

COMPUTER AIDED TEACHING SUITES (CATS) SUPPORTING STUDENTS AND STAFF WITH INFORMATION TECHNOLOGY

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ABSTRACT: The Computer Aided Teaching Suites (CATS) constitute a computing facility supporting the learning and teaching needs of undergraduate students in five schools in The University of Adelaide: the School of Architecture, Landscape Architecture and Urban Design, and the Schools of Chemical Engineering, Civil and Environmental Engineering, Electrical and Electronic Engineering and Mechanical Engineering. This paper discusses the approaches used in CATS to support students and academic staff within an information technology context and the economics of providing this support.

INTRODUCTION

The Computer Aided Teaching Suites (CATS) provides services to over 2500 students, spanning five disciplines and their service courses. This is nothing new in the field of education. The difference is the collaborative approach and academic grouping which support CATS. The supporting departments work together, to satisfy common needs, and promote information technology as a core component of their discipline. This co-operative environment has enabled CATS to pursue its key goals of: providing computer facilities to support staff and enhance student learning; and providing support for staff in the teaching of technology based subjects.

THE METHOD OF PROVIDING COMPUTER FACILITIES TO SUPPORT STAFF AND ENHANCE STUDENT LEARNING

Two full time staff are employed in CATS. Our core task is to provide excellent computer facilities and specialist technical advice, to support staff and enhance student learning. Each year educational funding is becoming increasingly scarce. We acknowledge that our funding is not on par with some of the leaders in the designing of teaching and learning environments (that of the Politecnico di Milano, University College Dublin, Union City) [1], [2] field, nevertheless we do provide an enhanced learning experience for students and staff by expanding our users expectations and concentrating on the basics of service (Facilities, Reliability, and Responsiveness) [3].

1. Facilities

In the area of services marketing one of the important factors is that of *facilities*. *Facilities* are considered to be appearance of the physical facilities, equipment, personnel and communication materials. Students appear to use the appearance of the physical facilities as an indicator of the quality of the facilities. This is not surprising, as the functionality of the rooms to allow easy instructor access to students, unrestricted views of whiteboards and projected displays, together with reliable modern equipment, create a positive atmosphere which functions well. Indeed the demands placed upon the network infrastructure and serving computers are high. This is especially true when a class of 80 students all want to start and run the same package at the same time, while different packages are being started and run by, say, 100 other students.

The computers are arranged in a series of suites:

- Four formal teaching suites for classes from 30 to 80 students;
- A random access suite (35 capacity) with connection points for lap-top computers;
- A specialist graphics suite with 25 machines; and
- Support for wireless network and for four department-based suites.

There is also a range of peripheral devices such as: printers (colour and mono), scanners, CD-burners, a photocopier, a A0 colour DesignJet printer, zip-drives, video projectors, and a public address system for staff and student use. The suites are available to students 24 hours per day, 7 days per week, with after-hours access via a security card system. A monitored video surveillance system is installed in the suites to protect the users and the facilities during after-hours use.

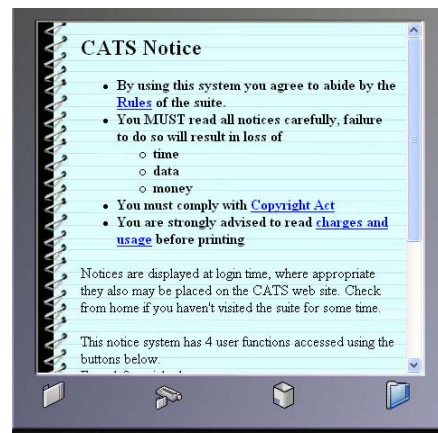
2. Reliability

CATS staff try to meet this expectation, through a two-step process. The first step is a regular routine of maintenance. All CATS computers have a sticker on their monitors with a letter and number on it. For example, the sticker A7 informs the student they are sitting in front of computer number 7 in computer suite A. When there is a problem, students are encouraged to specify the problem and machine they were working on at the time. Staff aim to have a short response time to solve problems. The second approach is through information. New students to the faculty are provided with an induction talk at the start of their scholastic studies, which highlights the CATS Noticeboard, CATS On-line notices, the CATS quick start guide, the CATS web-page, (www.cats.adelaide.edu.au), CATS personnel, OH&S issues and centrally run sources of information.

The on-line Notices page informs users and staff of system and network changes scheduled, of academic problems solved, and of coming events. This process allows staff to say what they are going to do, why and provide a deadline. The latter is very important because it is by this attribute that people establish your ability to perform core business efficiently.

3. Responsiveness

Responsiveness is said to be the willingness to help customers and provide prompt service. This very important aspect is achieved by CATS personnel through the use of three main methods of real time dissemination of information. These are the CATS web site, CATS noticeboard, and direct consultation with students and staff. The CATS web site provides students and staff information on the use and running of the facilities and packages, the timetable for scheduled classes, staff specific information, student take home software, and links to other departments and associations. All of these sources of information can be accessed as the need arises and digested at the users own pace. Staff and student consultation is achieved through the following: e-mail, by approaching the two full time staff who manage the suite, student surveys, The University of Adelaide Engineering Society (AUES), and the Architecture and Engineering Local Management Group (AELMG). Through these channels equipment purchases, advice and improvements to the CATS service can be achieved in a timely manner.



