Student Use of Library Computers: Are Desktop Computers Still Relevant In Today's Libraries?

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ABSTRACT

Academic libraries have traditionally provided computers for students to access their collections and, more recently, facilitate all aspects of studying. Recent changes in technology, particularly the increased presence of mobile devices, calls into question how libraries can best provide technology support and how it might affect the use of other library services. A two-year study conducted at California State University San Marcos library analyzed student use of computers in the library, both the library's own desktop computers and laptops owned by students. The study found that, despite the increased ownership of mobile technology by students, they still clearly preferred to use desktop computers in the library. It also showed that students who used computers in the library were more likely to use other library services and physical collections.

INTRODUCTION

For more than thirty years, it has been standard practice in libraries to provide some type of computer facility to assist students in their research. Originally, the focus was on providing access to library resources, first the online catalog and then journal databases. For the past decade or so, this has expanded to general-use computers, often in an information-commons environment, capable of supporting all aspects of student research from original resource discovery to creation of the final paper or other research product. However, times are changing and the ready access to mobile technology has brought into question whether libraries need to or should continue to provide dedicated desktop computers. Do students still use and value access to computers in the library? What impact does student computer use have on the library and its other services? Have we reached the point where we should reevaluate how we use computers to support student research?

California State University San Marcos (CSUSM) is a public university with about nine thousand students, primarily undergraduates from the local area. CSUSM was established in 1991 and is one of the youngest campuses in the 23-campus California State University system. The library, originally located in space carved out of an administration building, moved into its own dedicated library building in 2004. One of the core principles in planning the new building was the vision of the library as a teaching and learning center. As a result, a great deal of thought went into the design of technology to support this vision. Rather than viewing technology's role as just supporting access to library resources, we expanded its role to providing cradle-to-grave support for the entire research process. We also felt that encouraging students to work in the library would encourage use of traditional library materials and the expertise of library staff, since these resources would be readily available.[1]

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Rethinking our assumptions about library technology's role in the student research process led us to consider the entire building as a partner in the students' learning process. Rather than centralizing all computer support in one information commons, we wanted to provide technology wherever students want to use it. We used two strategies. First, we provided centralized technology using more than two hundred desktop computers, most located in four of our learning spaces: reference, classrooms, the media library, and the computer lab. Three of these spaces are configured like information commons, providing full-service research computers grouped around the service desks near each library entrance. In addition, simplified "walk-up" computers are available on every floor. The simplified computers provide limited web services to encourage quick turnaround and no login requirement to ensure ready access to library collections for everyone, including community members. The other major component of our technology plan was the provision of wireless throughout the building, along with extensive power outlets to support mobile computing. More than forty quiet study rooms, along with table "islands" in the stacks, help support the use of laptops for group study. However, only two of these quiet studies, located in the media library, provide desktop computers designed specifically to support group work.

In 2009 and again in 2010, we conducted computer use studies to evaluate the success of the library's technology strategy and determine whether the library's desktop computers were still meeting student needs as envisioned by the building plan. The goal of the study was to obtain a better understanding of how students use the library's computers, including types of applications used, computer preferences, and computer-related study habits. The study addressed several specific research questions. First, librarians were concerned that the expanded capabilities of the desktop computers distracted students from an academic and library research focus. Were students using the library's computers appropriately? Second, the original technology plan had provided extensive support for mobile technology, but the technology landscape has changed over time. How did the increase in student ownership of mobile devices—now at more than 80 percent—affect the use of the desktop computers? Finally, did providing an application-rich computer environment encourage student to conduct more of their studying in the library, leading them more frequently to use traditional library collections and services? This article will focus on the study results pertaining to the second and third research questions. We found that, according to our expectations, students using library computer facilities also made extensive use of traditional library services. However, we were surprised to discover that the growing availability of mobile devices had relatively little impact on students' continuing preference for library-provided desktop computers.

LITERATURE REVIEW

The concept of the information commons was just coming into vogue in the early 2000s, when we were designing our library building, and it strongly influenced our technology design as well as building design. Information commons, defined by Steiner as the "functional integration of technology and service delivery," have become one of the primary methods by which libraries provide enhanced computing support for students studying in the library.[2] One of the changes in libraries motivating the information-commons concept is the desire to support a broad range of learning styles, including the propensity to mix academic and social activities. Particularly influential to our design was the concept of the information commons supporting students' projects "from inception to completion" by providing appropriate technologies to facilitate research, collaboration, and consultation.[3]

