The Impact of Laptops in the Classroom: An Assessment on Participation, Motivation and Student Learning

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Abstract

As the world becomes increasingly connected, the proliferation of social media and technology has caused today's businesses to rely heavily on these tools to enhance productivity. This study examines the effect of laptop and tablet usage in the classroom, and its impact on student learning, motivation, and participation. It was conducted in the fall of 2016 in a Historically Black College and University (HBCU), in the eastern region of the United States where 531 respondents were surveyed with 514 usable surveys being completed, a response rate of 96%. The study will be helpful, not only in a college or university setting, but to business practitioners in training, and educating them on how to utilize technological tools appropriately.

Introduction

As the world becomes increasingly connected and domestic markets open to worldwide competition, the proliferation of social media and technology has caused today's businesses to rely heavily on these tools to enhance productivity. This growing approach to communication and adoption of new methods has inspired a new approach to business communication in which Bovee and Thill (2014) describe as interactive and conversational, where audience members are no longer passive recipients of messages, but active participants in a conversation. Similarly, George (2010) describes these new tools as the most significant business development in decades, transforming communications with their employees and customers, shifting from one-way transmission of information to two-way interaction. Lavin, Korte, and Davies (2010) concurs describing todays' classrooms as becoming wired as students have become increasingly tech-savvy, where technology is now expected in many classrooms around the country. However, these varieties of technologies have not only had a persuasive influence in the business world, but also in educational institutions, as the benefits of technology and social media in the classroom are becoming more and more evident. Lytle (2011) points out that not only are social media on the rise on college campuses, but platforms such as Facebook and Twitter have been ingrained in the culture of today's students. Now, students' usage of such technology range from connecting with friends, to collaborating with classmates, to corresponding with professional contacts for internship recruitment. Referring to a 2010 survey conducted by Harrisburg University of Science and Technology that found 20 percent of the respondents spending between 11 and 20 hours a week using social media, Lytle notes that such a high level of weekly use by students and faculty can be harmful to the goals of higher education. Junco (2016) whose recent study of 2,000 undergraduate students' use of Facebook use and academic performance further found that these technologies had a negligible impact on grades. Similarly, Bovee and Thill (2014), reports how technological tools, if not used properly, can waste as much time as they save. For example, inappropriate use of the web can distract both employees and students from their responsibilities, causing a loss of production.

In terms of technology in the classroom, the verdict is still out. Cox (2016), when expounding on the merits and benefits of technology in the classroom, cites the predominance of such tools as tablets that are now replacing textbooks. Here, the author notes how such tools make learning more fun, prepares students for the future, and improves the retention rate. In addition, teachers are beginning to teach with emerging technologies (tablets, iPads, Smart Boards, digital cameras, and computers). Cox further explains that since technology changes by the minute, educators need to keep up with the times in order to best prepare students for the ever-changing world.

Hence, this research paper continues the inquiry into the impact of technology on student perceptions of their learning, participation, motivation and in the classroom. The next section covers the current literature within the field of students' perceptions of laptop and tablet use in the classroom and how it effects and impacts their participation, motivation and learning in the classroom, followed by the significance of the study. Section on methodology follows with how the study was conducted. Next, the paper presents the results of the study, followed by the discussion, conclusion, and implications for future research.

Literature Review

Bork (1985) writes, "We stand at the beginning of a major revolution in the way people learn….We are moving rapidly toward a future when computers will comprise the dominant delivery system in education. Not since the invention of the printing press has a technological device borne such implications for the learning process". The rapid pace of technology and student access to technological tools, such as laptops and tablets, must be consistently monitored for their effectiveness and impact in the classroom. Burbules and Callister (2000) describe how technology use, both well and poor, is dependent on how it is used and by whom. This phenomenon has been studied in the educational field (Fisher, Keenan, & Butler, 2004; Fried, 2008; Gardner, 2004; Graham, 2001; Kotz & Essien, 2002). However, these studies concentrate on technologies introduced by the instructor or institution and does not delve into the use of technology that students bring to the classroom. Also, none of these studies deal with the perception of the students. In addition, there is some debate and controversy about the effectiveness of these tools in the classroom. Are these emerging and advancing technologies a hindrance or a help? As Fisher (2015) note, "As instructors, we may wonder if laptop use helps or hinders learning in our classrooms. We may find ourselves on the fence – understanding that some students prefer to type their notes, but then wondering whether students are paying attention and staying engaged, and whether their laptop use may be distracting others" (pg. 1). Hence, this literature review will cover the use of students' laptops and tablets in their classroom setting and how these tools effect and impact the students' perception of their learning, participation, and motivation.

