MANAGING A MOBILE COMPUTING INITIATIVE IN A BUSINESS SCHOOL

By

RAM B.MISRA,Ph.D,
Department of Management and Information Systems,
Montclair State University, NJ.

RICHARD PETERSON,Ph.D,
Department of Management and Information Systems,
Montclair State University,NJ.

ABSTRACT

This paper presents a systems approach to launching a mobile computing initiative in the school of business of a public university. The vision of this initiative is that all students, irrespective of their economic status, have a mobile computing device capable of interfacing with instructional delivery systems within the University computing network and on Internet from anywhere (classrooms, residential halls, library, and others). This will enable students and faculty to exploit the capability of technology to transform the learning process inside and outside the classroom. Because the majority of the students that the university draws belong to families with modest means, the cost burden that this initiative would add was a key issue. The paper identifies the constraints of the initiative, explains how each was addressed, and presents the logic of the approach. We conclude with a set of hypotheses to measure the effectiveness of our decisions.

INTRODUCTION

Technology has become a key part of students' experience in the classroom starting from the use of Power Point slides by instructors to WebCT or Blackboard as repositories of class material and tools for communications among students and instructors, to the delivery of lectures in computer labs. . Many colleges and universities already require their students to bring a laptop to the classroom. Many institutions are in the process of making it a requirement. This paper presents a systems approach that was followed to launch a mobile computing initiative in the school of business of a public university. The vision of this initiative was that all students have anywhere, anytime access to technology as a significant support to learning. This would enable students and faculty to exploit the capability of technology to transform the learning process. The success of this initiative depended on how well technology was integrated in the classroom, and on whether the students perceived and accepted the value of the laptop experience the pedagogical value of the laptop requirement, affordable technology (to students) and the IT infrastructure that met the new needs. This article identifies the constraints and explains how each was addressed and explains the logic of the approach. We conclude with a set of hypotheses to be tested.

Background

Laptops are becoming a requirement in higher education. According to Ray Brown of Worcester State College [1], about 224 colleges and universities in the USA have some kind of laptop requirement. A quick review of these institutions' efforts in this area reveals that the institution itself must be instrumental in making the requirement happen. However, there is a great variation in the level of involvement by the universities and colleges. On one end of the spectrum is the ubiquitous computing model in which the laptops are procured by the institution (from vendors) and distributed (to students). The university provides technical support as well. The cost of hardware, software, warrantee and support is added to the tuition. We call this model the university- centric model as the university is taking the total responsibility of all aspects of provisioning and supporting the requirement. Seton Hall University, for example, uses this model.

The main benefits of this model are operational simplification, and convenience to students that are derived from the simplification of the configuration and

The support needed since everyone has one type of laptop with standard (common) hardware, software and networking specifications. The student compliance with a laptop requirement is the highest. However, on the down side, this model is expensive and when added to the tuition may create a serious affordability issue for the students. In some cases, as was the case in this university, increasing the tuition for a laptop was not an option. Other issues with this model are the initial investment needed (on the part of the university) and students' complaints from those who already had one. On the other end of the scale is a model in which students are given full responsibility for buying and maintaining a laptop with little or no university involvement. This method simplifies things for the university as it requires only minimal work by the university. Most of the responsibilities fall on the students. We call this model the student-centric model. Then, there are many variations in between. For example, the University of Rhode Island's RAM model [2] does not include the computer cost in the tuition but offers the entire package (hardware, software and support) on an optional basis; in other words, buying from the school is not mandatory. We recommended the student-centric model for this public university.

Methodology/ Process To Launch The Mobile Device Initiative

We applied the systems development life cycle (SLDC) approach [3] to this initiative.