Providing access to computers appears to contribute to the value of libraries as "place." Shill and Toner, early in the era of information commons, noted "there are no systematic, empirical studies documenting the impact of enhanced library buildings on student usage of the physical library." [4] Since then, several evaluations of the information-commons approach seem to show a positive correlation between creation of a commons and higher library usage because students are now able to complete all aspects of their assignments in the library. For example, the University of Tennessee and Indiana University have shown significant increases in gate counts after they implemented their commons.[5] While many studies discuss the value of information commons, very few look at why library computers are preferred over computers in other areas on campus. Burke looked at factors influencing students' choice of computing facilities at an Australian university.[6] Given a choice of central computer labs, residence hall computers, and the library's information commons, most students preferred the computers in the library over the other computer locations, with more than half using the library computers more than once a week. They rated the library most highly on its convenience and closeness to resources.

Perhaps the most important trend likely to affect libraries' support for student technology needs is the increased use of mobile technology. The 2010 nationwide EDUCAUSE Center for Applied Research (ECAR) study, from the same year as the second CSUSM study, showed that 89 percent of students had laptops.[7] Other nationwide studies have corroborated this high level of laptop ownership.[8] So, does this increased use of laptops and mobile devices have affect the use of desktop computers? The 2010 ECAR study reported that desktop ownership (about 50 percent in 2010) had declined by more than 25 percent between 2006 and 2009, a significant period in the lifetime of CSUSM's new library building. Pew's Internet & American Life Project Trend Data showed desktop ownership as the only gadget category in which ownership is decreasing, from 68 percent in 2006 to 55 percent at the end of 2011.[9]

Some libraries and campuses are beginning to respond to the increase in laptop ownership by changing their support for desktop computers. University of Colorado Boulder, in an effort to decrease costs and increase availability of flexible campus spaces, is making a major move away from providing desktop computers.[10] While they found that 97 percent of their students own laptops and other mobile devices, they were concerned that many students still preferred to use desktop computers when on campus. To entice students to bring their laptops to campus, the university is enhancing their support for mobile devices by converting their central computer labs into flexible-use space with plentiful power outlets, flexible furniture, printing solutions, and access to the usual campus software. Nevertheless, it may be premature for all libraries and universities to eliminate their desktop computer support. Tom, Voss, and Scheetz found students want flexibility with a spectrum of technological options.[11] Certainly, they want Wi-Fi and power outlets to support their mobile technology. However, students also want conventional campus workstations providing a variety of functions, such as quick print and email computers, long-term workstations with privacy, and workstations at larger tables with multiple monitors that support group work.

While the ubiquity of laptops is an important factor today, other forms of mobile devices may become more important in the future. A 2009 *Wall Street Journal* article reported the trend for business travelers is to rely on smartphones rather than laptops.[12] For the last three years, Educause's Horizon reports have made support for non-laptop mobile technologies one of the top trends. The 2009 Horizon report mentioned that in countries like Japan, "young people equipped

with mobiles often see no reason to own personal computers."[13] In 2010, Horizon reported an interesting pilot project at a community college in which one group of students was issued mobile devices and another group was not.[14] Members of the group with the mobile devices were found to work on the course more during their spare time. The 2011 Horizon Report discusses mobiles as capable devices in their own right that are increasingly users' first choice for Internet access.[15]

Therefore, rather than trying to determine which technology is most important, libraries may need to support multiple devices. Trends described in the ECAR and Horizon studies make it clear that students own multiple devices. So how do they use them in the study environment? Head's interviews with undergraduate students at ten US campuses found that "students use a less is more approach to manage and control all of the IT devices and information systems available to them."[16] For example, in the days before final exams, students were selective in their use of technology to focus on coursework yet remain connected with the people in their lives. The question then may not be which technology libraries should support but rather how to support the right technology at the right time.

METHOD

The CSUSM study used a mixed-method approach, combining surveys with real-time observation to improve the effectiveness of assessment and generate a more holistic understanding of how library users made their technology choices. The study protocol received exempt status by the university human subjects review board. It was carried out twice over a two-year period to determine whether time of the semester affected usage. In 2009, the study was administered at the end of the spring term, April 15 to May 3. We expected that students near the end of the term would be preparing for finals and completing assignments, including major projects. The 2010 study was conducted near the beginning of the term, February 4 to February 18. We that early term students would be less engaged in academic assignments, particularly major research projects.

We carried out each study over a two-week period. An attempt was made to check consistency by duplicating each time and location. Each location was surveyed Monday—Thursday, once in the morning and once in the afternoon during the heavy-use times of 11 a.m. and 2 p.m. The survey locations included two large computer labs (more than eighty computers each), one located near the library reference desk and one near the academic technology helpdesk. Other locations included twenty computers in the media library, a handful of desktop computers in the curriculum area, and laptop users, mostly located on the fourth and fifth floor of the library. The fourth and fifth floor observations also included the library's forty quiet study rooms. For the 2010 study, the other large computer lab on campus (108 computers), located outside the library, also was included for comparison purposes.