Laptops and Student Learning

Fried (2006) in her study on whether in-class laptop use aid or hinder the learning process, showed that students spent a large percentage of classroom time to tasks unrelated to class which hindered their understanding of course material, as well as, lowering their performance in class. It also showed that the laptop use posed a significant distraction to not only users, but fellow students as well. The results of that research suggest that laptop use hindered the students' attention span, thus lowering their test scores. Respectively, Sana, Weston, & Cepeda(2013) and Lindroth & Bergquist (2010) report that laptops in the classroom hinders the personal learning situation for both users and nearby peers. In the first study, the focus of the research was to provide an empirical experience from a classroom/laptop experience, so to put a strategy in place for the professor or lecturer. They note that without such a strategy, "the unaligned activities may attract both the student and lecturers attention and result in a misunderstanding of the laptops potential" (pg. 31). The latter study reaffirms our previous comments, that is, laptops in the classroom pose a significant distraction for both faculty and students. Here, the authors found that students who used laptops in the classroom scored lower on a test compared to those who were not. And while some studies have shown no significant differences between students enrolled in computer-mediated courses versus those enrolled in traditional lecture-based course, (Brallier, Palm, & Gilbert, 2007; Rivera & Rice, 2002), there are studies that provide evidence of a clear advantage to the student use of laptops in the classroom. In fact, some research (Lavin, Korte& Davies, 2010) argue that laptops provide a meaningful impact on student preparation for class and student learning.

Several other studies highlight the positive aspects in the utilization of laptop computers in today's college classrooms. Skolnik & Puzo (2008) used student surveys, a faculty survey and direct classroom observation to identify benefits of laptops in the classroom. The study revealed an increase in student spreadsheet skills and an increase proficiency in note taking. In the open ended section of the survey, the faculty cited the ability of students to create, manipulate and store information; the convenience of note-taking; the exposure to technology; and the ability to work on practical problems as advantages of employing laptops in a classroom environment. In addition, there are a few studies that probe the use of laptops in a high school classroom environment.

Rockman (1998) surveyed both teacher and student with the overall results showing that (1) students engage in more collaborative work with peers when using laptops, (2) teachers and students find that laptops when used with direction for project work stimulate twice the participation in projects, and (3) students and teachers take on increasingly different roles: teachers become facilitators as opposed to lectures, and students become collaborators and self-directed learners. Barak (2006), Kay & Lauricella (2011), Kolar (2002), Lindorth & Bergquist (2010), and Nicol & MacLeod (2005) reported comparable results indicating higher levels of beneficial peer collaboration, as well as, greater, easier and immediate classroom access to academic resources through the internet.

Laptops and Student Participation

Zhu, Kaplan, Dershimer & Bergom (2010) reported on ways laptops in the classroom could support communicative interactions. Here, instructors can take advantage of laptops to encourage students to actively participate and engage in class activities. For example, students could participate in class polls and answer questions using a web- browser. These answers would help the professor pace the lecture and shape the class discussion. While these activities could be carried out in pencil and paper form, communicating with laptops allows for faster instructor response, and offers a convenient way to maintain a permanent electronic record of students' in class writing. In another study, Samson (2010) surveyed a group of students from the University of Michigan, who were given the option to use Lecture Tools in their class, an interactive suite of tools designed specifically for larger classes. The objective of the study was to create a more active learning environment and to simulate student participation by (1) the ability to take notes synchronized with an instructor's slide, (2) the ability to pose questions and get responses in real-time during lectures, (3) the ability to reflect on and report confidence in understanding during lectures, and (4) the ability to respond to question posed by the professor. The results showed that with faculty direction on the use of the laptops in classroom situations, students could achieve improved attentiveness and overall engagement in the course objectives. And while all of these results are encouraging, there is still a body of research that hold negative opinions of the effectiveness of this technology in classroom situations.

Kraushaar & Novak (2010) found that students engage in substantial multitasking behavior with their laptops, as well as, having social networking sites open 42% of their classroom time. The study also found that not only do students understate the frequency of email and instant messaging use in the classroom, there was a statistically significant inverse relationship between the ratios of distractive versus productive multitasking behaviors during the lecture. Similarly, Ragan, Jennings, Massey, & Doolittle (2014) concur, reporting students in a large class who chose to bring laptops, tended to use their laptops for unrelated class activities two-thirds of the time allotted to the lecture. Demb, Erickson, & Hawkins-Wilding (2003) also reported that only a slight majority of students found their laptop computers essential to their academic success and student participation.