Planning

This initiative was undertaken at the directive of the university Provost as part of the newly adopted strategic charter of the university under the goal of "embracing the pervasive and transforming use of technology". The objective of this initiative was to enhance student's classroom learning and improve their (students') skills for the work place. The overriding concern was what kind of financial burden this would impose on students and whether students would perceive the benefits and accept the requirement. The project was broken down in the following major activities that had to be addressed:

- Formation of a Steering Committee
- Formulation of Laptop and Implementation Strategy
- Students' Input
  - What type of mobile device?
  - Laptop Strategy
- Formulation of Operations Strategy
  - Mobile Device Acquisition Strategies
  - Refresh, Repair and Support Strategy
- High Level Requirements, scope and Constraints
- Feasibility Analysis
- Mobile Device Selection
  - Hardware, Software and Networking Reqts.
- Operational Aspects of laptop initiative
- Vendor Selection/Procurement
- Advertisement and Marketing
- Pedagogical Aspects of Mobile Computing

Forming a University-wide Steering Committee

We first decided to conduct a stakeholder analysis to determine who should be part of the university-wide steering committee. We decided that constituents that should be represented in the steering committee are the academic department that would pilot the initiative, Business School Dean's Office, Provost's Office, Office of the Dean of Students, Office of Information Technology, Procurement Office, Financial Aid Office and Registrar Office. The charter of this steering committee was to define a mobile device policy that was acceptable to all stakeholders.

Formulation of Laptop and Implementation Strategy

Getting Initial Customer Input As part of developing a strategy to launch this initiative, a student survey was conducted. This survey showed an overwhelming (90%) support for the laptop. Those who did not support the requirements did so because of the cost concerns. Many students cited the reduction of computer labs congestion as the biggest advantage and the cost of buying a laptop was their biggest concern. Many thought leasing might reduce the financial pain.

What kind of Mobile Device? The choice fell between two types of mobile devices laptop or tablet PC. The tablet PCs, though very appealing from the portability point of view, did not get favorable response from students. In fact, students found the writing capability of tablet PC unattractive as they can type faster than they can write. Also, tablet PCs were more expensive compared to equivalent laptops and lacked the sufficient number of ports. Hence, it was decided that laptop was going to be the mobile device of choice for this university.

Laptop Policy and Implementation Strategy The steering committee concluded that since the tuition had been raised recently, another increase to cover the cost of a mobile device was not a feasible option. This implied that the student would be responsible for the laptop purchase with minimum university involvement. This choice made the 100% compliance an issue as the acquisition of laptops by students could not be guaranteed. The steering committee decided (due to enforcement related issues) not to have any administrative penalty for non-compliance, but instead, to rely on the value driven compliance, i.e., students would see the value of having a laptop in the classroom. This value assessment would take place over a three semester period. A laptop in the classroom would be "nice to have" in the first semester, "highly recommended" in the second semester, and a "must have" in the third semester. However, some students were exempted from this requirement. Students who needed only 12 hours or less to graduate were exempt. Students taking 3 to 6 hours each semester were also exempt from this requirement. A mobile computing lab consisting of 30 laptops was available for these students. To expand the laptop requirement to the entire university, it was decided that it would be first applied to the pilot department, then to the business school and then to other schools and colleges in the university. All these plans were contingent on a successful pilot.

Financial Aid and Ease of Payment The financial aid office informed us that the amount of financial aid could be increased by $2500 to cover for laptop related expenses. Also, the committee decided that one of the criteria of vendor selection would be that the vendor provides flexibility in making payments. [We had checked that such plans were being offered by many vendors.]

Formulation of Operations Strategy

The next policy decision that the steering committee made was related to the operational aspects of this initiative - specifically, the university's role in laptop acquisition and distribution, and in providing on-going support (refresh, repair and other support). There are two prevailing models here. In one, the university takes responsibilities for all these functions and in the second model, it selectively chooses whatever functions it wants to support including not supporting anything. The university bookstore gave us ballpark charges for the acquisition and distribution. And, the IT department did the same for the support functions. The alternate strategy was to let outside vendors provide these services. A value analysis was done to determine what value bookstore and the IT department would add in providing these services. The conclusion of this analysis was that it (the added value) was marginal (since vendors could provide these services free or cheaper bundled with the sale of laptops) and did not justify increasing the overall cost of this initiative for students. On the refresh policy, the committee decided on a no-refresh policy (i.e. the hardware would not be upgraded during a four-year period.) This policy had implication for the hardware requirements that would be discussed next.