We used two techniques: a quantitative survey of library computer users and a qualitative observation of software applications usage and selected study habits. The survey tried to determine the purpose for which the student was using the computer for that day, what their computer preference was, and what other business they might have in the library. It also asked students for their suggestions for changes in the library. The survey was usually completed within the five-minute period that we had estimated and contained no identifying personal information. The survey administrator handed-out the one-page paper survey, along with a pencil if desired, to each student using a library workstation or using a laptop during each designated observation

period. Users who refused to take the survey were counted in the total number of students asked to do the survey. However, users who indicated they refused because they had already completed a survey on a previous observation date were marked as "dup" in the 2010 survey and were not counted again. The "dup" statistic proved useful as an independent confirmation of the popularity of the library computers.

The second method involved conducting "over-the-shoulder" observations of students using the library computers. While students were filling out the paper survey, the survey administrator walked behind the users and inconspicuously looked at their computer screens. All users in the area were observed whether or not they had agreed to take the survey. The one exception was users in group-study rooms. The observer did not enter the room and could only note behaviors visible from the door window, such as laptop usage or group studying. Based on brief (one minute or less) observations, administrators noted on a form the type of software application the student was using at that point in time. The observer also noted other, nondesktop computer technical devices in use (specifically laptops, headphones, and mobile devices such as smart phones), and study behaviors, such as groupwork (defined as two or more people working together). The student was not identified on the form. We felt that these observations could validate information provided by the users on the survey.

RESULTS

We completed 1,452 observations in 2009 and 2,501 observations in 2010. The gate counts for the primary month each study took place—70,607 for April 2009 and 59,668 for February 2010—show the library was used more heavily during the final exam period. The larger number of results the second year was due to more careful observation of laptop and study-group computer users on the fourth and fifth floor and the addition of observations in a nonlibrary computer lab rather than an increase of students available to be observed. The observations looked at application usage, study habits, and devices present, but this article will only discuss the observations pertaining to devices.

In 2009, 17 percent of students were observed using laptops (see table1). This number almost doubled in 2010 to 33 percent. Most laptop users were observed on the fourth and fifth floors where furniture, convenient electrical outlets, and quiet study rooms provided the best support for this technology. Very few desktop computers were available, so students desiring to study on these floors have to bring their own laptops. Almost 20 percent of students in 2010 were observed with other mobile technology, such as cell phones or iPods, and 16 percent were wearing headphones, which indicated there was other, often not visible, mobile technology in use.