Laptops and Student Motivation

There are numerous studies offering both the advantages and disadvantages in using laptops and other technologies to stimulate motivation in the classroom. Robertson (2012) study's results showed that students' motivation significantly increased after learning on the Web page accessed by their private laptops. The study also suggested that the Web-based learning could help students be more motivated to learn, as well as, offer them control and power over their own activities. Chen (2010) report from an open-ended survey that many students are bored and unmotivated because of the way they are being taught, with a heavy reliance on textbooks and lectures. He states, "Technology in its many forms is showing how teaching and learning can paint with a much broader palate of colors, from images and music to games, simulations, wikis, and many others, any time, any place, on laptops, desktops, and smartphones" (pg.1) Here, the author recommends to use the power of that motivation and connect learning to it. Still another study,Kindle (2007) assert that students today are quite computer-savvy, so why not attack the information age head on and motivate the students with the media with which they are so familiar. On the contrary, there is another body of research that declaims the value of technology sure as laptops in the classroom. Quevillon (2015) report that many students prefer not to use Facebook, Twitter, Instagram, and social media for educational purposes, noting that the majority of students would rather have a class discussion in class, not in a chat room. Cramer and Smith (2002) indicate that the use of technology in certain areas is not beneficial to students, and yet other having mixed feeling where technology integration must have a purpose in order for it to be beneficial for producing positive results.

Significance of Study

This study will be a significant endeavor in promoting the productive use of technological tools in the classroom, as well as, how these tools contribute to student's learning, motivation, and participation. This study will also be beneficial to students and instructors in institutions of higher learning, in the development of strategies and procedures geared to effective classroom management.

By understanding the dynamics of student activity and technology as it pertains to their use of classroom time, these instructors and students can be assured of the productive use of time, in this learning environment. Moreover, this study will be helpful, not only in a college or university setting, but to business practitioners in training, and educating them on how to utilize technological tools appropriately. Poorly designed or inappropriately used technology can hinder communication more than help, as it distracts employees from responsibilities (Bovee& Thill, 2014).It will also serve as a future reference for researchers to help assess the efficacy of technological tools for student learning and to gain insights on how this technology can contribute to student learning, motivation, and participation.

Method

This study was conducted in the fall of 2016 in a Historically Black College and University (HBCU), inthe eastern region of the United States. The researchers' primary focus was conducting empirical data on the effects of laptop/tablet usage in a university classroom setting. Prior studies have sparked a debate on whether laptops benefit or hamper the learning process (Zhu, Kaplan, Dershimer & Bergom, 2011; Sana, Weston, & Cepeda, 2013). The pool of respondents was given the opportunity to participate in a survey with the purpose of assessing the relationship between laptops in the classroom and students' motivation, participation, and learning. The survey was administered on a strictly voluntary basis, with the respondents receiving extra credit points for their participation. The tool was given in classes within multiple disciplines and grade levels in an effort to capture the best possible richness of respondents (See Table 1).531respondents were surveyed with514 usable surveys being completed, a response rate of 96%. The survey questions were modified from the work of the Center for Research on Learning and Teaching, (2010).

Table 1. Background of Students.

Demographic	*n*	*%*
Gender		
Woman	334	65
Man	180	35
Class		
Freshman	145	28.2
Sophomore	118	23
Junior	136	26.5
Senior	66	12.8
Graduate Student	49	9.5
Age		
17 or younger	12	2.3
18 to 20	318	61.9
21 to 29	146	28.4
30 to 39	28	5.4
40 to 49	10	1.9

Results

As shown in Table 2, the students were asked how often they used their laptops, tablets, or smartphones in the classroom. Over 65% of the respondents reported using those types of technology in most or all of the classes, with 21.1% reporting *"every class"* and 44.8% reporting *"most classes"*.

Table 2. Frequency of Tablet/Laptop Use in Class (In response to the question *How often do you use a laptop/tablet in the classroom?*)

Choice	*n*	*%*
Every class	108	21.1%
Most classes	229	44.8%
Few or No Classes	174	34.1%
Total	511	100.0%

Note. Scale was the following: 1 = every class; 2 = most classes; 3 = few or no classes.

