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# Factors Influencing a Laptop Initiative: An Empirical Study on Students' Attitudes

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## ABSTRACT

Laptop computers have become widely used in many workplaces and schools and are currently the largest growth area within the personal computer market. For higher education, providing experiences with computer tools tends to be one of the prerequisites to professional success because employers value extensive experiences with information technology. Several universities are initiating laptop programs where all students are required to purchase laptop computers. The success of laptop program relies heavily on the extent to which the laptop environment is accepted and wholeheartedly implemented by students and faculty. Defining the conception factors necessary to successfully implement a laptop initiative becomes a critical issue to the success of the program. By understanding what factors encourage or distract students from supporting a laptop initiative, such a program can be made more useful to students as well as more beneficial to universities.

## INTRODUCTION

The demand for technology-enhanced learning environments no doubt will grow substantially over the next decade as society, the academic community, and students continue to expect the educational process to employ technology comparable to that found in the real world (Hall and Elliott, 2003). On campuses where all students are expected to have and use computers, laptops appear to be the popular choice. Laptops are more and more attractive and are often put into operation by several groups of users. The portability of laptops allows students to take them to classes, libraries, and on trips. It is also argued that their ubiquity makes computer-enhanced classroom instruction possible, decreases the need for labs, and consequently lowers the institution's computer budget (Badamas, 2001).

Students' use of laptop computers is becoming more prevalent in today's universities. This more ubiquitous use of technology has forced several universities to discover and manage new perceptual issues in addition to some more familiar issues from the primary use of university labs. At an increasing number of universities, laptop computers have become a requirement for incoming students.

Laptop computers provide unsurpassed flexibility and convenience for students in the modern academic environment (Bazillion and Braun, 2001; Vaughan and Burnes, 2002). For higher education, providing experiences with computer tools tends to be one of the prerequisites to professional success because employers value extensive experiences with information technology (Brown, Burg, and Dominich, 1998; Rola, 2002; Tomek and Muldner, 1999). Previous researchers have shown that laptop computers in the classroom can lead to positive educational outcomes (Finn and Inman, 2004; Fouts and Stuen, 1997; Gottfried and McFeely, 1998; Varvel and Thurston, 2002). Defining the conception factors necessary to successfully implement a laptop initiative becomes a critical issue to the success of the program.

## LITERATURE REVIEW

Laptop computers have become widely used in many workplaces and schools and are currently the largest growth area within the personal computer market (Berkhout, Hendriksson-Larséna and Bongers, 2004). The need to access information technology on a daily basis continues to grow and the laptop computer's advantages of being portable, light-weight and space saving, enabling the users to work anywhere and anytime, have increased its popularity among personal computer users.

The decision to require student ownership of computers is not unusual among higher education institutions. Several universities are initiating laptop programs where all students are required to purchase laptop computers. These universities also offer their students computing and networking facilities that enable them to use every kind of Web-based resource, from the library catalog to complete graduate degree programs. Within an astonishingly short time, higher education has achieved a ubiquitous electronic presence.

The laptop initiative has not only given students a better education but has made them more competent in using technology. Several issues comprise a students' perceptual base regarding a laptop initiative. A study reported that key themes related to these issues include (1) academic and social use of laptops, (2) e-mail and instant-messaging, (3) faculty utilization, (4) web uses, (5) comparisons with desktops, (6) cost, (7) library use, (8) problems, (9) family utilization, (10) service and help, (11) convenience, (12) network access, (13) worry, and (14) hardware and software (Demb, Erickson, and Hawkins-Wilding, 2004).

However, since university laptop initiatives are still in their infancy stages, many people may choose not to support such initiatives (Finn and Inman, 2004). Unless, it is imperative for the university that students are willing to support the program, it is quite risky to start requiring all students to purchase a laptop. Not everyone exposed to an innovation will adopt the new technology at the same rate. The speed at which technology diffuses throughout a social system, such as higher education, is believed to be heavily dependent on several factors. The success of the laptop program relies heavily on the extent to which the laptop environment is accepted and wholeheartedly implemented by students and faculty. As with any new technology adoption, the acceptance of a laptop initiative is likely to be quite uneven. Some students will accept it readily, whereas others will resist change actively.

This research was centered on the needs and attitudes of students. Typically, students are still skeptical when it comes to actually requiring them to purchase and use a laptop in higher education. This study attempts to investigate what factors are important to students. It is important to understand what factors can influence students' decision on the laptop program. By understanding what factors encourage or distract students from supporting a laptop initiative, such a program can be made more useful to students as well as more beneficial to universities.