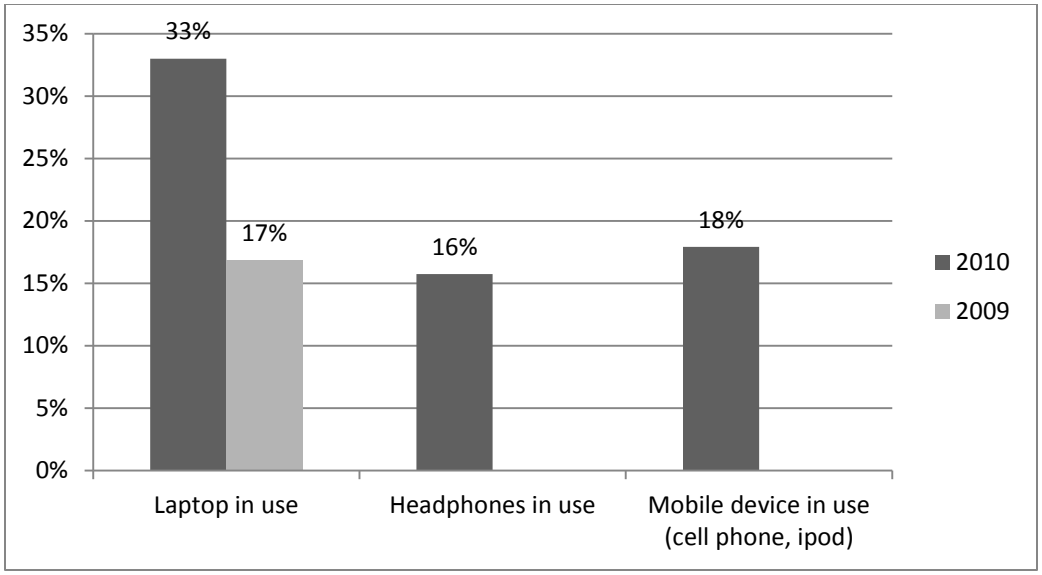

Table 1. Mobile Technology Observed

In 2009, 1,141 students completed the computer-use survey. However, we were unable to accurately determine the return rate that year. The nature of the study, which surveyed the same locations multiple times, revealed that many of the students were approached more than once to complete the survey. Thus the majority of the refusals to take the survey were because the subject had already completed one previously. The 2010 study accounted for this phenomenon by counting refusals and duplications separately. In 2010, 1,123 students completed the survey out of 1,423 unique asks, resulting in a 79 percent return rate. The 619 duplicates counted represented about half of the 2010 surveys completed and could be considered another indicator of frequent use of the library's computers. The 2010 results included an additional 290 surveys completed by students using the other large computer lab on campus outside the library.

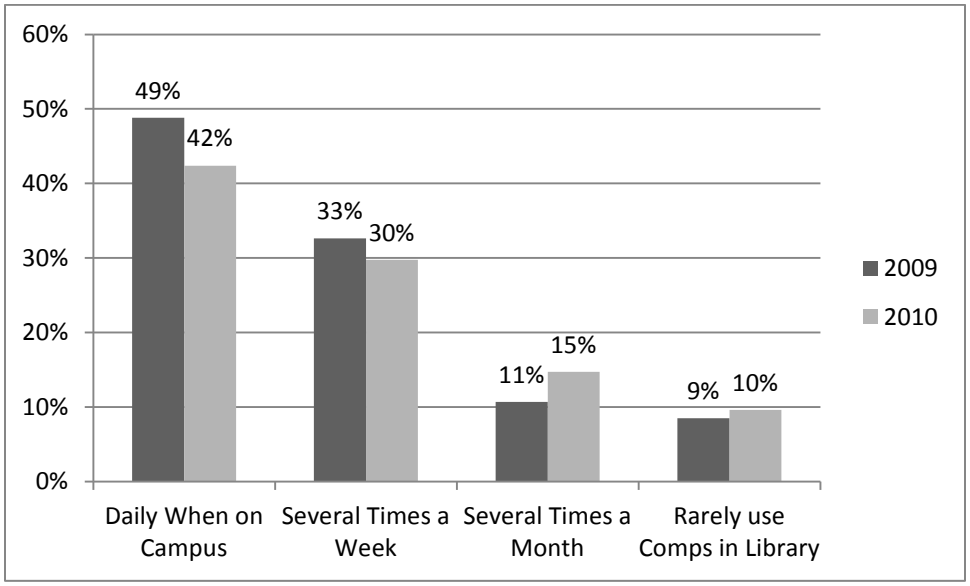

Table 2. Frequency of Computer Use

In both years of the study, 78 percent of students said they preferred to use computers in the library to other computer lab locations on campus. Students also indicated they were frequent users (see table 2). In 2009, 82 percent of students used the library computers frequently—49 percent daily and 33 percent several times a week. The frequency of use in the 2010 early term study dropped about 10 percent to 72 percent but with the same proportion of daily vs. weekly users. Convenience and quiet were the top reasons given by more than half of students as to why they preferred the library computers followed closely by atmosphere. About a quarter of students preferred library computers because of their close access to other library services.

