

How Faculty Use Information Technology at a Small Liberal Arts College: A Case Study

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ABSTRACT

Colleges and universities have made large investments in Information Technology resources and support personnel for those resources. One goal of this technology initiative has been to supply faculty with computers to enhance productivity and integrate technology into the curriculum. However, there is little or no information on assessment of these resources including the frequency of use, how users are utilizing these resources, ability levels of different faculty, faculty preferences for different types of computers and whether college-owned computers are able to meet the computing needs of faculty. We studied the computing habits of faculty across all academic departments to answer some of these questions.

We found that 100% of the faculty surveyed were using their computers on a regular basis in their teaching, scholarship and committee work. A majority of faculty were using their computers for word processing, web browsing and e-mail. Faculty vary in their preferences for desktop versus notebook computers or Apple versus Windows platforms. We feel this is useful information for IT personnel for planning support and training programs. It is useful for administrators involved in planning and budget decisions. It is our intent to make public issues we have experienced at our institution and share them with other small colleges that are going through similar growing pains with developing plans for IT on campus.

Keywords

Information Technology, faculty, faculty computing habits, computer survey, planning and budget, computer usage, computer platform preferences, software preferences.

1. INTRODUCTION

The explosive growth in Information Technology (IT) and the World Wide Web (WWW) has had a significant impact on computing and the role of technology in the curriculum at most colleges and universities. Although the number of schools that have launched campus-wide computer initiatives is small [3], some institutions have made considerable investments in IT including infrastructure for campus networks, Internet connectivity, multimedia classrooms and computer laboratories, desktop computers for faculty and administrators and an IT staff to support these resources. Upgrade programs to replace aging hardware have followed initial purchases of hardware and software or computers that have become obsolete because they lack RAM, processor speed and hard disk space. Upgrade programs like *leasing* or *purchasing to own* are expensive, but necessary. Some institutions have also required their students to lease/purchase computers from the college or come with a personal computer of their own that meets some predetermined minimal configuration for use on the campus network [2]. The reasons for making these large IT investments vary among institutions but there are several reasons common to almost all colleges. Investing in IT has been driven by the development and popularity of the World Wide Web (WWW) where courses and course materials are rapidly migrating [8]. There is a national trend to integrate technology into the curriculum through the WWW using the Internet and Intranets [1]. The concept of the 1980's and 1990's of *Writing Across the Curriculum* is rapidly being replaced by *Computing Across the Curriculum*. This includes the curriculum of all academic departments on campus as well as the development of distance education programs for the off campus market. This also maintains a competitive advantage with other institutions and attracts prospective students. Some other important reasons for investing in IT include enhancing user productivity through the use of technology, improving knowledge management and communication among users on and off campus.

Although IT expenditures are large and long term, few institutions (i.e., Drew University - see [4]) have conducted any assessment of their purchase programs, studied the computing habits of computer users across the curriculum or used this information in planning IT budgets. Colleges do not know if IT investments have been successful or if the investments address the specific needs of their users. These questions both apply to computing at the administrative and faculty levels. We decided to survey the computing habits of all faculty to find out how this segment of the campus community uses IT. We distributed a

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paper questionnaire to every faculty member and also created an alternative online form of the same questionnaire (<http://www.anselm.edu/homepage/jpitocch/survey1.html>). The survey results would provide information about computer use from all academic departments. We thought the results of this survey would be useful for two reasons. First, the College could assess the success of the original faculty desktop purchase program in early 1990's when it purchased desktop computers and software for all full time faculty. Most departments also received network printers. Two goals of this purchase program were 1) to foster the development of the integration of technologies into the curriculum and 2) support research and enhance scholarly productivity. Results from the survey would provide information about whether faculty have the resources and ability levels to achieve these goals. The results of the survey would also be extremely valuable for planning. Factoring in the diversity of faculty uses of IT would provide information for planning IT budgets, developing help desks, software training and other types of support programs.

We also wanted to share our experience with other institutions that are undergoing similar experiences but do not know how technology is being used by a large segment of the college community. Our results could be used as a model from which to compare how IT resources are used at other, similar small liberal arts colleges. According to Burg and Thomas [3], only a few colleges and universities have initiated the development of campus-wide computing programs connecting faculty, administration and the students into a single electronic community. Our results could also be used as an example of studying general issues regarding faculty computing across all academic departments. Although it is essential to study and assess the impact of implementing new technologies within in a single course or academic department, it is even more important to understand issues across campus concerning all academic departments such as: which departments are using computers, how are all faculty using computers, what are their perceived needs and how do faculty feel their computing needs could be met.

