Exploring the Benefits and Challenges of Using Laptops in Higher Education Classrooms

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Abstract: Because of decreased prices, increased convenience, and wireless access, an increasing number of college and university students are using laptop computers in their classrooms. This recent trend has forced instructors to address the educational consequences of using these mobile devices. The purpose of the current study was to analyze and assess the benefits and challenges associated with classroom use of laptop computers in higher education.

Overview

It is speculated that laptop use in higher education is increasing for at least three reasons. First, today's students have been raised on a steady diet of computer technology - they are digital natives who expect to use computers on a regular basis for a wide range of educational tasks. They demand anytime, anywhere use making a mobile computer an obvious and seemingly necessary choice (Montgomery, 2009; Palfrey & Gasser, 2008; Tapscott, 2008). Second, the price of mobile technology appears to have reached a tipping point where almost any student can afford to purchase a laptop or notebook computer (Wikipedia, n.d., Wilen-Daugenti, 2008). Over 88% of all higher education students owned a laptop computer in 2009 (Smith, Salaway, & Caruso, 2009). Finally, since many universities offer ubiquitous access to the Internet, a laptop computer allows students to research, collaborate and collect information almost anywhere in the university environment (McCrea, 2010).

Recently, the popular media has expounded upon the considerable challenges faced by higher education faculty with respect to the use of laptops in class (Kladko, 2005; McWilliams, 2005; Schwartz, 2003; Szaniszlo, 2006; Young, 2006). The critical problem area appears to be the extent to which students are distracted and the frustrations of faculty who are being ignored. However, systematic, formal research on the benefits and challenges of using laptops in higher education classrooms is relatively limited. The purpose of the following study was to examine benefits and challenges of using laptop computers in higher education classrooms.

Literature Review

Benefits of Using Laptops In Class

Higher education students who use laptop technologies in class have reported greater satisfaction with their overall academic experiences. For example, Mitra & Steffensmeier (2000) found that students preferred taking classes in which they could use their laptops, and McVay, Snyder & Graetz (2005) noted that satisfaction ratings were higher when students reported using laptops for academic purposes. Similarly, alumni who had participated in an undergraduate laptop program agreed that laptop computers were beneficial in their college careers (Finn & Inman, 2004). Closely linked with student satisfaction is student motivation. Trimmel & Bachman (2004) and Mouza (2008) both observed that students using laptops in class exhibited higher motivation.

Laptops have also been shown to improve student achievement. Demb, Erickson & Hawkins-Wilding (2004) found that for two-thirds of the students, the laptop computer made a significant difference in study habits. Students reported that laptops helped with classroom assignments, email, communication and research. Similarly, Siegle’s (2001) observations indicated that students benefited from using PowerPoint presentations and reviewing course material via the laptop. In addition, several studies have noted that students believe laptops make learning “easier” (Barak, Lipson & Lerman, 2006; Mitra & Steffensmeier, 2000; Weaver & Nilson, 2005).
Challenges of Using Laptops In Class

The potential for the laptop to distract students from in-class learning activities is a notable drawback. Fried (2008) found that students who used laptops in class spent considerable time multitasking and that the level of laptop use was negatively related to overall course performance. Hembrooke & Gay (2003) investigated students’ multitasking behaviour and found that students were “engaged in computing activities that were often unrelated to the immediate class lecture and tasks” (p. 48). Barkhuus (2005) also observed that students with laptops in class were surfing the internet, emailing, or writing assignments during a lecture. Crook & Barrowcliffe (2001) reported similar evidence of recreational laptop activity, arguing that students’ self-reported work to play ratio was 30:70%. Wurst, Smarkola & Gaffney’s (2008) study suggests that students were significantly distracted by the use of laptops in class and therefore less academically satisfied.

Some of the most distracting activities include communication tools such as email and instant messaging (IM). Grace-Martin and Gay (2001) found that recreational email and IM are among the primary uses of wireless laptops by students. Crook & Barrowcliffe (2001) added that recreational use of email and instant messaging in class are notable distractions. Barak et al. (2006) reported that 12% of students used their laptops for non-learning purposes such as web surfing or social emailing.