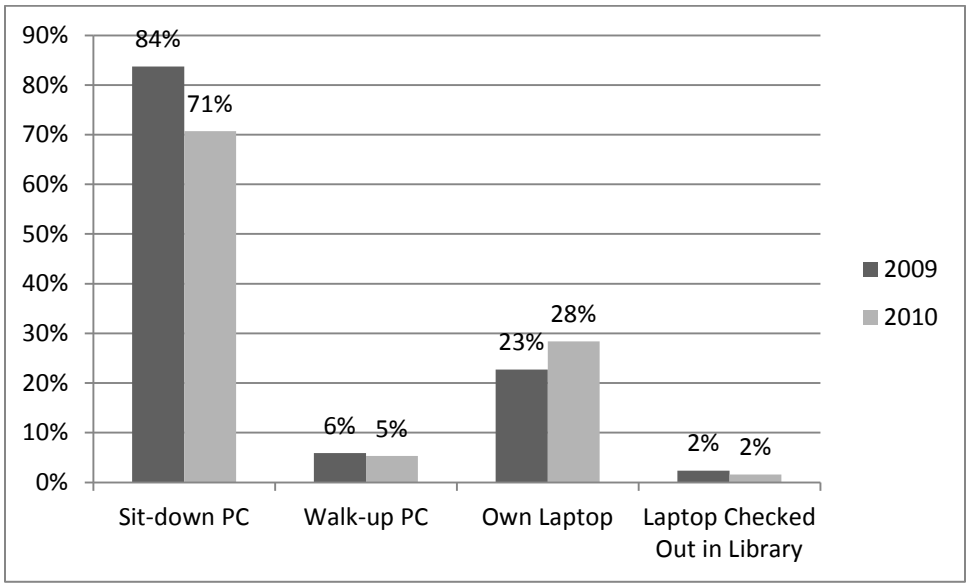

Table 3. Preferred Computer to Use in the Library

The types of computer that students preferred to use in the library were desktop computers followed by laptops owned by the students (see table 3). It is notable that the preference for desktop computers changed significantly from 2009 and 2010: 84 percent of students preferred desktop computers in 2009 vs. 72 percent in 2010—a 12 percent decrease. Not surprisingly, few students preferred the simplified walk-up computers used for quick lookups. However, we did not expect such little interest in checking out laptops, with only 2 percent preferring that option.

The 2010 study added a new question to the survey to better understand the types of technology devices owned by students (see table 4). In 2010, 84 percent of students owned a laptop (combining the netbook and laptop statistics). Almost 40 percent of students owned a desktop, therefore many students owned more than one type of computer. Of the 85 percent of students that indicated they had a cell phone, about one-third indicated they owned smart phones. The majority of students own music players. The one technology students were not interested in was e-book readers, with less than 2 percent indicating ownership.

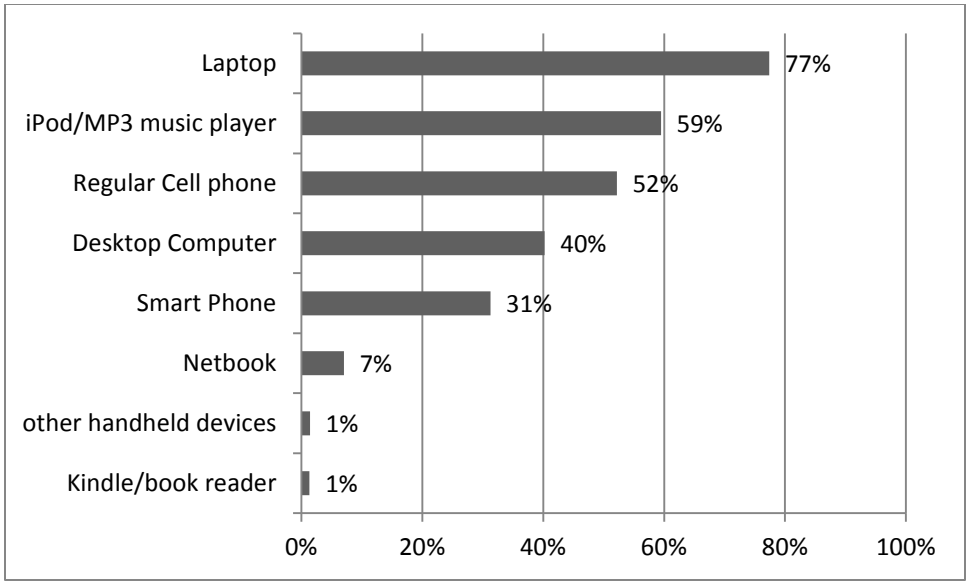

Table 4. Technology Devices Owned by Students (2010)

To understand how the use of technology might affect use of the library in general, the survey asked students what other library services they used on the same day they were using library computers. Table 5 shows survey responses are very similar between the late term 2009 study and the early term in 2010. By far the most popular use of the library, by more than three-quarters of the students, was for study. Around 25 percent of the students planned to meet with others, and 20 percent planned to use the media services. Around 15 percent of students planned to checkout print books, 15 percent planned to use journals, and 10 percent planned to ask for help. The biggest difference for students early in the term was an increased interest (5 percent more) in using the library for study. The late-term students were 9 percent more likely to meet with others. By contrast, users in the nonlibrary computer lab were much less likely to make use of other library services. Only 24 percent of nonlibrary users planned to study in the library, and 8 percent planned to meet with others in the library that day. Use of all other library services was less than 5 percent by the nonlibrary computer users.