Enhance Student Learning

The enhancement of student learning manifests itself in the subjects offered by the CATS member departments; in designing a chemical production facility, or laying out a computer chip, or product that can be visualised in three dimensions. CATS supports the latter by combining the expertise of its staff and its resources. Consider the example of first, and second year engineering students being taught Engineering Design. Students are taught to model objects and “think in three-dimensions” from the start and progress to fully animate their designs. Manual drawing is taught after the students have become proficient on most aspects of design specification. This is not a new approach [4], but it led to the principles of Design Graphics being used in areas where students would not have traditionally used these techniques and an affirmation of the theory that by using of technology as an adjunct to teaching of such subjects as Design Graphics and widening student and staff experience, the overall quality of work produced can improve and provide benefits to information understanding. An example of this was a final year Mechanical Engineering project by Stuart Keynes and Daniel Handley, entitled “Kistler K-2 Re-useable Launch Vehicle”. These students used their engineering design experience to go beyond the normal poster and component style of demonstration of their projects concepts. They realised that if a picture could tell a thousand words, a three-dimensional simulation of the launch, detachment of components and return of the Kistler K-2 Re-usable vehicle to Earth would convey all of the information required in a quick, concise and captivating manner.

SUPPORT THE TEACHING OF TECHNOLOGY BASED SUBJECTS

Aristotle claimed, the end cause of a thing is the function that it is intended to serve. A person’s goals for a given piece of software or hardware whether recreational, utilitarian, or a combination of both, will only be met through engagement and support. Interaction combined with support from CATS personnel is the key to expanding the educational experience for students and allowing the teaching curriculum objectives of staff to be met. Too often teaching staff across the education spectrum have indicated that “...*the biggest impediment to my getting my job done is still too little support for the amount of equipment I have in my school*”. [5] This “support” is not restricted to the setting up of equipment. It includes the use and manipulation of software. There is a steep learning curve which educators are asked to follow in their enthusiasm for new technology, which not only requires them to become au fait with new hardware, and software, but requires significant amounts of time. Hence, there is a real danger that the inclusion of new technology in education may be badly received not because of its own deficiencies, but due to the lack of instructional provision academic staff can encounter. CATS personnel believe that the “... *development of on-line teaching and learning resources cannot be yet one more task lumped onto the workload of academics...*”. [6] For this reason our approach to teaching with technology is not only to encourage staff to utilise our expertise, but to be a partner in the teaching process by providing the following:

- expertise and encouragement to staff in developing on-line material;
- advise on hardware and software purchases;
- advise on software for research requirements;
- electronic examinations and evaluations;
- implementation of web-based notice-boards for students;
- software on CD for engineering students;
- work experience and position referrals (Science and Health Sciences, Information Technology Services, Motorola and the ANZ bank);

- Sole center on campus to integration of Linux, Windows, and Solaris operating systems using a single e-directory;
- tutoring of remedial groups; and
- web-based display of student portfolios.

Consider, support for web-based display of student portfolios. Courses provided by CATS member departments require the display of a portfolio of student work. This is an important component in the seeking of employment for students. CATS staff have worked with the School of Architecture, Landscape Architecture and Urban Design to develop a mechanism for students to edit and display their portfolios on the world wide web. The popularity of this has grown to the point where a dedicated student web server was brought on-line in 1999, to display student academic work.

ECONOMICS OF RUNNING CATS

The five departments which constitute CATS, have combined to achieve the “critical mass” necessary to fund the type of computer facility needed to achieve best practice in the courses offered. Due to this direct input, the departments have an equal influence on the operation of CATS, and thereby a strong feeling of ownership and subscription to the academic ideals perpetuated by CATS.

However, in order to provide the best software and hardware possible innovative methods of stretching our budget are necessary. This led to the following strategies:

1. CATS became the “South-East Asia reference site” for several software packages. This partnership allows CATS to provide a wider range of software to our students than would otherwise be possible, at competitive prices.
2. CATS management recognize that we cannot have one computer per student and that due to economical and geographical constraints not all students are able to remain at university for extended periods of time. For these reasons we spend a significant amount of time each year working with software manufacturers and distributors to develop innovative programs to provide students access to software packages. CATS has also promoted “take home” software packages. This has the benefits that students with home computers can work at home and those without computers at home can gain easier access to terminals after hours. CATS in conjunction with vacation employed students produced the 1998, 1999 School of Engineering cd-rom. Students could then access the tutorial and lecture material for a total of 55 subjects. In 2000 the list grew and students are now encouraged to burn their own from the on-line repository available.
3. CATS offers access to “scholarly” organizations ranging from professional academic bodies (Conference of the Australasian Science Teachers Association, workshops by the Cooperative Research Centre for Sensor and Signal and Information Processing) to groups of school children (International Baccalaureate Middle Years Program Student Summit), on a cost-recovery basis. This is a method by which academic staff, future students and the community as a whole benefits from the facilities.
4. CATS purchased the majority of its equipment on a rent-to-buy arrangement.
5. CATS applies for educational style on-line or web development projects.
6. CATS strives to be part of university wide site license agreements. This enables us to take advantage of the purchasing power of the university as a whole and purchase software at a reduced rate. We also encourage other departments to form co-operatives to purchase software and achieve the “economy of scale” a bulk license agreement would give.

CONCLUSIONS

In a time of economic constraints and increasing user expectations technology centers need to avail themselves of every possible avenue to expand their capabilities and adapt to meet the increased technological sophistication of their users. This increased capability does not simply imply the purchasing of the latest technology, but implies the dissemination of information and expertise through communication with anyone who is interested. For it is through collaboration, dissemination of expertise and information, that technology will be utilized and expanded.

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