## METHODOLOGY

A direct survey was used to collect the data for this study. The survey questions were compiled from previous study questions pertaining to information technology innovation as well as suggestions from researchers and students (Demb et al., 2004; Luarn and Lin, 2004; Moore & Benbasat, 1991). These questions were designed to gather data on students' perceptions on the prerequisite factors necessary to implement a laptop initiative, as well as their demographics. To check the clarity of these questions, three professors and three students were asked to read through the survey questions and provide feedback. Revisions to the survey were made based on the feedback received.

A total of 54 items were used as five-point Likert scaled questions with end points rating from "strongly disagree" to "strongly agree." Survey items Q1 to Q28 collected demographic data. Survey items Q29 to Q53 measured students' perceptions on the prerequisite factors necessary to implement a laptop initiative. Survey item Q54 measured students' willingness to support a laptop initiative.

### Data Collection

Surveys were distributed to 204 undergraduate and graduate students enrolled in a mid-sized four-year university. The participants were given a 54 item survey and allowed class time to complete the survey. The sample was 66 percent female and 34 percent male with an average age of 26.75 years. Forty-eight percent of the respondents were Caucasian, 37.3 percent were Hispanic, 6.9 percent African-American, 5.4 percent Asian, and 2 percent Native American. Almost all, 96.2 percent, of the participants currently own a desktop computer, a laptop computer, or both and 52.2 percent of the participants have had experience using a laptop computer. In addition, 44.6 percent of the respondents had previously used a laptop computer in an academic environment. Approximately 18.1 percent of the respondents agreed or strongly agreed with requiring all students to purchase a laptop computer for use in their education. Approximately 55.9 percent of the respondents disagreed or strongly disagreed with a laptop computer initiative. The remaining 26 percent of the respondents were neutral on a laptop computer initiative.

## ANALYSIS AND DISCUSSION

All 204 participants completed and returned the survey instruments. The research data showed an odd-even reliability score of 0.952, suggesting internal consistency of the data. In addition, a Cronbach's alpha score of 0.921 was calculated as a second measure of reliability. It should be noted that these high levels of reliability relate to the data resulting from the measurement, not the instrument itself.

### Factors Perceived as Critical

To determine which factors were deemed as critical to the successful implementation of a laptop computer initiative, the mean responses to each question were calculated and examined. The threshold for the factors deemed critical was set at a relative consensus point of 90 percent agreement. The survey items were on a Likert-scale ranging from 1 to 5. For a factor to be perceived as critical, a mean score of at least 4.50

was needed. Five of the twenty-five survey items were perceived as critical to the success of a laptop initiative (see Table 1).

Students believe that access to printers is the most important factor in the success of a laptop initiative. This factor, item Q45, had a mean score of 4.61 out of 5 with 94.1 percent agreeing or strongly agreeing with this factor. This finding is consistent with observed student behavior in physical computer labs. Many students complete their assignments on computers off-campus and bring their work to the computer lab to print hard copies.

Students also believe that it is critical to have their files protected from computer viruses. This is evidenced by the high mean scores for survey items Q32 and Q46. Item Q32 asked the importance of having virus protection on the laptop computer. The mean response for item Q32 was 4.57 out of 5 with 92.6 percent agreeing or strongly agreeing with this factor. Item Q46 asked the importance of providing updates for virus protection. The mean response for Q46 was 4.55 with 92.2 percent agreeing or strongly agreeing with this factor.

Following the trend that exists in industry, believe that it is critical for the university to provide a wireless network for them to access information stored at various points on campus and to access the Internet. Item Q33 examined the students' opinion on the necessity of the university providing a wireless network. The mean response for Q33 was 4.56 with 90.7 percent agreeing or strongly agreeing with this factor.

The notoriously power hungry laptop computers drove the students to rate item Q36, the necessity to provide sufficient power outlets in the class room, with a mean score of 4.55 implying that 92.2 percent agreeing or strongly agreeing with this factor.

### Factors Perceived as Not so Critical

To determine which factors were deemed as not so critical to the successful implementation of a laptop computer initiative, the mean responses to each question were calculated and examined. The five survey items with the lowest mean scores were those perceived as not so critical factors. The highest mean score for the five lowest scoring items was 3.60 for survey item number 49. The five lowest scoring items of the twenty-five survey items were labeled as the not so critical factors that are of limited impact to the success of a laptop initiative (see Table 2).

Students believe that requiring all students to purchase a backup battery, item Q50, is not a critical issue. This factor had a mean score of 2.95 out of 5 with only 35.7 percent agreeing or strongly agreeing with this factor. This finding is consistent with the observed critical factor of providing sufficient power outlets in class, item Q36. With sufficient power outlets available, the need for a backup battery becomes a non-critical issue.

Students also believe that it is not a critical factor to require a hardware update after two years. Items Q48 and Q49 looked at the perception for both requiring a hardware update and not requiring a hardware update after two years. The mean scores of Q48 and Q49 were 2.96 and 3.60, respectively. While only 32.4 percent agreed or strongly agreed with the required hardware update, more than 54.4 percent agreed or strongly agreed with not requiring a two year hardware update.