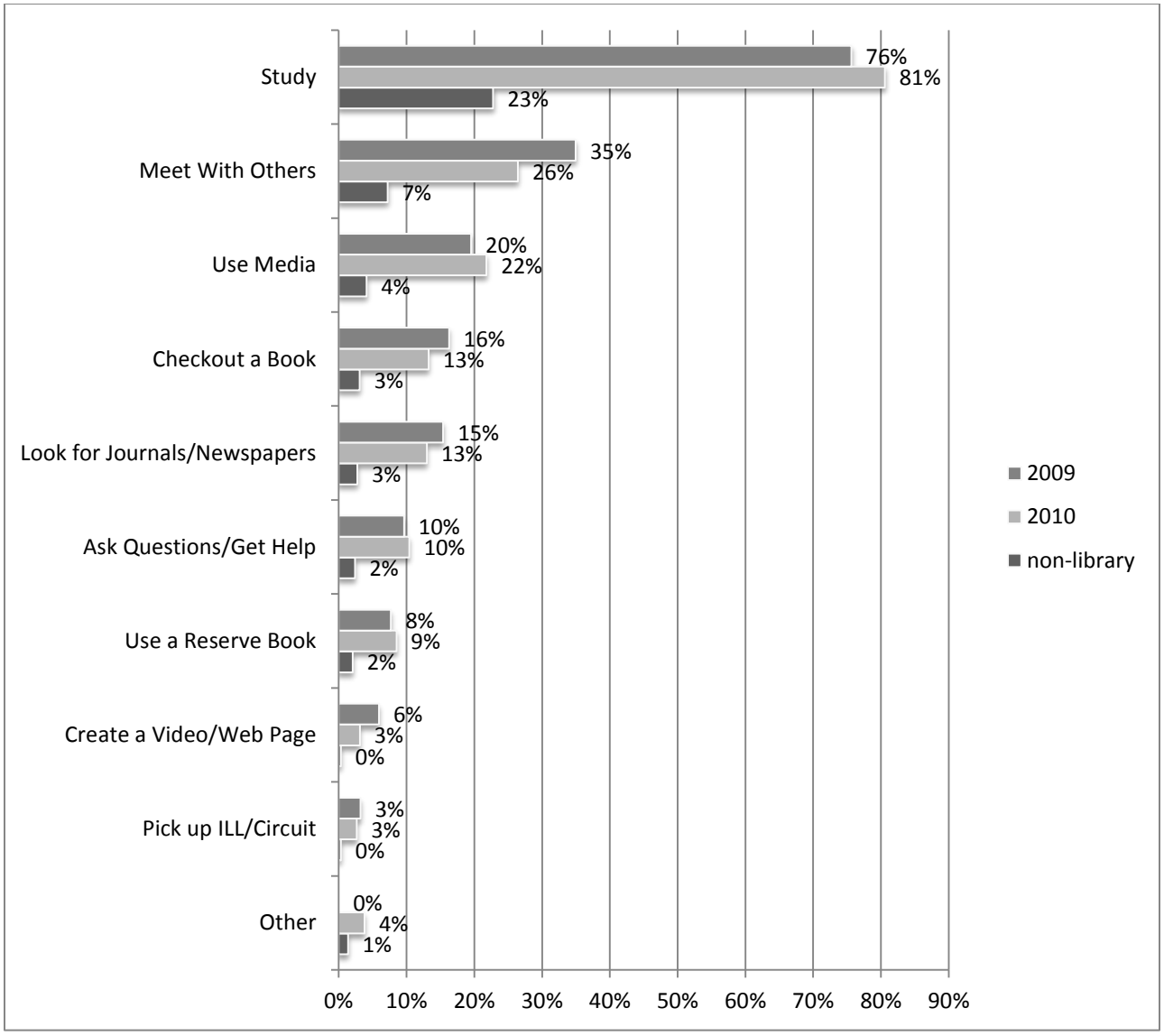

Table 5. Other Library Services Used

In 2010, we also asked users what changes they would like in the library, and 58 percent of respondents provided suggestions. The question was not limited to technology, but by far the biggest request for change was to provide more computers (requested by 30 percent of all respondents). Analysis of the other survey questions regarding computer ownership, and preferences revealed who was requesting more traditional desktops in the library. Surprisingly, most were laptop users; 90 percent of laptop owners wanted more computers and 88 percent of the respondents making this request were located on the fourth and fifth floor, which were almost exclusively laptop users. The next most comments received were remarks indicating student satisfaction with the current library services: 19 percent of students said they were satisfied with current library services and 9 percent praised the library and its services. Commonality of requests dropped quickly at that point, with the fourth most common request being for more quiet (2 percent).