Current Study

Previous research offers a patchwork description of the potential benefits and challenge of using laptops in higher education classrooms, however, a thorough analysis of these behaviours using reliable, valid data collection tools has yet to be conducted. The purpose of the current study was to offer a comprehensive examination of on- and off-task laptop related behaviours in university classrooms.

Method

Sample

The sample consisted of 177 higher education students (89 males, 88 females), in their first (n=74), second (n=59), third (n=30) or fourth year (n=13) of study. Seventy-five percent (n=132) of the student were born in Canada and 86% (n=153) said that English was their first language. Students were enrolled in social science (n=108), business (n=43), engineering (n=11), science (n=12) or health science (n=3). Twenty-four of the 177 students did not have English as their first language. The average grade of first year students before they entered UOIT was 78.9 percent (S.D. =6.3, range 65 to 90). The average grade for second to fourth students was 74.6 percent (S.D. = 7.8, range 59 to 90). Almost 85% (n=149) of the students reported that they were either proficient (n=94) or very proficient (n=55) at using computers. All students leased an IBM laptop imaged specifically to their selected programme and had wireless access to the web throughout campus.

Context

The study was conducted at small university located in large metropolitan area. All students and faculty at this institution were issued laptop computers. Students from this study were enrolled in one of two social science courses: Issues in the Family and Social and Political Philosophy. Sample in-class laptop-based activities included online surveys (e.g., assess gender roles, outlook on family issues), web-based research on assigned topics (e.g., social factors in historical perspective), interactive case studies to improve communication skills, creation of family genograms using online charting software, viewing online videos, reviewing published articles, consultation and discussion of websites (e.g., hate speech) and online philosophy games (e.g., philosophersnet.com). The main strategy of content delivery was a traditional lecture using a PowerPoint presentation. In addition, all class activities, notes, and PowerPoint presentations were posted on a Learning Management Systems (LMS). Compared to the majority of previous laptop-based studies where a lecture format was the dominant teaching strategy (e.g., Demb et al., 2004; Fried, 2008; Grace-Martin & Gay, 2001; Hembrooke & Gay, 2003; Lindorth & Bergquist, 2010; Wurst et al., 2008), a concerted attempt was made to meaningfully integrate the laptop into the curriculum.

Procedure

At the conclusion of the final class meeting, students were invited to participate in an anonymous, online survey by following a link provided by the instructor. Participation was voluntary and participants could withdraw from the study at any time. The instructor was unable to determine who chose to participate in the study and data was not accessed until all marks for the courses were submitted. It took approximately 10-15 minutes for students to
complete the survey. The total number of students in both courses was 521, resulting in an approximate coverage rate of 34%.

Data Sources

Descriptive data. All students were asked their age, gender, year of study, and average grade at UOIT. They were also asked how much time they spent in total on non-academic activities during class and whether, overall, they felt that laptops helped them academically.

Survey Data. In class laptop behaviour was assessed using the Laptop Use Scale (Lauricella & Kay, in press). This metric collected information on five benefits (taking notes, academic activities, impact on academic success, collaboration, and instant messaging - see table 1) and seven challenges (email, instant messaging, internet activities, playing games, watching movies, viewing pornography, and distraction of other student using laptops - see table 2). The Laptop Use Survey is available at Lauricella & Kay (2009a).

Student comments. Students were asked two open ended questions about (a) how were laptops helpful during class time (n=240 comments) and (b) how were laptops not helpful during class time (n=119 comments. All question responses were categorized and rated independently by two raters. Categories used to assess comments are presented in tables 5 and 6. The coding system is available at Lauricella & Kay (2009b). The rating scale used to assess comments ranged from -2 to +2 (-2-very negative, -1- negative, 0 – neutral, 1 – positive, 2 – very positive). Items where categories and/or ratings were not exactly the same were shared and reviewed a second time by each rater. Using this approach, inter-rater reliability estimates ranged from 96% to 98% for categories of benefits and challenges and 99% to 100% for numerical ratings of the positive or negative impact of laptop behaviours.