The factor of upgrading the hard drive of the laptop, item Q29, was also a less critical issue. This factor had a mean score of 3.51 with only 50.5

Table 1. Critical Success Factors

Survey Item	Question	Mean Score
Q45	For the laptop initiative to be successful, the University must provide students with access to printers.	4.61
Q32	For the laptop initiative to be successful, it is important to have virus protection on the laptop.	4.57
Q33	For the laptop initiative to be successful, the University must provide a wireless network.	4.56
Q36	For the laptop initiative to be successful, the University must provide sufficient power outlets in the class.	4.55
Q46	For the laptop initiative to be successful, the University must provide updates for virus protection.	4.55

Table 2. The Not So Critical Success Factors

Survey Item	Question	Mean Score
Q50	For the laptop initiative to be successful, the University must require all students to purchase a backup battery.	2.95
Q48	For the laptop initiative to be successful, the University must require all students to exchange to a new laptop after two years.	2.96
Q29	For the laptop initiative to be successful, it is important to upgrade the hard drive of the laptop.	3.51
Q47	For the laptop initiative to be successful, the University must provide physical storage space/locker for students to store the laptop when not in use.	3.57
Q49	For the laptop initiative to be successful, the University must not require all students to exchange to a new laptop after two years.	3.60

percent agreeing or strongly agreeing with this factor. This is consistent with the findings for items Q48 and Q49 regarding a required two year hardware update.

Students also perceived that the necessity of providing physical storage space, for the laptop computer when not in use, was a non-critical issue. This factor, item Q47, had a mean score of 3.57 with 56.9 percent agreeing or strongly agreeing with this factor. This finding is consistent with the portability concept of the laptop computer. Laptop and notebook computers are smaller and lighter which make them easy to carry around when not in use. Hence, physical storage space on campus is not a necessity.

**Differences Between Groups**

To determine if there were significant differences, on the critical factors, between the group of students who support a laptop initiative and those students who do not support a laptop initiative, t-tests on the means were conducted. The responses from participants were divided into two groups based on their responses to survey item Q54. The two groups were those who favored the laptop initiative (support group) and those who did not support the initiative (reject group). The students who were uncertain on the laptop initiative were excluded from the t-tests.

The results of the t-tests revealed that there was almost a consensus between the two groups in classifying the factors critical to the success and not critical to the success of a laptop initiative. Of the factors perceived as critical, only item Q45 demonstrated a significant difference between the two groups at the  $p = 0.05$  level. The support group showed more of a need to have access to printers than did the reject group (see Table 3).

The other significant difference came by way of the requirement to purchase a backup battery, item Q50. Of the factors perceived as non-critical issues, only item Q50 displayed a significant difference between the support group and the reject group at the  $p = 0.01$  level. While considered not a critical factor, the support group saw more of a need to have a backup power source (battery) than did the reject group (see Table 3).

The remaining t-tests indicated that there were no significant differences between the two groups on any of the other critical or non-critical factors. This suggests that participants' perceptions on the critical factors, regardless of their initial attitudes on the requirement of a laptop

computer, are in fact the necessary elements for a successful laptop initiative.

**CONCLUSIONS**

The initiative for the use of laptop computers in higher education is viewed as advantageous by many. Due to the ever increasing use of technology in primary education and the increasing demand, by industry, for more computer savvy graduates, the use of technology in higher education will continue to grow. Nevertheless in order to smooth the transition, the factors critical to a successful laptop program must be identified and addressed.

This study has provided an empirical glimpse into the minds of students as to what they perceive as critical factors in a laptop initiative. The findings revealed that students, both those who favor and those who do not support laptop initiatives, place a critical level of importance on following factors: 1) having access to printers, 2) having sufficient power outlets available in class, 3) having a wireless network in place, and 4) having continuous and up-to-date virus protection software. Both groups also perceived that the following five factors are not so important: 1) requiring all students to purchase a backup battery, 2) requiring all students to exchange to a new laptop after two years, 3) providing upgrade to the hard drive of the laptop, 4) providing physical storage space/locker for students to store the laptop when not in use.

The results in this study reveal the factors which are perceived by students as important or not important if the University would like to implement a laptop initiative. These initial findings warrant further investigation. To achieve a better understanding of all of the critical factors in a laptop program, future research should also include the perceptions of faculty, administrators, and staff as well as those of students.

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Table 3. Significant Between Group Differences

Factors	Mean		t-value	p-value
	Support Group	Reject Group		
Q45: Access to printers	4.78	4.57	1.978	0.044*
Q50: Require the purchase of a backup battery	3.67	2.66	1.991	0.000**

\* Significant at the  $p < 0.05$  level, \*\* Significant at the  $p < 0.01$  level

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