ABSTRACT

Most students entering university now and increasingly in the future are younger than the microcomputer. They have grown in an information age and therefore have different demands than those from previous generations. They tend to be more visual learners. They learn and are entertained with the assistance of computers and the ‘net’. Accordingly, preferences of present and future generations will be for institutions that offer technologically enhanced learning facilities.

In view of the rapid change in technology and the associated change in the preferences and learning styles of new generations, AUC, in line with many other residential institutions, has sought new ways to enhance teaching and learning and assume a leading position amongst other peer institutions in the region.

WebCT - Web Course Tools - is a course management system that is widely used in the U.S. and Europe. It was chosen by AUC after a comparative study as the most suitable platform. WebCT is a tool that facilities the creation of sophisticated World Wide Web-based educational environments. It was built by educators at the University of Columbia, to be used by faculty members with little technical expertise. WebCT provides a set of educational tools to facilitate learning, collaboration and communication, and a set of administrative tools to assist the instructor in the process of management and continuous improvement of the course.

In this paper, we attempt to trace the development of the technology platform and its usage at AUC, from its early beginnings to the present time. The shift in patterns of technology usage from a piece meal, scattered mode to a standardized and widespread mode resulted from the adoption of a customized technology-enabled teaching and learning environment. Details as to the strategy and encountered challenges are narrated.
I – Technology in education @ AUC prior to WebCT

The first attempts at integrating technology in education at AUC centered around a variety of different tools, introduced mainly by 'early adopters', faculty members who initiated various educational exercises and projects centered around a particular tool, either because they had already used it at a different institution, or because it was readily available at AUC. These early attempts, although lacking in coordination and the benefit of a uniform approach, found early success due to the provision by Academic Computing Services of an advanced computing platform, and supporting infrastructure that made available technical support, computer training, software and in-house application development where needed.

A brief historical perspective of the advancement of the computing platform at this point clarifies the different factors that affected early adopters of technology, and how it perhaps shaped their choices at the time. A critical component of the computing platform that played a major role in facilitating the use of technology in the early years was network connectivity to the outside world, which started with an EARN/Bitnet connection that was active for a few hours daily, and grew gradually to a dedicated Internet connection that increased in capacity from an initial 64Kb line to the 26 Mb we take for granted today. Another giant leap forward in the development of the computing platform at AUC was the establishment of the campus-wide network, which tied all of AUC's campuses together, and was the first FDDI network installed in an educational institution in the Middle East. The network, together with the increasing proliferation of PCs in departments, and the establishment of the first open access labs, overcame the bottleneck that restricted access to computing equipment had hitherto presented. Another favorable factor came into play with the signing of the first software site licensing agreements, which made software readily available to all faculty and students, either at reduced academic pricing or free of charge to the end-user.

A key success factor in the successful growth of the computing infrastructure was the parallel growth of support services, provided by qualified technical staff, who in coordination with faculty, created prototypes in the adoption of technology in education. The institution of the first computer training programs introduced many faculty members and students to tools and software that helped in day to day educational tasks, such as basic assignment preparation, creation of class presentations, and early manifestations of student collaboration in the form of class projects and Internet research. One on one training was introduced, and focus groups centering around a particular group of students intent on a particular computing task were held. Comprehensive guides and documentation was created, tackling usage of various software tools, Internet research, online libraries, to mention a few.

First signs of the adoption of technology in education centered mainly around Internet tools, and commonly used office productivity tools such as Word Processing and Presentation software. Resources, in support of and in addition to class materials and instruction, appeared in the establishment of ftp and gopher sites, and the first faculty and class web sites. Projects involving student collaboration were initiated, allowing students to work closely with one another, and to evaluate and critique each other's work. One such project was the HUT project, which allowed students studying English from different universities to submit essays to a common pool, for peer evaluation, and to be used as a medium of exchange of ideas, cultural practices and language skills.
Although not comprehensive, early experiments aimed at leveraging technology in education enjoyed limited success, but due to a lack of instructional tools that supported a comprehensive environment, technology was being adopted on a piecemeal basis [1]. It also became apparent that adoption of technology among faculty was limited, and was confined to scattered groups in various departments. Large numbers of faculty were resistant to change, and were concerned at the time factor involved in learning new skills, and moreover, saw little or no value-added in the usage of technology. It therefore became apparent that a new strategy for implementing a technology enabled teaching and learning environment was necessary, and efforts were directed in achieving this objective.

