6.762	105				
Non-Participants	40.53	9.604	89	37.796	.000	6.417	.000
Involved w/Outdoor Activities	44.67	8.966	39	5.356	.022	2.140	.037
Involved w/Indoor Activities	38.35	9.679	26	33.715	.000	5.042	.000

however a significant effect for the control group for inside activities for escape (mean 27.46 vs 20.91, F= 25.930, p=.000), fascination (mean 41.00 vs 28.86, F= 46.484, p=.000), and approach/avoidance (mean 44.77 vs 37.34, F= 24.530, p=.000).

There was also a significant difference between the control group and those engaged in outside activities versus those pursuing inside activities, in escape (mean 28.74 vs 20.91, F= 37.101, p=.000), fascination (mean 43.24 vs 28.86, F= 51.292, p=.000), and approach/avoidance (mean 45.39 vs 37.34, F= 23.608, p=.000).

In the year two study however unplugged participants had higher levels of fascination, escape and positive valence for the total non-participant group, the outside activity control group, and the inside activity group. Escape was higher in the unplugged group compared to the total non-participant group (mean 29.78 vs 23.94, F= 43.934, p=.000), the control group engaged in outside activities (mean 29.78 vs 26.34, F= 12.864, p=.000) and the control group engaged in inside activities (mean 29.78 vs 21.32, F= 50.746, p=.000).

Fascination was also higher in the unplugged group relative to the non-participant group (mean 44.66 vs 37.06, F= 33.462, p=.000), those in the control group engaged in outside activities (mean 44.66 vs 40.11, F= 7.141, p=.008) as well as inside activities (mean 44.66 vs 33.65, F= 39.369, p=.000).

Similarly, approach/avoidance was higher among the unplugged participants versus the control group (mean 47.78 vs 40.53, F= 37.796, p=.000), the control group engaged in outside activities (mean 47.78 vs 44.67, F= 5.356, p=.022) and control group engaged in inside activities (mean 47.78 vs 38.35, F= 33.715, p=.000). In the test between the inside/outside control group, participants in outside activities had higher and statistically significant scores for escape (mean 26.34 vs 21.32, F= 6.438, p=.014), fascination (mean 40.11 vs 33.65, F= 5.048, p=.028) and approach/avoidance (mean 44.67 vs 38.35, F= 6.811, p=.011) than those engaged in inside activities.

Procedure Study 2

To test the students in multitasking and unplugged situations, two possible environments were considered. First, a regular classroom with a seating capacity of 30 students was used. Second, an indoor "natural" facility was used as a representation of an outdoor setting, and as an attempt to recreate the fascinating experience. This room is a student lounge area some 120 feet x 80 feet x 50 feet with windows from ceiling to floor facing outside. In this room, there are planted trees and other living green plants. Against the inside wall are several two-foot waterfalls providing both visual and audio stimulations. Both of these environments were tested in multitasking and unplugged situations, giving a 2 x 2 frame of multitasking/classroom, unplugged/classroom, multitasking/natural setting, unplugged/natural setting. 118 students participated in the study.

The study was begun using the following script: *The test is very simple. When the test is activated you will see an animated "finger" point to the blocks in a series. Your purpose is to repeat the series using your own finger on the touchpad. When you touch the block, the block will change a color. Wait until you see the block change color, then move to the next block in sequence. As you are successful, the sequence and number of blocks to repeat will change. Your job then will be to continue repeating the series until you are told to stop. Once you stop, please raise your hand and give the iPad to the instructor. The instructor will make a quick record, then hand it to the next person.*

For the students in the unplugged group, we asked that they refrain from using any electronic devices. For the multitasking group, they were encouraged to use their smart phones or computers. For both groups, discussion between classmates while waiting to take the test was allowed. Three 10-inch iPads running a software version of the Corsi block test was given to the students to complete the test individually and independently. When finished, the results were emailed to the moderator, the test was cleared, and given to the next person and the process was repeated until everyone in each group completed the test. Univariate analysis was performed comparing those students in unplugged versus multitasking settings.