Findings

Overall Laptop Behaviours and Attitudes

Average daily use of laptop computers reported by students inside and outside of class was 8.8 hours (S.D. = 4.4, range 2 to 16). Sixty-percent of the students (n=107) reported being logged on the instant messaging most or all of the day. With respect to in-class use of laptops, 72% (n=120) noted that laptops were helpful or very helpful in supporting their academics.

Benefits of Using Laptops

Survey data. Students reported that note taking was the most prevalent and important laptop activity they participated in during class. Almost two thirds of the students agreed that this activity consumed 50 to 100% of their time in a typical lecture. A majority of students (57%) also noted that academic-based laptop activities were conducted over 50% of the time during a standard lecture. Seventy-two percent of all students reported that in class use of a laptop was important or very important to their overall academic success. In addition, almost 80% of the students felt that the laptop was important or very important for collaboration or group work. Finally, students reported using instant messaging for academic endeavours about one third of the time during a usual lecture.

Open-ended questions. Students offered twice as many comments about the benefits of laptops versus the challenges experienced. Note taking activities were reported as the largest benefit to using a laptop in class and included taking notes, following lectures notes that were provided by the instructor, and, to a lesser extent, sharing notes. A number of students said that laptops helped them focus better during class and access academic resources more effectively. In-class laptop benefits that appeared to have a marginal impact included being better organized, being more efficient, and participating in class-based activities. For a much smaller subset of students, learning new technology, addressing special needs (e.g., attention deficit or English as a second language), and having access to administrative course information were beneficial.

Challenges of Using Laptops

Survey data. Almost, one half of all students reported that they were sometimes or frequently distracted by other’s students use of laptops in the classroom. Forty-three percent of students agreed or strongly agreed that they would perform better during a lecture without the Internet distracting them. One quarter of all students reported that they participated in instant messaging for personal reasons from 50 to100% of the lecture time. Sixteen percent of students reported that pornography on another student’s computer was distracting or very distracting.
Approximately 10% of students used email for personal reasons 50 to 100% of time during a typical lecture. Finally, the vast majority of students did not play games or watch movies during a standard lecture.

Open ended questions. Comments about laptop-based challenges were reported far less than benefits by a factor of almost 1:2. Students observed that communication (e.g. instant messaging) and playing games were the two biggest laptop challenges or distractions experienced in-class. To a lesser extent, watching movies, the inability to focus, and surfing the web inhibited in-class productivity. A small but vocal group of students complained that the laptops were far too expensive for the value they offered as an academic aid. Finally, a subset of miscellaneous challenges included a preference to take notes by hand, serious technological problems, not having enough discipline to avoid the distractions that a laptop has to offer, and the usefulness of the laptop being linked to the type of class offered.

Conclusion

A comprehensive and systematic analysis of laptop use in higher education revealed a number of significant benefits including note taking, in-class academic activities, collaboration with peers, and communication using instant messaging. Students also noted that the laptop helped them focus better, follow in-class presentations, and take advantage of academic resources on the web. However, the inclusion of laptops in higher education classrooms also comes at a cost. Students reported being distracted by other students' computers, the Internet, instant messaging for personal reasons, and games.

Overall, the benefits of using laptops computers in higher education classrooms appeared to outweigh the challenges. Almost 75% of all students reported that the laptop was important or very important to their academic success and positive comments exceeded negative comments by a factor of 2:1.

An final point to consider when interpreting this research is that, for the most part, higher education students in the current study were given laptop related activities to pursue in class. In other words, the laptop was actively integrated into the curriculum. In studies where laptops proved to be more of a distraction than a benefit, the main teaching strategy was a traditional lecture (e.g., Barkhuus, 2005; Hembrooke & Gay; Fried, 2008; Wurst et. al., 2008). In order to maximize the benefits of laptops in higher education, it may be necessary to develop meaningful laptop-based activities and move away from the passive dissemination of knowledge.

References