Software Licensing Issue:

In pricing of the software, we ran into two software licensing issues - whether the university educational licenses applied to student laptops, and whether a vendor could charge lower educational prices that are generally available to teaching institutions. The answer to the first question was no and to the second, yes. The second answer helped bring down the cost

High Level Requirements, Scope and Constraints

The criteria for the laptop were quite straightforward. It should be portable (light) and have battery power to last 4-6 hours (charging during the class was not an option due to the lack of sufficient number of electrical outlets). It should be wireless. It should be affordable (preferably

around $1K but less than $2K). The device should be fast with enough memory. It should have a CD read and write drive. It should have serial and parallel ports so that it could be connected to other devices (a printer, for example). And, above all, the hardware should be on the high end of the speed and memory because of the no-refresh policy, i.e. it should not become outdated in less than four years. To accommodate the no refresh policy the technical requirements were stated as minimum requirements; that is, for example, the process or speed should be at least 1.6 GHz, but a faster process will be even better. Because the selected vendors were going to distribute the laptops and provide support, it was important that they be near the campus (within 5 miles). The preferred vendor must satisfy these requirements:

- Close to university for management and support
- Represents a variety of vendors
- Provide quality customer service
- Willingness to support the marketing process
- Reasonable pricing

Feasibility Analysis

Going into this initiative, a major feasibility question was whether the university's IT infrastructure would be able to support this initiative. Specifically, were there enough wireless access points around the campus (various buildings, student center, parking lots, open areas in between the buildings where students congregate) and was there enough bandwidth in the backbone network to support the extra traffic created by this initiative. The task of answering these questions was assigned to the IT department, which, after an analysis, assured the committee that the university's IT infrastructure was fully capable of supporting this initiative. No other issues were seen as showstoppers.

Analysis:

Requirements Formulation Hardware

The high level requirements for the hardware defined during the planning phase were sufficient for looking for laptop models that would meet those requirements. We specified minimum configuration that included the speed of Centrino processor, 1.6MHz, memory of 512MB, hard drive of 40GB, and a DVD/CD RW drive.

Software

Defining software needs were a bit tricky. We divided the requirements in two categories common and discipline specific. We polled various departments to determine both needs. The common software package requirements were XP professional operating system, Microsoft Office XP, Roxio easy CD creator/burner, WinZip, and WS_FTP. Much of discipline specific software was available in the text books.

Networking

We added one specific networking requirement of having a built-in network card, 802.11b/g, (instead of a separate network card) to eliminate the potential problems of losing, misplacing the network card.

Design of Alternate Solutions and Selection of Laptops and Vendors

Recognizing that there were many suppliers and many laptop models that could meet the requirements, we primarily focused on the cost and convenience (of purchasing and maintenance). First, we narrowed our search to three laptop manufacturers HP, IBM and Toshiba. Being a state school, we checked first with the procurement office if we needed to go through an open bid process before selecting retail vendors (suppliers). We were advised that we did not need to. Then, we analyzed different sources and compared their prices. The interviews with potential vendors led to deal breakers: high price of on-campus bookstore, vendors with limited product lines, and vendors with limited service solutions. Finally, we selected a local retailer that was a couple of miles from the campus. Negotiating with this vendor led to the selection of IBM T40 that met all our requirements and price point. We recommended this model fully realizing that student may buy other equivalent or higher models. But, we thought selecting a laptop was important to give students something concrete to compare and shop.

Implementation

As part of implementation, we defined the laptop

delivery process, payment process and marketing process.

Delivery and Payment Process

In order to reduce the cost, we did not have a campus distribution of laptops. Students went to the vendor shop and ordered an "X X University laptop" after showing their student card. The vendor imaged the laptop with the software packages on the list. The vendor offered a six-month no interest payment option. Students could also use their credit cards. Those getting financial aid paid for the laptop from that money. The university did not have any financial liability. The vendor also agreed to give a 15% discount on other computer related accessories. The vendor would also image the laptops bought elsewhere or already owned as long as the software was being bought from the vendor's store. Once ordered, a fully configured laptop was available in a week, except for the peek period (beginning of a semester) when it could take two weeks.