1.1 Background

Saint Anselm College is a small liberal arts college in southern New Hampshire with 2010 students and 112 full time faculty. Students are not required to have their own computers but there is a *port for every pillow* in the student dorms. In 1993, the College purchased desktop computers for all full time faculty in an effort to enhance productivity and integrate new technologies into the curriculum. The College decided to support PC and Apple desktops so the faculty was given a choice of which platform they wanted to use. In addition, the college has installed a fiber-optic network connecting all buildings to support computing and communication for the campus community. Due to the ever-changing needs of faculty and how they use information technology, it was decided that the college should put a plan into action that periodically upgrades desktop computers. Discussion ensued on how this upgrade plan would be implemented. We thought it would be prudent to find out how faculty from all disciplines use their computers before deciding on an upgrade plan.

2. METHODS

We used a computer survey to assess how the faculty uses computer hardware and software to accomplish their work. We wanted to answer five questions regarding computer usage by faculty. 1) Who is using computers on campus (by Department and by gender)? 2) What is the faculty currently using their computers for? 3) Do the faculty feel their current machines are adequate? 4) What type of computer would they prefer - desktop or laptop models? 5) Which type of desktop system would they prefer - PC or Apple? We designed the survey to answer these and other questions about faculty usage. A copy of the complete survey can be found and viewed on the World Wide Web at <http://www.anselm.edu/homepage/jpitocch/survey1.html>.

We analyzed the data by conducting frequency analyses of answers to different questions on the survey. We constructed bar charts for some of the most important questions on the survey mentioned above and have presented those here. We also analyzed which departments responded to the survey.

3. RESULTS

Our response rate was 48.2% or 54 out of 112 full time faculty. We considered this a high rate compared to the range of 10% - 20% for direct mail marketing surveys [6]. It is close to the norm of 50% for most studies in the social sciences [7]. The first part of our study addressed the demographics of who filled out the survey. We were interested in responses by Department and by gender. Thirty-seven males (68.5%) versus 17 females (31.5%) answered the survey. This closely represented the composition of full time male and female faculty on campus, which is 60.7% and 39.3% respectively. We received completed surveys from at least one faculty member from each of 19 Academic Departments. These results indicate that faculty from all academic departments considered faculty computer use an important enough issue to answer the survey. It also showed that the issue was as important for both male and female professors.

We analyzed how the faculty uses their computers at two levels. At one level, we wanted to know how faculty used technology to accomplish the three obligations for which they were evaluated for tenure, promotion and community service. Figure 1 shows that an overwhelming majority of faculty used their computers in teaching (53/54=98.1%) and research (51/54=94.4%).

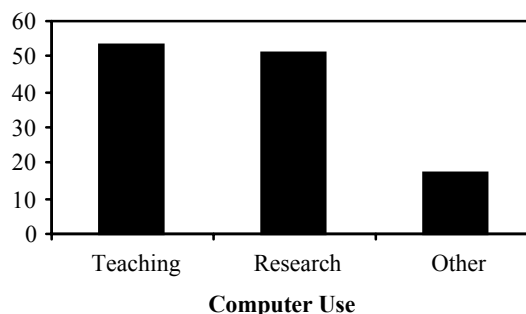


Figure 1. How faculty use their computers

Seventeen or 31.5% said they used their computers for other purposes such as community service, committee work, creating annual reports, communications, work with professional societies, work with student organizations and personal use (Figure 1). These results indicate that the initial faculty purchase was a clear success. Nearly 100% of the faculty used their computers in teaching and research which was one of the goals of the original purchase program. A corollary to this is that faculty have probably also become very dependent on software and hardware. They have begun to create large numbers of electronic records (i.e., computer files) of their teaching and research. This means that upgrades are an inevitable consequence of the initial purchase.

At a second level we asked faculty what kinds of software they used. There was an obvious trend in software usage with 100% of the faculty surveyed using word processing, web browsing and e-mail software. The numbers drop to 27.8% - 37.0% of faculty using presentation, spreadsheet, database, statistics and other software (Figure 2).

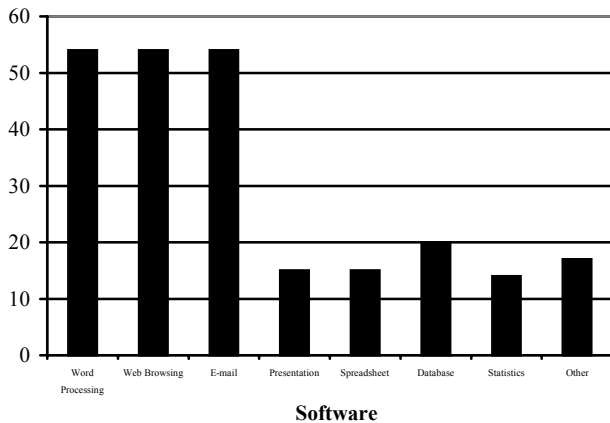


Figure 2. Software use by faculty.