Operationalization of cognitive processing capacity

The Corsi Block-Span Tapping test (Corsi, 1972) is a cognitive test that has been used by cognitive psychologists and clinical neuropsychologists to measure visuospatial and secondary memory. In the 40 years since its inception, the test has been considered one of the de-facto tests of spatial memory and the single most important test in nonverbal neuropsychological research (Pagulayan et al., 2006). In this test, subjects are presented with a series of nine 3mm blocks arranged in a "random" pattern (although the pattern is now standardized) on a 250 x 210-mm blackboard). The testers "tap" a series of blocks in sequence and the subjects are required to repeat the pattern. After a success, the pattern and number of blocks tapped increase. Scoring the blocks has undergone several modifications since 1972 (Berch et al., 1998). Kessels et al. (2000) has standardized normative scoring with the following: span is longest length of successful sequencing. Repeated failure to reproduce the sequence of length n is the correct order yields an estimate of $n - 1$ as the spatial memory span. Correct is the total number of trials minus the number of failures. Total score is the span times the number of trials. Berch et al. (1998) also noted that percent correct, span length and span limit are useful measures, while Fischer (2001) noted that average time is a useful measure of temporal performance, with the response time reflecting the extent of spatial working memory; slower time represents "topping out" the upper limits. The test has been standardized and can be given on iPads, with the scores emailed to the presenter/ researcher immediately after completion of the test.

Results Study 2

In the unplugged versus multitasking group, there is a clear statistical advantage in students who took the test in the unplugged environment versus the multitasking one, supporting H1. Students not engaged in multitasking performed better in span (mean 6.24 vs 5.75, F= 5.108, p=.026), total correct (mean 9.32 vs 8.36, F= 7.123, p=.009), total score (mean 60.02 vs 50.31, F= 5.610, p=.008), and total trials (mean 12.37 vs 11.49, F= 4.486, p=.036). Elapsed time is also significantly higher (mean 155.829 vs 137.932, F= 4.340, p=.039) (See Tables 3a and 3b). If we divide elapsed time by total trials, we come up with seconds per trial. Seconds per trial is higher for the unplugged group versus the multitasking group (mean 12.427 vs 11.672, F= 4.4104, p=.045). If the seconds per trial were not significant, you could explain the elapsed time as the extra time required for completing the greater number of trials. A possible explanation for this is the

higher number of trials in the unplugged group created a need for greater capacity; this stretched the capability for spatial memory demands and required the successive higher demands to take more time per trial. However, even under the greater load, cognitive functions were still superior in the unplugged group versus the multitasking group.

Table 3a
Descriptive Statistics and Between-Subjects Effects for Corsi Block Test: Classroom

		Classroom				
		Descriptive Statistics			Test of Between-Subjects Effects	
		Mean	Std. Dev.	N	F	Sig.
Span	Unplugged Participants	6.24	1.179	59		
	Multitasking Participants	5.75	1.183	59	5.108	.026
Correct	Unplugged Participants	9.32	1.842	59		
	Multitasking Participants	8.36	2.082	59	7.123	.009
Total Score	Unplugged Participants	60.02	23.653	59		
	Multitasking Participants	50.31	20.796	59	5.610	.020
Total Trials	Unplugged Participants	12.37	2.149	59		
	Multitasking Participants	11.49	2.366	59	4.486	.036
Elapsed Time (Seconds)	Unplugged Participants	155.829	45.259	59		
	Multitasking Participants	137.932	48.015	59	4.340	.039
Seconds Per Trial	Unplugged Participants	12.427	1.910	59		
	Multitasking Participants	11.672	2.129	59	4.104	.045

In the classroom versus natural setting frame, we found a unique outcome. While multitasking in the classroom is greater for span, correct, total score and total trials, none of these were statistically significant. However, elapsed time (mean 136.023 vs 159.317, F= 7.513, p=.007) and seconds per trial (mean 11.396 vs 12.798, F= 15.431, p=.000) are significantly lower in the natural setting versus the classroom.

Table 3b
Descriptive Statistics and Between-Subjects Effects for Corsi Block Test: Natural Setting

		Natural Setting				
		Descriptive Statistics			Test of Between-Subjects Effects	
		Mean	Std. Dev	N	F	Sig.
Span	Unplugged Participants	5.84	1.221	63		
	Multitasking Participants	6.16	1.167	55	2.133	.147
Correct	Unplugged Participants	8.57	2.248	63		
	Multitasking Participants	9.15	1.682	55	2.407	.124
Total Score	Unplugged Participants	52.59	23.190	63		
	Multitasking Participants	58.11	21.976	55	1.748	.189
Total Trials	Unplugged Participants	11.65	2.370	63		
	Multitasking Participants	12.25	2.295	55	2.053	.155
Elapsed Time (Seconds)	Unplugged Participants	136.023	45.431	63		
	Multitasking Participants	159.317	46.758	55	7.513	.007
Seconds Per Trial	Unplugged Participants	11.396	45.431	63		
	Multitasking Participants	12.798	46.758	55	15.431	.000

These results partially support H2. This could be explained in several ways. First, one could consider the classroom as a place of stress for students and there could be a natural recoiling in performing anything in this setting. In addition, the natural setting could possibly create the restorative setting sufficient to reduce stress and lessen fatigue, creating a greater opening in capacity to perform the test. In either respect, in terms of efficiency it you could state that students performed the Corsi block test better in the natural setting versus the classroom.

