

ACCOMODATING THE COMPUTING ACCESS NEEDS OF PERSONS WITH DISABILITIES

Glenda E. Moum Manager of User Services University of Missouri-Columbia Columbia, Missouri 65211

The operating paradigm on most college campuses is that computing is a tool for facilitating education and future employment. The University of Missouri-Columbia (MU) has taken a leadership role in promoting general computing access. In the process of promoting computing use by nontraditional students and faculty, however, most of us have overlooked an important segment of the University population -- students with disabilities.

Is it possible for students with disabilities to fully participate in their classes, including completion of computing assignments? Campus Computing, in conjunction with several other departments within the University, has implemented a mo del to encourage full integratation of students with disabilities into their computing-related coursework.

HISTORY

Through a variety of funding initiatives over the last seven years, MU has made significant progress toward integrating computing into the general classroom environment. The goal was to expand computing use beyond the traditional use by computer science and the school of business to any area where the use of spreadsheet, word processor, or draw programs might enhance the academic activity. Thus one-time funds were made available to convert classrooms to computing sites. These sites were equipped with IBM and Apple microcomputers. In addition to workstations, a core set of software was purchased and made widely available for general computing use. Faculty desks were seeded with microcomputers and software to enable them to incorporate computing assignments into existing courses.

The integrating computing into the curriculum initiatives were immensely successful. In addition to students in traditional computing-related disciplines and the ever popular word processing users, art majors, interior designers, and cartographers now are sitting side-by-side with spreadsheet users. The seats in the lab are filled and waiting lists form early in the semester, not just the last two weeks.

Another fact to keep in mind is that the city of Columbia and the University have a long-standing partnership regarding accessibility. Years before it was mandated, the city began removing barriers from curbs and public buildings. A top-rated trauma unit at the teaching hospital and a rehabilitation center which works actively with patients to return them to a productive lifestyle are additional incentives to persons with disabilities. Given these elements and a moderate climate, it is little wonder that the city of Columbia and the University have a reputation among students with disabilities as a good place to go to school and live.

THE CHALLENGE

These two forces —widespread integration of computing into all disciplines AND the accessibility of the city and University— combined to create a new challenge for the computing organization. Was it possible for students with disabilities to fully participate in their computingrelated courses?

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In light of technological advances it also was time to ask: can students with disabilities use the same computing facilities, machines, and software as their peers?

Campus Computing decided to make that answer yes. Or at least to see how close to yes it was possible to come. Our objective has been not to isolate students with disabilities from their peers but to integrate them, wherever possible, into the general student computing environment.

This has not been the tradition in computing training for persons with disabilities. Programming was quickly recognized as an employment mechanism for the disabled. Yet most of the training programs shuffled their students to remote locations, isolating them from their peers, and trained them on specialized equipment and perhaps in specialized languages. The result was that the student who completed this program ran a great risk at still being unemployable!

THE VISION

Drawing upon the experience of local professionals from a wide range of non-computing fields, local programs (successful or not), and through research into other programs, Campus Computing made a commitment to try a different method. Our model would be an extension of our Library Model of computing followed for the general student population, i.e. computing resources are as integral to education as the resources in the library. All students should have access to those resources.

In essence, the computing organization recognized that the value of the educational experience goes beyond what the students read in books and is greatly enhanced by the opportunity to participate fully in class and social activities. The same must be true for a student with a disability, to use not just the same workstations and software in an isolated location, but to work in the same facilities WITH their classmates. The model recognizes the educational value of such things as the teamwork required to complete an assignment and the additional learning experience from helping and being helped by classmates outside of the classroom.

Thus our mission was to identify a way to incorporate students with disabilities into our general computing environment. Once the computing sites were accessible, the next step, that of working with faculty to fully incorporate these students into the class experience, could begin.

THE ADAPTIVE COMPUTING TECHNOLOGY CENTER

The first step was to acquire the knowledge base we did not currently have; this was done by hiring a graduate student in the physical rehabilitation field to begin studying the steps necessary. Shortly thereafter, we added a second graduate student whose major was computer science. These two worked as a team to evaluate needs and the resources available to meet those needs.

The Adaptive Computing Program researched existing software and hardware resources. They also began working with our vendors, primarily IBM and Apple, to study their initiatives in the area of disabled access. The result of five years of research and development was the establishment of the Adaptive Computing Technology Center, a service unit within the Campus Computing organization.

The ACT Center works on several levels with students with a variety of disabilities. Client needs include: access to student computing resources; recommendations for individual computer systems, identifying funding resources and advocacy, training, technical support, adaptive academic testing, and follow-up assessments.