The *other* software faculty used fell into two general categories. The first category was software that supported teaching, which included test generation applications, electronic gradebook programs and educational or tutorial programs on CD ROMs that accompanied course textbooks. The second category was composed of specialized software for faculty and student research. Some of the programs mentioned were mapping programs, digital image analysis software, laboratory data collection software and programming software. Although we did not ask specifically whether faculty used web page construction or other html software, less than five faculty indicated they had used it. Very few faculty are currently using the network (web) as a tool to disseminate course information and virtually none are using it as an interactive medium to engage their students and promote collaborative learning. This information reveals some important trends. 1) Faculty use a rich diversity of software applications. 2) However, most faculty only use word processing, e-mail and web browsing software. The majority of remaining applications is used by a small number of faculty. 3) Very few faculty are using software to promote the

web as a communications interface to enhance their curriculum or allow them to disseminate information to other colleagues about research. For the most part, St. Anselm faculty think of their desktops as stand-alone machines and appear not be taking advantage of the local intranet now in place on campus or the vast resources of the internet off campus. These results parallel the findings of Candiotti and Clarke [4] who studied faculty software use at Drew University prior to planning a faculty development program emphasizing integration of technology into the curriculum. A majority of Drew University faculty also used the basic programs but relatively few used courseware or online information resources.

It was difficult to survey whether current desktop computers meet the needs of the faculty because there is a diversity of faculty desktop computers on campus and some departments have recently been upgraded while others have not. Apple operating system computers ranged from Macintosh LC 475s to Power Macintoshes with 603e or 604e processors. Windows operating system computers ranged in power from 386 processors to Pentium processors. Figure 3 is frequency distribution of these different types of computers across campus.

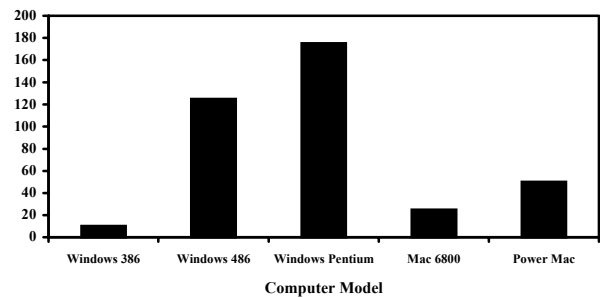


Figure 3. Distribution of different computer models across campus.

Many desktop computers have been upgraded to higher end models but there are still many older and obsolete models in use. While 50% of the faculty said their computers were not powerful enough to meet their computing needs, 46.3% felt their current computers did meet their needs. The remainder were not sure (Figure 4).

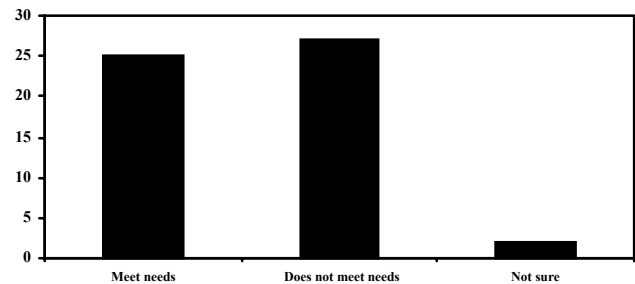


Figure 4. Faculty opinions on whether current computers were adequate enough to meet their computing needs.

These results reveal 50% of the faculty feel they need new computers. These mixed results could be very useful for planning IT budgets.

Different institutions have selected different options when selecting notebook versus desktop computers for their faculty [3]. The original faculty purchase program here, and all subsequent upgrades, have only been for desktop computers. However, many faculty replied that they would also like to use or have access to notebook computers. In fact, most faculty, 38.8%, preferred having both a notebook and a desktop computer, followed by desktop only at 31.5% and notebook only at 20.4% (Figure 5).

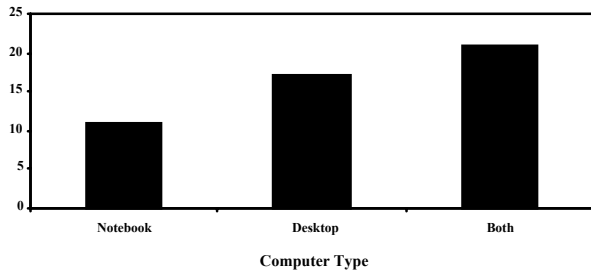


Figure 5. Faculty preferences for notebook versus desktop computers.