Discussion

Discussion of Study 1

The results of Study 1 are mixed. While overall the unplugged event had greater levels of escape, fascination and approach/avoidance, when we broke down the activities in the control group we found no significant difference between the control and the unplugged group in Year One. However, the second year group showed a significant difference between the unplugged group, the control-inside group, and the control-outside activity group. Discussion of these results could include that the second year of measurement was performed with the experience of having run an unplugged event and having a greater competence in collecting the data. Another possible explanation is that in the first year, there were only 39 students that participated while in year two there were 105 students. While the relationship between the unplugged group and the outside/control group there is still a significant difference in those engaged in inside activities in the control group and the outside control group.

Study 1 also found that removing oneself from their normal environment and engaging in activities in natural surroundings created higher levels of escape and fascination, two major components in restorative experiences, than engaging in regular off-hour activities in regular locations. Unplugging students from their normal experiences promotes recovery, restoration, and the learning experience by relieving them from the fatigue of both the classroom and the participation in multitasking activities.

Discussion of Study 2

As of this writing, this is the first study that has used a cognitive memory test with the aim to understand the functioning capacity of students during unplugged and multitasking situations. Based upon the test, multitasking creates a cognitive "load" that translates into lower cognitive scoring, with spatial and secondary memory functions inhibited. This may further help explain the lower test scores that occur after a multitasking process.

This research calls into question the value of multitasking work in the normal classroom experience. Giedd (2012) notes that technology is not a problem; however, the habits formed around usage and consumption of technology can become problematic. Previous research provides ample evidence that students who are "plugged in" all the time are not necessarily achieving the optimum from their classroom experience. As college-level educators, we believe that it is our duty to help students develop healthy lifestyle habits.

Discussion turns towards limiting technology that is not necessary for learning (Sana et al. 2013) or discussing with students at the start of a course the possible consequences of using a laptop in class and their impact on grades (Gasser and Palfrey, 2009) is vital. Faculties routinely include a clause in syllabi about academic integrity and other assorted policies. The authors of this study believe that as educators, we have an obligation to our students to confer both the positive and negative effects of technology consumption, just as we ask students to get an honest education. We recognize students with disabilities may not be able to obtain an education without the assistance of computer devices.

Given there is no movement to remove multitasking devices from the classroom experience, educators will have to adjust and consider how they further educate students on his issue and they can help manage student stress and fatigue.

General Discussion and Conclusion

Marketing educators should be cognizant of promoting student behavior that restores their cognitive balance by providing assignments that limit "plugged in" experiences. Role-modeling activities in the classroom that draw students away from multitasking activities and provide enriching experiences should be considered. Educators should schedule "unplugging" events that engage students in social activities away from the connectedness of technology and that also involve natural surroundings. Evans and McCoy (1998) report we spend 90% of our lives within buildings, and since the industrial age, we have been losing our contact with nature (Mayer and Frantz, 2004).

The ramifications of our 'disconnect' from nature are particularly sobering in the area of education and cognitive development. Technology and new media are changing social relationships, communication, education, and the very nature of who we are (Rainie and Wellman, 2012; Moeller et al., 2012). Psychologist Sherry Turkle argues that 'the little devices most of us carry around are so powerful that they change not only what we do, but also who we are' (Turkle, 2012:p.SR1). Similarly, Granitz and Pitt (2011) note that rather than academic disciplines shaping the tools we use, it is the tools that are molding academic disciplines. Put in another context, the tools are shaping the way we teach and learn.

The inner drive to relate to other human beings or things is also evolving with the tools evolving the way we interact and relate. Staying 'plugged in' is one way to satisfy the human impulse to connect (i.e. connected to family, friends, and social networks). Assigning time for unplugged activities, on the other hand, can enable college students to connect to other people or things outside their virtual environment (e.g. classmates, community events, organizations, or nature) and could potentially serve as a win-win strategy. Such unplugged but connecting activities can allow students to both meet their inner impulse to relate to others, as well as to refocus their attention away from technology and onto activities that promote cognitive restoration and learning.

The challenge for marketing educators lies in finding a balance between learning technologies and traditional techniques of classroom instruction. Use of technology for instruction and learning is now a routine practice in marketing education, but preferences for use of such technology vary across the disciplines and between students and instructors (Nulden, 1999; Buzzard et al., 2011; Hunt et al., 2004). Only 30% of students believed that learning technologies were effective teaching tools, compared to 55% of instructors (Buzzard et al., 2011). This suggests some room for marketing unplugged or other traditional learning techniques both in and outside the classroom that would align with student expectations and beliefs. Online education (e.g. online courses, hybrid courses, web-journals) is an increasing trend in higher education and more research and attention needs to be directed toward the potential of traditional or unplugged learning activities within online platforms of higher education.