Advertisement and Marketing

We adopted three methods to inform students of the laptop policy, its benefits and other necessary information to purchase a laptop and the needed software. These were letters, emails and face to face information sessions. We also loaded all this information on the website of the university. Faculty members were made aware of the initiative at the staff meetings and were urged to revise their course presentation to align with the availability of laptops in the classroom.

Maintenance and Support

A 3-year maintenance warrantee was included as part of the recommended package. Students could buy additional insurance to cover breaking of the screen. Since most of the support issues are software related, students will get a real-time support (while they wait). The hardware-related problems will involve shipping. A 24-hour turnaround time was promised in such cases.

Post-implementation:

Key Learnings

The laptop policy has been in effect in the pilot department for a semester now. We have not heard any major horror stories. In fact, it has been almost too smooth. We have been collecting anecdotal data from students and also conducting surveys. An analysis of the survey data will be presented in a separate paper. Below, we present some of the key anecdotal data that we have gathered so far.

- Tuition support vs. self-fundingstudents liked the idea of softening the hit, but purchased anyway. No notion of importance of vendor financing
- Phase-in (over a three semester period) not necessary, but must give plenty of notice

  Financial aid was not a significant incentive.
- Flexible standard vs. rigid - allowed options in purchasing, especially in price
- Many students welcomed the laptop requirement as a prod to get a laptop they wanted anyway
- Use in classroom, except for strictly hands-on courses, was not a driver
- Package of information announcing requirement was important, but information sessions were not. They were not well attended.
- Vendor options facilitated the process, but having a vendor nearby was really valuable.
- University malware practices were transparent and appreciated by students
- Ubiquitous mobility on campus was a big plus.
- Upgrade commitment was not an issue. Students tended to buy way above the minimum specification
- Support/maintenance has not be an issue not much of it, university handling routine work

Conclusion And Further Work

This paper has focused on the process that we used to launch a mobile computing device initiative. We have addressed how we went about finding a solution that would meet all the constraints such as the reluctance to increase the tuition to cover for the laptop, the low financial affordability level of our students. The paper also shares some of the early observations about the initiative. The plot has been considered a success and now the

requirement is being extended to the business school. Other schools in the university will follow the suit. The success of this initiative eventually depends on how well technology is integrated into the classroom instruction, and on whether the students perceive and accept the value of laptop experience.

The next phase of this project consists of testing out assumption made during the formulation of this policy. We are already seeing that certain assumptions did not matter.

The other aspect of research is aimed at testing and verifying the above pedagogical assumptions. The anticipated outcomes of this proposal are to come up with the innovative formats of using the laptop in the class and around the campus, to develop the ways to implement them and measure their effectiveness. Surveys will be designed to measure the attitude of students and faculty towards the new formats, their implementations and the ways to measure the success. The results of these surveys will be used in adapting them in the classroom.

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ABOUT THE AUTHORS

Dr. Ram B. Misra is an Associate Professor in the Department of Information and Decision Sciences in the School of Business., Montclair State University, USA. Dr. Misra was an Executive Director of Strategic Business Development at Telcordia Technologies (formerly Bell Communications Research). He has over 24 years of telecom industry experience that spans Bell Labs, Bell Communications Research and Telcordia Technologies. He received his Ph.D. in Operations Research from Texas A&M University, College Station, Texas. He received MBA from Columbia School of Business, New York. Dr. Misra has a number of publications in IEEE Transactions, the International Journal of Management Research, the International Journal of Production Research and the Naval Logistics Review. He can be contacted at misrar@mail.montclair.edu

Dr. Richard Peterson is an Associate Professor and Chairperson of the Management and Information Systems department in the School of Business, Montclair State University. Dr. Peterson received his Ph.D. from Pennsylvania State University in 1974. Peterson's current research interests are focused on factors of technology adoption, course/instructor assessment strategies, and business continuity planning. He can be reached at petersonr@mail.montclair.edu