One persistent question on most campuses is whether to support a single computing platform versus a multiplatform environment. Two of many important considerations are 1) the costs involved in supporting either of these alternatives and 2) the effects of each alternative on faculty productivity in the classroom and their research. We surveyed faculty preferences for operating systems. We found that faculty were nearly equally divided among which operating system they preferred. A majority, 46.3%, preferred computers running the Windows operating system. Apple computers were preferred by 37% of the faculty. A minority of 13% preferred having one of each different computer (Figure 6).

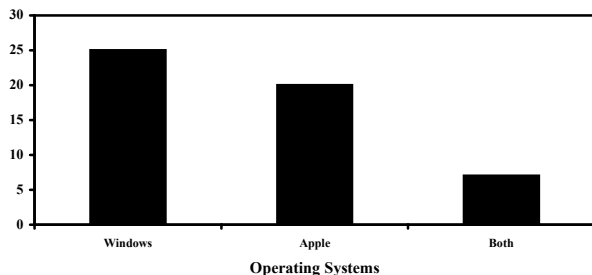


Figure 6. Faculty preferences for computers running Apple versus Windows operating systems.

This evidence shows that there are two camps of users with distinct preferences for two different operating systems and that a few faculty are interested in learning both operating systems. This is probably typical of most colleges and universities. This is valuable information for choosing single versus multiplatform computing environments. With this information, IT personnel could estimate the amount of work needed to support faculty in multiplatform versus single platform environments. It should also have an impact on decisions about student computing requirements. Many colleges with multiplatform environments have established minimal requirements on processor speed, RAM, internet connectivity, hard disk size, etc., but not computer platform. The other extreme is to adopt the ThinkPad University paradigm in a single platform environment. It is critical to be aware of each of these variables when making decisions about computer platforms.

4. CONCLUSIONS

Our survey has provided some important trends in faculty use of computers at a small liberal arts college. The comparatively high response rate of faculty has shown that most faculty are using the computers provided by the college. Computer use was also universal across disciplines, with at least one faculty member from every academic department responding to the survey. The unanimous use in teaching and research is an initial indication that faculty are using computers to enhance productivity in the areas of teaching, scholarship and community service which was one of the original goals of the faculty desktop purchase program. The results of this preliminary assessment is a confirmation that the desktop purchase program by the College was successful.

The College made a large investment in infrastructure and the fiber optic campus network. The next step is to integrate technology and information that can be accessed from the network into the curriculum. This is part of the five-year plan to further enhance and develop the curriculum of Saint Anselm College for the next millennium. Integration of technology into the curriculum is being encouraged for several reasons. 1) It will enhance and enrich courses by adding a new medium of electronic delivery of information to students. Professors will add technology to traditional lecture, text and audio-visual media to deliver information to students. 2) The incorporation of technology into the classroom will enhance the communication component of education by utilizing asynchronous and synchronous communication tools (e.g., electronic discussion forums, virtual meeting places, collaborative team environments). 3) Exposure to technology in the classroom will better prepare students for the collaborative, team oriented career environment of the 21st century. 4) Knowledge of technology will provide students with an arsenal of electronic tools for research in graduate programs or professional schools. 5) Students exposed to technology in the classroom will also have computer experience and experience searching for, managing and processing electronic information.

One of the first steps towards integration of technology into the curriculum is to understand how faculty use computers and whether they have the necessary resources and background to implement technologies into their courses and research. The

results of our computer survey have revealed how faculty use computers and whether current computers meet their needs. Most faculty are still using basic software like word processing, web browsing and e-mail suggesting there is a dichotomy of computer users. There is a minority of *sophisticated* users that have branched out to explore other software applications for use in their teaching and research. There is a majority of *basic* users that utilize the three basic applications mentioned above. There were only five faculty reporting integration of technology into their courses. One reason may be due to the fact that most of the faculty are not inclined or have the expertise to design and develop content for the web. This could be due to the fact that most of faculty at the college did not academically “grow-up” with networked computers to see the potential they have to enhance the standard classroom lecture and laboratory experiences. Faculty are simply not aware of the potential uses of the web as an instructional tool.