When asked whether the three factors (participation, motivation, and learning)were influenced by their use of laptops, tablets and smart phones in the classroom, means generally fell in the range of 2.39 to 2.72 (Table 3). This indicated students reported "agreeing" that their participation increased, that they were more motivated, and that they learned more in the classroom when they bought their technology to the classroom.

Table 3. Impacts of Classroom Laptop/Tablet Use on Participation, Motivation, and Learning.

Item	*n*	*M*	*SD*	*%*
My participation in the classroom has increased due to laptop/tablet use	511	2.72	1.04	55.6
My laptop/tablet helped me to be motivated during class lectures.	511	2.70	1.03	57.1
I learned more due to the use of my laptop/tablet in the classroom than I would have without it.	510	2.39	1.03	80.1

Note. Scale was the following: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, 5 = strongly disagree. Percentage based on number of participants who *agreed* or *strongly agreed*.

Of the students surveyed, 46.9% reported that laptops, tablets, and smartphones "somewhatincreased"their time on tasks unrelated to class, while 32.6% of the respondents reported the technology having "no effect" on the time spent on unrelated tasks in the classroom. On the contrary, 10.2% of the respondents indicated that the technology "somewhat decreased" their tasks unrelated to class (See Table 4). Only 8.6% of the students reported that their laptops, etc., "significantly increased their time on tasks unrelated to class".

Table 4. Impact of Classroom Laptop/Tablet Use on Unrelated Tasks. (In response to the question How has your use of a laptop/tablet in the classroom changed the amount of time you spend on tasks unrelated to your classes?)

Choice	*n*	*%*
significantly increased my time on tasks unrelated to class	44	8.6
somewhat increased my time on tasks unrelated to class	240	46.9
has had no effect on my time on tasks unrelated to class	167	32.6
somewhat decreased my time on tasks unrelated to class	52	10.2
significantly decreased my time on tasks unrelated to class	9	1.8
Total	512	100.0

Note. Scale was the following: 1 = significantly increased my time on tasks unrelated to class, 2 = somewhat increased my time on tasks unrelated to class, 3 = has had no effect on my time on tasks unrelated to class, 4 = somewhat decreased my time on tasks unrelated to class, 5 = significantly decreased my time on tasks unrelated to class.

In response to the question, *"When you brought your laptop/tablet to class, how much time, on average, did you spend on Facebook (or other social networking websites), checking email, playing games, doing homework for other classes, or any other activity unrelated to your class"*, only 11.7% of the students reported spending *"no time"* on the above unrelated tasks, while 7.8% of the students reported spending *"over 60 minutes"* on these unrelated tasks. Over 80% of the respondents spent from just a few minutes to 30 minutes on the above listed unrelated tasks (See Table 5).

Table 5. Time of Classroom Laptop/Tablet Use on Unrelated Tasks. (In response to the question,When you brought your laptop/tablet to class, how much time, on average, did you spend on Facebook (or other social networking websites).

Choice	*n*	*%*
a lot (over 60 min)	40	7.8%
some (10 to 30 min)	208	40.6%
a little (under 10 min)	204	39.8%
none	60	11.7%
Total	512	100.0%

Note. Scale was the following: 1 = a lot (over 60 min), 2 = some (10 to 30 min), 3 = a little (under 10 min), 4 = none.

Conclusions

In the regression shown in Table 6, the independent variables of every class, most classes, and few or no classes were all significantly and positively related to all three factors, participation, motivation, and learning.

Table 6. ANOVA Test of Differences Based on Self-Reported Use of Tablets/Laptops in the Classroom.

	Every class		Most classes		Few or no classes			
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Participation	2.06	0.94	2.52	0.90	3.38	0.89	80.71	.00**
Motivation	2.09	0.98	2.53	0.88	3.31	0.92	66.01	.00**
Learning	1.78	0.86	2.24	0.92	2.97	0.98	60.73	.00**

Laptops, tablets, and smart phones in the classroom are here to stay. Students seem to agree, that to some extent, laptop computers in the classroom enhance the educational experience. As this technology becomes increasingly prevalent in college classrooms, future research could compare the learning outcomes of students with laptops versus those without laptops. Monitoring laptops, tablets, and smart phones in the classroom is essential. Being able to monitor student activity should be a cornerstone of good classroom management. Not only does it ensure students stay on task, it increases participation, motivation, and learning. Instructors must encourage the productive use of technology in the classroom. Teachers can incorporate several software applications to help students learn more about the course material.

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