DISCUSSION

The results show that students consistently prefer to use computers in the library, with 78 percent declaring a preference for the library over other computer locations on campus both years of the study. This preference is confirmed by the statistics reported by CSUSM's campus IT department, which tracks computer login data. This data consistently shows the library computer labs are used more than nonlibrary computer labs, with the computers near the library reference desk as the most popular followed closely by the library's second large computer lab, which is located next to the technology help desk. For instance, during the 2010 study period, the reference desk lab (80 computers) had 6,247 logins compared to 3,218 logins in the largest nonlibrary lab (108 computers)—double the amount of usage. The data also shows that use of the computers near the reference desk increased by 15 percent between 2007 and 2010. Supporting the popularity of using computers in the library is the fact that most students are repeat customers. Table 2 shows 82 percent of the 2009 late-term respondents used the library computers several times a week with almost half using our computers daily. In contrast, 72 percent of the 2010 early term students used the library computers daily or several times a week. The 10 percent drop in frequency of visits to the library for computing applied to both laptop and desktop users and seems to be largely due to not yet receiving enough work from classes to justify more frequent use.

The kind of computer that users prefered changed somewhat over the course of the study. The preference for desktop computers dropped from 84 percent of students in 2009 to 72 percent in 2010 (see table 3). One reason for this 12 percent drop may be related to how the survey was adminstered. The 2010 study did a more thorough job of surveying the fourth and fifth library floors where most laptop users are. As a result, the laptop floors represented 29 percent of the response in 2010 vs. only 13 percent in 2009. These numbers are also reflected in the proporation of laptops observed each year—33 percent in 2010 vs. 17 percent in 2009 (see table 1). The drop in desktop computer preference is interesting because it was not matched by an equally large increase in laptop preference, which only increased by 5 percent. The other reason for the decrease in desktop preference is likely due to the larger change seen nationwide in student laptop ownership. For instance, the Pew study of gadget ownership showed a 13 percent drop in desktop ownership over a five-year period, 2006–2011, while at the same time laptop ownership almost doubled from 30 percent to 56 percent.[17] However, it is interesting to note that, according to the Pew study, in 2011 the percent of adults who owned each type of device was nearly equal—55 percent for desktops and 56 percent for laptops.

The 2010 survey tried to better understand students' preferences by identifying all the kinds of technology they had available to them. We found that 77 percent of CSUSM students owned laptops and an additional 7 percent owned the netbook form of laptops (see table 4). The combined 84 percent laptop ownership is comparable with the 2010 ECAR study's finding of 89 percent student laptop ownership nationwide.[18] This high level of laptop ownership may explain why the users who preferred laptop computers almost all preferred to use their own rather than laptops checked out in the library.

Despite the high laptop ownership and decrease in desktop preference, it is significant that the majority of CSUSM students still prefer to use desktop computers in the library. Aside from the 72 percent of respondents who specifically stated a preference for desktop computers, the top suggestion for library improvement was to add more desktop computers, requested by 38 percent

of respondents. Further analysis of the survey data revealed that it was the laptop owners and the fourth and fifth floor laptop users who were the primary requestors of more desktop computers. To try to better understand this seemingly contradictory behavior, we have done some further investigation.

Anecdotal conversations with users during the survey indicated that convenience and reliability are two factors affecting student's decision to use desktop computers. The desktop computers' speed and reliable Internet connections were regarded as particularly important when uploading a final project to a professor, with some students stating they came to the library specifically to upload an assignment. In May 2012, the CSUSM library held a focus group that provided additional insight to the question of desktops vs. laptops. All of the eight-student focus group participants owned laptops, yet all eight participants indicated that they preferred to use desktop computers in the library. When asked why, participants indicated the reliability and speed of the desktop computers and the convenience of not having to remember to bring their laptop to school and "lug" it around. Another factor influencing the convenience factor may be that our campus does not require that students own a laptop and bring it to class, so they may have less motivation to travel with their laptop. Supporting the idea that students perceive different benefits for each type of computer, six of the eight participants owned a desktop computer in addition to a laptop. The 2010 study also showed that students see value in owning both a desktop and a laptop computer, since the 40 percent ownership of desktop computers overlaps the 84 percent ownership of laptops (see table 4).