To open this communications medium we need to make faculty aware of the possibilities of using IT resources in their courses. There are several ways to accomplish this. One is training through faculty development workshops. The College is currently working with the New Hampshire Consortium of Universities and Colleges which has been awarded a grant from the Davis Foundation to help member institutions develop faculty training programs. Another is providing an organized shell into which faculty can simply plug their academic elements (see Wake Forest example in [2], Blackboard, WebCT). Some institutions have developed technology institutes for faculty. The Sandbox, developed at Acadia University [5], is an excellent model of a training and support institute for faculty opting to use technology in their courses. Our results point out that a majority of faculty will need training and support on courseware and software for developing online resources as part of the initiative to foster the integration of technology into the curriculum. This is most likely true of most colleges and universities.

This information can also be used by IT personnel who must support technology resources among administrative and academic departments. Identifying the most popular software on campus could be useful for developing a standard set of supported software and strengthening help desk support. Our results identified the most commonly used software as e-mail, word processing and web browsing. These would be applications we would recommend to IT as help desk priorities.

Choosing computers for faculty is a complex task that requires input from users at three different levels: 1) computing power - adequate hardware with fast processor speed, RAM, hard disk space to use memory hungry software needed to implement technology into the curriculum (e.g., web page development software, sound, image and video editing software, etc.); 2) choosing a desktop versus a notebook/PowerBook; 3) platform (see above). Our survey results have shown that perceived computing needs of faculty are diverse. Some faculty felt their current computers were adequate while others needed upgrades. Some faculty wanted desktops versus notebooks or access to both. Different faculty came to the College with different computing backgrounds. Some prefer Apple while others prefer Windows and some needed to or would like to use both.

We have dealt with some practical examples of considerations that need to be factored into planning IT budgets.

They are intimately tied to money issues and the impact of the IT budget on the annual operating budget of the college. However, there are also important conceptual and philosophical issues that need to be integrated into planning IT budgets. For example, how does computing and IT fit into the mission of a small liberal arts college? Should students be required to purchase or lease computers? If they are required to purchase/lease computers, what is the institution offering them in return for this requirement over and above web browsing and e-mail (e.g., online course support, distance education, etc.)? How would a computer requirement for students influence the platform and types of computers purchased for faculty? It is beyond the scope of this paper to answer these questions but they should be considered along with the practical issues during IT budget planning.

Finally, we offer some suggestions regarding the planning process at two different levels. At a practical level we mention some alternatives for large purchase programs for faculty computers. IT resources are expensive but necessary because computers are becoming standard equipment at all academic institutions [2]. At the same time, budgets at many small liberal arts colleges are tight and the administration must invest in IT carefully, making sure they get the most out of their investment. However, the strategy at our college, and most other institutions, is to purchase computers without any assessment of computer usage. This often results in the purchase of a generic desktop model for all faculty with some minimal configuration that can run word processing, Internet browsing and e-mail software. Based on the diversity of users' need we found in our study, there are numerous alternatives that could be considered here. One approach is to purchase more powerful computers for the sophisticated users and generic models for the basic users. Another option is to purchase the generic model for all users but also set up special faculty computing labs with a few high-end machines that could be used by all faculty. A third alternative is to adopt a client-server based approach for high powered applications used by a small number of users (e. g., statistical software like SAS, SPSS, BMDP). Cost comparisons made between these different options would be very valuable to the budget and planning process.

At a second level we strongly suggest improving communications between IT personnel and users. We have two different constituencies with little or no experience in each other's areas of expertise. How would IT personnel really know what faculty need for teaching and research? How would faculty know what IT resources are available to meet their needs? IT personnel do not know, and are not expected to know, all the details regarding how computing is used in teaching and research in the sciences and humanities. Faculty are expected to know the content of their discipline but not the latest technological advances in computer hardware and software. Academic departments need help from IT personnel in planning and budgeting for IT resources. IT personnel need help from faculty in understanding the curriculum and how IT resources might serve those needs. The solution to overcome this communications gap is to evaluate users' needs on a consistent basis. A survey of users is helpful in revealing user needs but it is less personal. One alternative is to assign a member of the Office of IT to one or several academic departments as a liaison who regularly discusses IT issues and needs with each department. Another option would be to have a faculty member in each department act as a resource

person, working directly with IT personnel, communicating academic needs and enlisting support. These latter two options provide a direct conduit between the Office of IT and the users. These, or other paradigms, could also be extended to reach the remainder of the academic community including administrative departments and student organizations. The most important goal is to overcome the communications gap, share our areas of expertise and use this to budget more efficiently. It is somewhat ironic that the biggest problem here is a lack of communication which is one of the primary uses of computers today. We strongly recommend surveying users about the perceived needs and current uses to better understand how users operate in an academic environment and to better support them.

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