The challenge for our students is to find a balance, not necessarily with technology, but within them. This can occur in the classroom by unplugging ourselves and engaging in genuine conversation with our students. We should discuss the positive aspects of unplugging and encourage activities in natural environments that promote escape and fascination. If students experience the restoration of cognitive balance and relief from stress, they may engage in approach/avoidance behaviors, returning and receiving the benefits of an unplugged experience. As instructors, we exert a considerable influence on our students. We have the opportunity to provide them with a way to reduce the stress and anxiety so often seen.

Finally, considering the context in that modern academia is living on a rift line between the value of a university experience and an online one, perhaps we can provide ourselves with the most powerful advantage over the growing cry towards massive online courses; the ability to control the learning environment and maximize our student's potential. While the student online learns within their environment of smartphones, social media and Skype phone calls ever ready to break their mental stride, as marketing educators we can prepare them with the right material at the right time, without the background noise of the outside world creeping in. In the fight between the tools shaping how we teach, perhaps it is time for us as educators to grab the reins once again and have the teaching shape the tools.

Limitations

This study incorporated two *Unplugged* event days, at a single campus during two years. In terms of study 1, although the events were scheduled during similar times during the year (late April), the weather over the two years was quite different. The first year the weather was overcast and around 55 degrees warm which may have affected the total number of students participating in the event. The second year it was sunny and about ten degrees warmer which made an outdoor event much more attractive. Study 1 was not duplicated in the classroom (or an indoor environment) to provide a control for the classroom experience. In addition, while restorative experiences promote restoration, actual figures on how much cognitive restoration were not tested. The Corsi Block Tapping test in Study 2 was performed with a total of 118 students in four difference scenarios, with the smallest block being 22 students. A study with a larger sample size could seek to replicate the results stated here.

Appendix

Restorative Scale (adapted from Hartig et al. 1997)

Escape

Being there was an escape experience.

Spending time here gives me a break from my day to day routine.

It was a place to get away from it all.

Being here helps me to stop thinking about the things that I must get done.

Being there helped me to get relief from unwanted demands on my attention.

Fascination

The place had fascinating qualities.

My attention was drawn to many interesting things.

I wanted to get to know that place better.

There was much to explore and discover there.

I wanted to spend more time looking at the surroundings.

The place was boring.

The setting was fascinating.

There was nothing worth looking at there.

Approach/ avoidance scale (adapted from Donovan and Rossiter 1982)

I would enjoy to come to this place again.

I would like to spend time browsing in this place.

I would avoid returning to this place.

In this place I would feel friendly and talkative to a stranger who happens to be near me.

I would avoid looking around or exploring this environment.

I like this environment.

In this place I would try to avoid other people, and avoid having to talk to them.

This is the sort of place where I would spend more time than I originally set out to spend.

Note: A previous version of this paper was presented and published in the Proceedings of the 2016 Atlantic Marketing Association Conference.

Acknowledgements

This research was partially funded by the Humanities Council and the Walker College of Business Dean's club grant at Appalachian State University. The authors are grateful to Associate Professor of Recreation Management Joy James and Associate Professor of Health Exercise Science Becki Battista at Appalachian State University who were essential for the project's initiation.

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Author Information

G. David Shows

(D.B.A., Louisiana Tech University) is an Assistant Professor of Marketing in the John A. Walker College of Business at Appalachian State University. His research includes focus on entrepreneurial marketing, restorative atmospherics, and intersubjectivity in co-creation activities. His research can be found in the *Journal of Business Research*, *Journal of Creating Value*, *Marketing Intelligence and Planning*, and other journals and proceedings.

Pia A. Albinsson

(Ph.D., New Mexico State University) is an Associate Professor of Marketing in the John A. Walker College of Business at Appalachian State University. Her research which focuses on green consumption practices, value co-creation, entrepreneurial marketing, and advertising effectiveness have been published in *Journal of Consumer Behavior*, *European Journal of Marketing, Journal of Macromarketing and many other journals and proceedings.*

Tatyana B. Ruseva

(Ph.D., Indiana University) is an Assistant Professor in the Department of Government & Justice Studies at Appalachian State University. Her work related to environmental policy and natural resource governance, has been published in the Journal of Environmental Management, Ecological Economics, Ecology and Society, and Journal of Forestry.

Dr. Diane M. Waryold

is a full Professor in the Student Affairs Administration graduate preparation program within the Reich College of Education at Appalachian State University. She earned her doctorate from Florida State University in 1991. She has published extensively in the area of student conduct. Her current research interests focus on college student resilience and the impact of short-term study abroad programs on US (centric) identity.