Exploring the Use of Laptops in Higher Education: 
The Analysis of Benefits and Distractions

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Abstract: This study explored the benefits and distractions of using laptop computers in higher education classrooms. Quantitative and qualitative data were collected from 156 university students (54 males, 102 females) enrolled in either education or communication studies. Laptop benefits included active note taking, particularly when instructors posted digital materials ahead of time, searching for resources, working with subject-specific software, communicating and sharing information with classmates, and using online interactive tools. Laptop distractions included surfing the web for personal reasons, social networking with peers, watching video podcasts, and playing games. Laptop benefits were reported 50 to 100% more often than distractions. Further research needs to be conducted on the degree to which distractions impede learning and productivity inside the classroom.

Introduction

In 2011, almost 90% of college or university students owned a laptop computer (Dahlstrom, de Boor, Grunwald, & Vockley, 2011). Given that many higher education institutions provide ubiquitous access to the Internet, today’s higher education students, also known as the “net generation,” (Tapscott, 2008) use laptops daily to engage in a wide variety of social, entertainment, economic, and educational activities. Their reliance on technology leads to an inevitable and sometimes insatiable desire for anytime, anywhere access to technology and the Internet (Montgomery, 2009; Palfrey & Gasser, 2008; Tapscott, 2008). However, the prominent availability and use of laptops in higher education settings is a relatively recent phenomenon, and research on the impact of this tool is limited (Lindorth & Bergquist, 2010). The purpose of the current study was to investigate and compare benefits and distractions of using laptop computers inside higher education classrooms.

Literature Review

Laptops Benefits

A comprehensive review of the literature on the use of laptops in higher education uncovered nine peer-reviewed articles from 2005 to 2011. A number of studies reported that students believed laptops helped enhance learning in four key areas (Barak, Lipson, & Lerman 2006; Kay & Lauricella, 2011; Lindorth & Bergquist, 2010; Mackinnon & Vibert, 2002; Skolnik & Puzo, 2008; Weaver & Nilson, 2005). First, students had increased access to academic resources in class via the web and therefore were able to research concepts and ideas when needed (Kay & Lauricella, 2011). Second, a new range of in-class, laptop-based learning activities emerged including using subject-specific software (Barak et al., 2006; Skolnik & Puzo, 2008), supplementary resources (Lindorth & Bergquist, 2010), online surveys, web-based case studies, and video podcasts (Kay & Lauricella, 2011). Third, productivity increased due to improved focus during class (Kay & Lauricella, 2011), more effective note taking (Arend, 2005; Kay & Lauricella, 2011; Lindorth & Bergquist, 2010; Skolnik & Puzo, 2008), and better organization of files and information (Kay & Lauricella, 2011). Finally, communication-related benefits were noted in the areas of peer collaboration (Kay & Lauricella, 2011; Kolar, Sabatini, & Fink, 2002; Lindorth & Bergquist, 2010; Nicol & MacLeod, 2005) and instant messaging among peers to gain clarification of concepts presented during class (Kay & Lauricella, 2011; Lindorth & Bergquist, 2010; Mackinnon & Vibert, 2002).

Laptop Distractions

At least, four key laptop distractions have been observed inside higher education classrooms. First, some students are distracted by their peers’ laptops (Barak et al., 2006; Fried, 2008; Kay & Lauricella, 2011). Second, several studies note that students engage in personal social networking during class in the form of instant-messaging (Fried, 2008; Hembrooke & Gay, 2003; Kay & Lauricella, 2011; Mackinnon & Vibert, 2002) and personal emails (Barak et al., 2006; Fried, 2008; Hembrooke & Gay, 2003; Kay & Lauricella, 2011; Skolnik & Puzo, 2008). Third, entertainment-based distractions include playing games (Barak et al., 2006; Fried, 2008; Hembrooke & Gay, 2003; Kay & Lauricella, 2011; Skolnik & Puzo, 2008), watching movies, podcasts, and pornography (Barak et al., 2006;
Kay & Lauricella, 2011), and listening to music (Barak et al., 2006). Forth, a number of students "surf the web" for personal reasons during class (Barak et al., 2006; Fried, 2008; Grace-Martin & Gay, 2001; Hembrooke & Gay, 2003; Kay & Lauricella, 2011; Skolnik & Puzo, 2008). In at least two studies, these distractions may have contributed to decreased learning ((Fried, 2008; Hembrooke & Gay, 2003).