II – An Integrated Framework for Multi Technologies

A new strategy was developed, with the main goal of creating a conceptual framework that would enable faculty to visualize the link between pedagogy and the use of technology from a global perspective. A generic framework was therefore developed, to illustrate the type of interaction that takes place between three main entities, the instructor, the student and technology, in class and beyond. [1] Moreover, the framework attempts to illustrate how technology can be harnessed in accordance to the Seven Principles of Good Practice. [2]

The generic framework [fig. 1] depicts the collaborations between the two main entities, the instructor and student, in addition to the interaction with instructional technologies. The instructor-student collaboration forms the backbone of the framework, and translates to the course delivery, announcements, discussions, problem sessions and project supervision. The role of learning technologies is made apparent in making course materials and supplementary information available, encouraging active learning among students. Technology also plays a role in facilitating the submission of online assignments and exams, as well as grade posting, ensuring a mechanism of prompt feedback and emphasizing time allocation to completion of tasks.

The framework also illustrates how instructors can minimize the administrative effort in managing classes through the use of appropriate course management tools, and student assessment.

The different forms of student-student collaboration are also made apparent within the framework, and take the form of group projects, discussions and collaborative research, as well as web-based applications. Thus, cooperation and reciprocity among students is encouraged in the many interactive activities depicted.

Leveraging technology in different ways is also illustrated in the access to digital information (online libraries), CD instruction and simulation (to illustrate dangerous environments or difficult abstract concepts), and are all means of encouraging students to experiment with the technology according to their different abilities and talents.

Finally, the framework went beyond the seven principles that focus on the student, and emphasized faculty-faculty interaction, and faculty to technology interactions.

Thus, within the context of the generic framework, a portfolio of common tools and applications began to take shape, and were gradually introduced and propagated within the academic curricula. Internet and web-based tools and applications proliferated, and the adoption of specific software tools for fulfilling particular tasks was standardized.
throughout the university. Training activities became more focused in accomplishing particular tasks that supported the pedagogical goals of courses, and instilled a common technology vision among faculty and students. In parallel, a training program dedicated to faculty only was established, and a lack of student participation in such workshops encouraged faculty to come forward to learn new skills. Several mechanisms for delivering the training were introduced to adapt to conflicting and busy faculty schedules.

The stage was thus set for the introduction of a customized framework, that could be adopted across all disciplines, and that would provide a comprehensive uniform technology-enabled teaching and learning environment for the entire campus.

![Generic Framework](image)

**III. The Search for a Comprehensive Instructional Technology Tool**

In summer 2000, ACS began investigating instructional technology tools available in the market, through research and attendance at international conferences, and narrowed down the choices to the list shown below:

- WebCT
- Academic.com (Blackboard)
- E-College.com

A table developed by Marshall University in Summer 2000 [3], and shows a comparison between instructional technology tools in use at different universities at that time. It was clear from the table that WebCT was the most comprehensive tool, with the most
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features, and was the tool of choice in many of the larger universities. However, a final decision was not reached until ACS was able to try trial versions of WebCT and the second most popular software, Academic.com (blackboard) for a period of 30 days. During this time, technical staff were able to evaluate the software first-hand, and were able to make an informed decision in favor of WebCT.

IV. Paving the way for WebCT

The choice of WebCT as a comprehensive course management system marked the beginning of a transition stage for AUC. Two major activities were accomplished to pave the way for the successful implementation of this instructional tool:

1. A seminar entitled ‘Enhancing the Role of Technology in Education: In class and Beyond’ was arranged as part of an orientation strategy to propagate interest among Faculty member, and to lay the threshold for the introduction of WebCT. The seminar presented emerging teaching and learning paradigms and the supporting hardware and software technologies. It therefore addressed the following themes:
   - Enhancing the teaching and learning environment.
   - The shift in paradigm from teacher–centered instruction to student–centered learning.
   - The Generic technology enabled teaching and learning framework (see section II).
   - Using network and computer technology in instruction.
   - Online educational software products.
   - Variations of ‘high tech’ classrooms and labs.
   - Planning an instructional technology development project.

2. A customized WebCT learning and teaching framework [Fig. 2] was derived from the generic framework described in section II, through a mapping process based on the type of interaction between the main entities, namely students, faculty and technology. The framework identified the WebCT tools supporting the five types of interactions depicted in the framework. Accordingly, for faculty–to–student interaction, faculty and students may communicate through the Mail, Discussion, Whiteboard, Survey and Student Tips tools. The customized WebCT framework lists all other WebCT tools associated with the recognized patterns of interaction between students, faculty, and technology.
V. The Preparatory Phase

As a result of interest generated by the ACS campaign for the adoption of WebCT, which culminated in the seminar mentioned above, the Writing Program came forward and expressed interest in adopting it, and making it mandatory for all English teachers to use it.

In the spring semester 2001, ACS purchased a license for up to 100 students to work on WebCT version 3.1 Standard Edition. The standard edition was chosen for this limited number of students for a number of reasons:

- To test the feasibility of using this instructional tool on a wide scale by faculty through orientation sessions, and evaluation of their feedback.
- To begin with a pilot project that would expose the pros and cons of the tool.
- To obtain more concrete feedback from faculty for whom accounts were opened for their experimentation.
- To invest minimally until a more pragmatic sense was obtained as to actual need for WebCT.