Their most important service is encouraging students to fully participate in their course work. This is accomplished through evaluation of the student's disabilities and a recommendation of what technology would help work around that disability.

Another service offered by the Center is training, either on the general access software that is available or on the use of the specialized peripherals available in the general access facilities.

An evaluation of disability and corresponding need is a critical component and a service provided through the ACT Center. What technology should be used to aid the person with a learning disability as opposed to a mobility impairment. Each client of the center is screened to determine just what assistance is required. The staff of the ACT Center works closely with the User Services group to ensure that general student facilities are accessible, including room layout, recommending software to make available for general use, seeking donations of adaptive workstations, and purchasing adaptive peripherals to place in key locations on campus. In addition the two groups work as a team to identify potential clients and to steer faculty or students to the Center.

SERVING CLIENT NEEDS

The ACT Center currently recommends computing solutions in four major disability categories: persons who are blind, persons with visual impairments, persons with mobility impairments, and persons with learning disabilities. The objective of these evaluations is to empower students to manage an academic load and gain and maintain employment.

Persons who are blind face the following obstacles: typing on a standard keyboard and feedback from the computer screen. They need some form of feedback from the computer screen which is automatic as well as upon request, an efficient means to scan portions of the computer screen, and feedback which is independent of the software which the individual has chosen to use.

Persons with visual impairments, i.e. who have some vision, generally need screen and print magnification as opposed to screen feedback.

Persons with mobility impairments need alternative for computer input, including alternate keyboards, scanning, or morse code entry. However in working with persons with mobility impairments, the staff has found that the standard keyboard is the preferred method of input if at all possible! Thus assistive techniques in using the standard keyboard are also recommended, including: positioning of the keyboard, pointing devices for typing, single finger input capabilities, and macro capabilities.

Persons with learning disabilities need a good word processor, a grammar checker, and one-on-one training.

SOLUTIONS

In most cases, the ACT Center is able to recommend a standard workstation solution for a client with one or two adaptive peripherals of software components to make the system accessible. For example, a person who is blind may use an IBM PS/2 with an attached screen reader and voice synthesizer while someone with a visual impairment may be able to use a Macintosh system running the CloseView desk accessory.

By keeping the solutions within the range of workstations available in the general computing sites, the clients of the ACT Center are able to interact with their peers in classroom related activities. Through the commitment of the computing organization to fund or assist in funding larger adaptive peripherals (like screen readers, voice synthesizers, screen magnification systems, etc.) and specialized software, students can work in the student computing sites and do not have to own their own system if they do not choose to.

AMERICANS WITH DISABILITIES ACT

President George Bush signed the Americans with Disabilities Act (ADA), a comprehensive, antidiscrimination law aimed at integrating persons with disabilities into the American work force, on July 26, 1990. ADA seeks to ensure the right of all people with disabilities to participate equally in society. In areas of employment and education, reasonable accommodation must be made to ensure that persons with disabilities can fully participate.

Many of the changes Campus Computing made as a result of suggestions from the Adaptive Computing Technology Center were motivated by familiarity with this legislation. However the lesson we learned in doing so is that the accommodation is not necessarily expensive nor does it require extraordinary effort to implement or support!

One of the first modifications made was installation of electrically adjustable tables. The tables allow keyboard, screen, CPU, and printer to be adjusted to any height the user chooses. At least one electric table was placed in every computing site. The next modification made was in facility arrangement. The demand for number of workstations encouraged room layouts where as many tables and workstations were crammed in as humanly possible. Although the need for as many seats as possible still exists, at least a portion of each computing facility is arranged to accommodate a wheelchair.

The procedures for handling waiting lists and priority use of workstations were reviewed and adapted to ensure prompt service to students with special needs while maintaining a standard of fairness for all users.

Indeed the most expensive components are the human resources dedicated to ensuring accessibility and the adaptive peripherals purchased for general access. The personnel expense was a choice made by this computing organization; much of the work done by the ACT Center staff could be handled by a coalition of health care and computing professionals.

Donations by vendors to encourage accessibility have helped offset some costs associated with equipment purchases. In addition, a portion of the student computing fee (an acrossthe-board charge for all students) is set aside each to year purchase new and maintain older equipment. Other sources of funding include grants and private donations.

Conclusion

Is it possible to integrate the computing access needs of students with disabilities into the general computing environment? Undeniably yes. And given the Americans with Disabilities Act, accommodation of persons with special needs has moved from a voluntary to mandatory action.

The University of Missouri-Columbia took an approach which made accommodation and integration a primary initiative and organizational goal. However, many of the same objectives can be accomplished through a variety of methods, depending upon the organizational resources and goals.