**Methodological Issues**

While research on the use of laptops in higher education has provided useful preliminary data, five methodical problems have been observed and include:

1. Limited descriptions of how laptops are used in the classroom;
2. Inconsistent metrics assessing laptop benefits and distractions;
3. Small sample sizes;
4. Absence of a mixed methods approach; and
5. Data collection tools without reliability or validity estimates

**Purpose of the Study**

To date, a patchwork of research methods and findings has provided an idiosyncratic picture of laptop use in higher education classrooms. The purpose of the current study was to addresses previous methodological limitations in order to provide a more rigorous analysis of the benefits and distractions of using laptops in higher education classrooms.

**Method**

**Overview**

The following steps were followed to address methodological concerns observed in previous research studies:

1. A clear description was provided about how laptops were used;
2. A comprehensive set of behaviours were assessed based on previous research;
3. The sample was relatively large and described in detail; and
4. Both survey data and open-ended questions were used; and
5. The reliability and validity of the data collection tools was reported.

**Sample**

The sample consisted of 156 university student volunteers (54 males, 102 females) in first (n=40), second (n=63), third (n=3) or fourth year (n=50). Students were registered in either communication (n=107) or teacher education (n=49) courses while using their laptops. The average self-reported grade was 81.4 percent (S.D. = 6.3, range 45 to 90). The majority of students reported they were either very interested (n=62, 40%) or interested (n=75, 48%) in the course they were taking while using the laptop computer. A majority of students were very comfortable (n=93, 60%) or comfortable (n=52, 33%) with using computers. All students leased an IBM laptop from the university and had wireless access to the web throughout the campus.

**Teaching Strategies and Using Laptops**

In the current study, a wide variety of teaching methods were used by instructors. In some classes, where the learning goal was to present basic concepts, a standard lecture with a PowerPoint presentation was used. In addition, a number of strategies were used that required more active use of laptops including web searches for specific topics, online case studies, assessment of video podcasts, reviewing published articles, participating in online voting and surveys, working with learning objects, sharing and coordinating ideas using common discussion boards, creating presentations and learning materials with tool-based software, using subject-specific software, creating mind-maps, and reviewing course materials posted on the class website.

**Procedure**

During the final class meeting, students were invited to participate in an anonymous, online survey. The instructor, left the class while the survey was being completed, and therefore was unable to determine who chose to participate. Data was not accessed until all marks for the courses were submitted. It took approximately 15 minutes for students to complete the survey.

**Data Sources**

**Descriptive data**

Students were asked to provide their gender, year of study, course taken, and estimated grade in the course. They also rated their interest in the course they were taking and their computer comfort level (Appendix A - Questions 1 to 6).
Based on the research of Lauricella & Kay (2010), an expanded version of the Student Laptop Use Survey was employed to assess use of laptops inside the classroom. Laptop benefits were evaluated by asking students about taking notes, using lecture notes, searching the web, using online interactive tools, participating in surveys, following PowerPoint presentations, communicating with peers, and using software programs. Laptop distractions were assessed by asking about playing games, watching movies, or video podcasts, searching the web, using Facebook or Twitter, instant messaging, and sending personal emails. All questions used a five-point Likert scale with the following options related to use: never, rarely, sometimes, frequently, and very frequently. The reliability and validity of these items was confirmed by Lauricella & Kay (2010).

Student comments

Students were asked the following open-ended questions about laptop benefits and distractions during class:

1. Overall what are the biggest benefits to having a laptop in class for this course? Why?
2. Overall what are the biggest distractions in having a laptop in class for this course? Why?

All responses were categorized based on the scoring scheme used by Kay & Lauricella (2011).

Results

Laptop Benefits

Survey data

"Use of laptops" in this section means students indicated they participated in an activity sometimes, frequently, or very frequently. Over 90% of the students followed and added comments to the notes or PowerPoint presentations provided by the professor. Two thirds of the students used their laptops to take notes independently. More than 90% of the students used academic software or searched the web for academic purposes. Over three-quarters of the students collaborated with their peers (e.g., email, instant messaging) or used online interactive tools for academic support. A summary of in-class benefits is presented in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (S.D.)</th>
<th>Never/Rarely</th>
<th>Sometimes</th>
<th>Freq/Very Freq</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passive Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use Professors Notes</td>
<td>4.0 (0.9)</td>
<td>6%</td>
<td>20%</td>
<td>74%</td>
</tr>
<tr>
<td>Follow PowerPoint Pres.</td>
<td>3.8 (1.2)</td>
<td>15%</td>
<td>14%</td>
<td>71%</td>
</tr>
<tr>
<td>Take Laptop Notes</td>
<td>3.2 (1.3)</td>
<td>31%</td>
<td>24%</td>
<td>44%</td>
</tr>
<tr>
<td><strong>Active Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web-Based Research</td>
<td>3.7 (0.9)</td>
<td>9%</td>
<td>28%</td>
<td>63%</td>
</tr>
<tr>
<td>Academic Software Use</td>
<td>4.2 (1.0)</td>
<td>6%</td>
<td>10%</td>
<td>84%</td>
</tr>
<tr>
<td>Online Interactive Tools</td>
<td>3.3 (1.0)</td>
<td>16%</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>Online Surveys</td>
<td>2.9 (1.1)</td>
<td>39%</td>
<td>32%</td>
<td>29%</td>
</tr>
<tr>
<td>Collaboration</td>
<td>3.5 (1.3)</td>
<td>23%</td>
<td>22%</td>
<td>54%</td>
</tr>
</tbody>
</table>