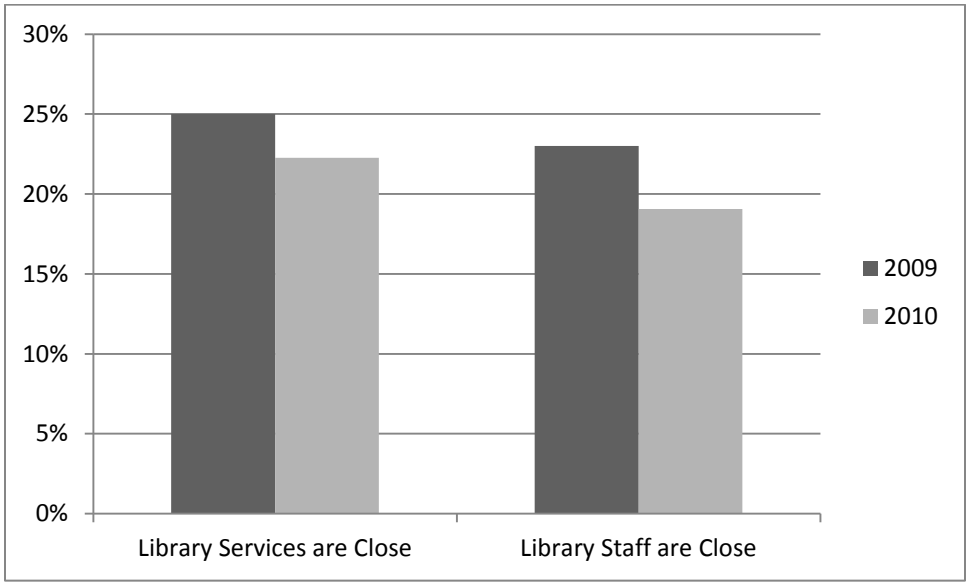

Table 6. Reasons Students Prefer Using Library Computer Areas

For almost half of the students surveyed, one of the reasons for their preference for using computers in the library was either the ready access to library services or staff (see table 6). Even more significant, when specifically asked what else they planned to do in the library that day besides using the computer (see table 5), more than 80 percent of the students indicated that they intended to use the library for purposes other than computing. The top two uses for the library were studying (76 percent in 2009, 81 percent in 2010) and meeting with others (35/26 percent), indicating the importance of the library as place. The most popular library service was the media

library (20/22 percent) followed by collections with 16/13 percent planning to checkout a book and 15/13 percent planning to look for journals and newspapers. It is interesting that the level of use of these library services was similar whether early or late in the term. The biggest difference was that early term students were less likely to be working with a group but were slightly more likely to be engaged in general studying. Even the less-used services, such as asking a question (10 percent) or using a reserve book (8 percent), exhibited an appropriate amount of usage if one looks at the actual numbers. For example, 8 percent of 1,123 2010 survey respondents represent 90 students who used reserve materials sometime during the 8 hours of the two-week survey period.

To put the use of the library by computer users into perspective, we also asked students using the nonlibrary computer lab if they planned to use the library sometime that same day. Only 24 percent of the nonlibrary computer users planned to study in the library that day vs. 81 percent of the library computer users; only 4 percent planned to use media vs. 24 percent; and 2 percent planned to check out a book vs. 13 percent. The implication is clear that students using computers in the library are much more likely to use the library's other services.

We usually think of providing desktop computers as a service for students, and so it is. However, the study results show that providing computers also benefits the library itself. It reinforces its role as place by providing a complete study environment for students and encouraging all study behaviors including communication and working with others. The popularity of the library computers provide us with a "captive audience" of repeat customers.

CONCLUSION

The CSUSM library technology that was planned in 2004 is still meeting students' needs. Although most of our students own laptops, most still prefer to use desktop computers in the library. In fact, providing a full-service computer environment to support the entire research process benefits the entire library. Students who use computers in the library appear to conduct more of their studying in the library and thus make more use of traditional library collections and services.

Going forward, several questions arise for future studies. CSUSM is a commuter school. Students often treat their work space in the library as their office for the day, which increases the importance of a reliable and comfortable computer arrangement. One question that could be asked is whether the results would be different for colleges where most students live on campus or nearby. If the university requires that all students own their own laptop and expects them to bring them to class, how does that affect the relevance of desktop computers in the library? The 2010 study was completed just a few weeks before the first iPad was introduced. Since students have identified convenience and weight as reasons for not carrying their laptops, are tablets and ultra-light computers, like the MacBook Air, more likely to be carried on campus by students and used them more frequently for their research? How important is it to have a supportive mobile infrastructure with features such as high speed wifi, ability to use campus printers, and access to campus applications? Are students using smart phones and other mobile devices for study purposes? In fact, are we focusing too much on laptops, and are other mobile devices starting to take over that role?

This study's results make it clear that we can't just look at data such as ECAR's, which show high laptop ownership, and assume that means students don't want or won't use library computers. As

the types of mobile devices continue to grow and evolve, libraries should continue to develop ways to facilitate their research role. However, the bottom line may not be that one technology will replace another but rather that students will have a mix of devices and will choose which device is best suited to a particular purpose. Therefore libraries, rather than trying to pick which device to support, may need to develop a broad-based strategy to support them all.

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