Student comments

One-hundred ninety-seven comments were made about laptop benefits. Students took notes (n=53) or followed a PowerPoint presentation (n=31) and particularly liked combining these two activities when the instructor provided a PowerPoint file ahead time. There categories of active laptop use were reported and included: accessing resources (n=52 comments), specific laptop-based activities (n=26), and collaboration with peers (n=15). With respect to accessing resources, students searched for direct references to information or concepts brought up in class (n=25 comments), general information (n=20), or course materials (n=4). Regarding specific laptop activities, students interacted with online tools and software (n=12), edited their peers’ work (n=5), participated in online quizzes to check for understanding (n=5), and produced class materials (n=2). Finally, when using the laptop as a collaborative tool, students emailed or messaged their peers for questions, clarity, or missed information during a lecture, often because they did not want to disrupt the flow of the class (n=15).

Laptop Distractions

Survey data

"Distraction" in this section means students indicated they were distracted by an activity sometimes, frequently, or very frequently. Regarding "information search" distractions, almost three quarters of the students surfed the
web for personal information. With respect to "social networking" distractions, instant messaging was the most common, followed by sending personal emails, and checking Facebook. Finally, "entertainment" distractions were observed relatively infrequently with about 20% of the students playing games or watching video podcasts. A summary of in-class distractions is presented in Table 2.

Table 2. In-Class Distractions Using Laptops (n=156)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (S.D.)</th>
<th>Never/Rarely</th>
<th>Sometimes</th>
<th>Freq/Very Freq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Search</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Web Search</td>
<td>3.1 (1.2)</td>
<td>27%</td>
<td>33%</td>
<td>40%</td>
</tr>
<tr>
<td>Social Networking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Instant Messaging</td>
<td>3.1 (1.4)</td>
<td>36%</td>
<td>16%</td>
<td>48%</td>
</tr>
<tr>
<td>Personal Email</td>
<td>2.9 (1.3)</td>
<td>40%</td>
<td>24%</td>
<td>35%</td>
</tr>
<tr>
<td>Facebook</td>
<td>2.9 (1.4)</td>
<td>40%</td>
<td>21%</td>
<td>40%</td>
</tr>
<tr>
<td>Use Twitter</td>
<td>1.2 (0.7)</td>
<td>94%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Entertainment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play Games</td>
<td>1.8 (1.1)</td>
<td>80%</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>Watch Podcasts</td>
<td>1.8 (1.1)</td>
<td>80%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Watch Movies</td>
<td>1.3 (0.8)</td>
<td>92%</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Student comments

Students offered 123 comments about laptop distractions. The biggest distraction involved social networking with almost two thirds of the students reporting being preoccupied with Facebook (n=43 comments), instant messaging (n=27 comments), or email (n=10 comments). Eleven percent of the students noted they were enticed by various entertainment distractions such as surfing the web (n=9 comments) or playing games (n=4). An additional 9% of the students were distracted by other students’ use of laptops during class (n=11 comments) and 10% of students (n=12 comments) claimed that the laptop was a distraction, but were non-specific about the source. Finally, several students (n=5 comments) noted that they were distracted because of trying to finish assignments that were due for other classes. It is important to note that 31 students reported that there were no laptop-based distractions during class.

Discussion

Laptop benefits

Students experienced both "passive" and "active" laptop benefits during class. This distinction has not been reported in previous studies, perhaps due to a more restricted range of laptop activities used. In this study an wide variety of laptop-based activities were employed by the instructors.

The most popular "passive" activity was note taking and this finding is consistent with previous research (Arend, 2005; Kay & Lauricella, 2011; Lindorth & Bergquist, 2010; Skolnik & Puzo, 2008). However, the current study revealed three specific types of note taking, two of which were more well-liked than the third. Students preferred to add to instructor-supplied notes or PowerPoint presentations versus as opposed to taking notes on their own. Starting a class with a core set of materials may reduce the cognitive load and permit students to focus more on understanding the material presented. Further research is required to either refute or confirm this speculation.

"Active use" of computers in the classroom was observed in three categories: research, learning, and collaboration. Research activities involved searching the web for course materials, finding information on supplementing concepts presented in class, and checking secondary sources. These results are consistent with previous research (Kay & Lauricella, 2011; Lindorth & Bergquist, 2010), although more detailed descriptions of the actual research activities are provided in this study. Learning focused-activities included the use of subject-specific software, online interactive tools, and online surveys. Again, the results matches those of previous research findings (e.g., Barak et al., 2006; Kay & Laricella, 2011; Skolnik & Puzo, 2008). Finally, collaborative learning occurred among peers particularly when students had questions about concepts presented. This is a result that was mirrored by a number of prior studies (e.g., Kay & Lauricella, 2011; Kolar, Sabatini, & Fink, 2002; Lindorth & Bergquist, 2010; Nicol & MacLeod, 2005).

Note that with respect to beneficial laptop behaviours, learning tasks in the classroom, web-research, and the use of academic software were used most frequently, followed by online tools and collaboration. Online surveys were
used relatively infrequently. These findings may reflect the frequency in which instructors chose to use include these activities.

**Laptop Distractions**

The most frequent class distraction, reported by almost 75% of all students, was searching the web for non-academic or personal information. This result has been noted previously (e.g., Barak et al., 2006; Fried, 2008; Grace-Martin & Gay, 2001; Hembrooke & Gay, 2003; Kay & Lauricella, 2011; Skolnik & Puzo, 2008), however, the prevalence and relative frequency of web searching behaviour is a new finding.

Social networking occurred nearly as often as surfing the web with 60% of the students communicating with peers for social reasons using instant messaging, email, and/or Facebook. The use of instant messaging and email has been observed in previous research (e.g., Fried, 2008; Hembrooke & Gay, 2003; Kay & Lauricella, 2011; Mackinnon & Vibert, 2002), but again the frequency of use compared to other distractions had not been reported. The use of Facebook, as a distraction, has not been previously noted in the literature. Students claimed that ease of use made all three of these social networking tools particularly seductive with respect to diverting their attention. If a student's attention or engagement attenuates, the beneficial aspects of using a laptop in the classroom can quickly and almost seamlessly turn this tool into a distraction. This phenomenon may explain why some instructors may prohibit or try to limit the use of laptops in higher education classrooms (e.g., McWilliams, 2005; Schwartz, 2003; Young, 2006).

The third category of distraction, entertainment, was reported relatively infrequently with only 20% of the students playing games or watching video podcasts during class. Two previous studies noted that these diversions were relatively uncommon as well (Barak et al., 2006; Kay & Lauricella, 2011).

**Benefits vs. distractions**

In-class laptop benefits were reported, on average, twice as often as distractions. Additionally, students made 60% more comments about benefits than distractions. Whether the laptop is a benefit or distraction may be partially dependent on how engaging the class is. As one student commented:

"I would say that the biggest distraction is also the reason why the laptop is a learning tool. It provides instant access to the internet which can just as easily be used for personal/non academic reasons as it can be for academic ones. However, I often find that if the class is interesting enough I won't use my laptop for leisure/personal activities, but instead participate in what is going on in the class."

In this study, instructors made a concerted effort to use laptops in a variety of meaningful ways, so it is reasonable to expect laptop benefits to exceed distractions. However, if laptops are used more passively and less effectively, it is anticipated that computer-related distractions would increase.

Note that on some occasions, students were explicitly told not to use their laptops, perhaps in an effort to limit potential distractions. If an instructor does not plan for the meaningful use of laptops in the classroom, restricting use may be a sensible solution given that students clearly seek distractions. On the other hand, given the range of potentially effective laptop activities used in the current study, preventing students from using laptops may inhibit motivation and learning.

**Conclusions**

This studied explored and compared laptop benefits and distractions in higher education classrooms. Active note taking based on materials provided by instructor ahead of time, searching the web for resources, working on a specific tasks with subject-specific software, communicating and sharing academic-related information among classmates, and using online interactive tools were the most beneficial activities reported. Surfing the web and social networking for personal reasons, watching non-academic video podcasts, and playing games were the most distracting activities occurring in class. Laptop benefits were reported 50 to 100% more often than distractions, a result that may reflect the quality of laptop activities used by the instructor in this study.

The current study did not explore the interaction between the extent to which benefits and distractions supported or inhibited learning respectively. Focus group or case study data would helpful in examining the extent to which distractions interfere with and beneficial activities enhance. In addition, detailed qualitative data might help discover when students shift from beneficial laptop activities to more distracting endeavors.
References