Training sessions were conducted by ACS, demonstrating the features of WebCT and how it could be used to advantage in support of in-class instruction. In addition to the Writing Program teachers, many faculty from other departments attended these sessions and expressed an interest in adopting it for use in their courses.
With the adoption of WebCT by 15 departments, and with 70 active courses, an increasing demand upon WebCT dictated an upgrade for the 100 student license, which was no longer sufficient, to an unlimited number of students. The unlimited license was purchased in Summer 2001, and an upgraded version of WebCT 3.6 Standard edition was introduced.

In order to provide students with access to the courses they are registered in automatically, a WebCT global database needed to be established. WebCT needed to be fed with information from a data file from the Student Information System, SIS, run by the University Registrar and Administrative Computing Services. Contact was made with both units, and they kindly provided the file with the necessary information, and ACS developed a special program to translate its format to a WebCT-friendly format. However, in order to reflect changes due to drop and add of courses, this file needed to be updated frequently, almost on a daily basis.

As WebCT propagated through departments, and the number of courses increased, ACS created a special WebCT team to handle the workload. The team consisted of 6 staff members, comprising two groups; the first group was responsible for administering WebCT, handling its installation, updates, backups and student records; and the second group was responsible for providing technical support and training for faculty and students.

A comprehensive study was then conducted to study the various tools of WebCT that would help faculty members build up their future courses. ACS creating detailed handouts explaining the use of each tool using step-by-step instructions. Hands-on training courses were organized to quickly orient and train professors on using each new feature.

Around 180 professors and graduate teaching assistants received training during the past two and a half years since the start of WebCT in Fall 2001. From Fall 2001 till Spring 2002, 28 comprehensive sessions were given each semester. These sessions comprised a general overview of WebCT, and a look at each of the available tools. Since Spring 2002, sessions were more focused on more advanced tools due to the fact that most professors had become proficient in the basic tools, and their main focus now was on introducing new features in their courses.

In parallel with all these activities, ACS developed a specialized WebCT website including useful information for both Faculty and students. Available handouts were converted to PDF format and made available online for download, in addition to a number of online forms to receive requests for training and the opening of accounts. A set of FAQs were also published online to answer common questions.

ACS also created a self-running demo CD to be distributed among faculty members which explains in video captures with audio annotation how the different tools work.

In Spring 2002, ACS began the tradition of holding an annual WebCT Day, and organized and held an event that would prove to be milestone in the propagation campaign for WebCT, entitled “Instructional Technology in Action: WebCT@AUC” on the 11th of Feb 2002. ACS invited the participation of early WebCT adopters at AUC to talk about their experience with WebCT. Live demonstrations of their work were
presented, which prompted many discussions, question and answer sessions. Booths were organized for each WebCT tool, with a special booth for the self-running demo.

VI. WebCT in Action: Growth, Support and Integration

With its adoption as the official Course Management Tool at AUC, WebCT was upgraded for the second time to version 3.8 Campus Edition. New features of the Campus Edition included a “logoff” button that was absent in the standard edition, and was a cause for concern with many users. Campus edition also has the capability of integrating with SIS+, allowing the global database of students to reflect drop and add activity instantaneously. Unfortunately, we could not make use of this feature, as SIS+ at AUC was a lower version than required.

In order to ensure that the WebCT global database promptly reflect any changes in the registrar's records, ACS continued to obtain the necessary data from the Registrar. However, in order to facilitate the process, ACS needed direct (Read-only) access to SIS+ data. Administrative Computing kindly opened a special account for ACS, thereby streamlining the process of obtaining the data whenever it was needed, without any intervention from the registrar's office.

At this stage, some department heads decided to adopt WebCT in all its courses for the following semesters. Special focus groups for faculty members and graduate teaching assistants were organized for each department, to provide training on the basic tools needed for their courses. Focus groups were held for the Writing program, Engineering and Business departments.

Special Focus groups were also held for students to help them get started with WebCT. Skills like how to log in and how to use the different tools created by their instructors were taught. In addition, we also accommodated special requests from faculty members to train students in their class on specific applications like power point, HTML conversion and web development tools, for use in their final projects using WebCT.

Through ACS efforts, other affiliated bodies to AUC such as CACE, IMD and ELTTP departments were encouraged to adopt WebCT as a standard tool for online learning in all their courses, which has required special focus group training to each of these departments as well.

With the widespread usage of WebCT in many departments, a solid support mechanism had to be established by ACS for faculty, in order to respond in a timely manner to any requests or problems. Support to faculty was made available in many forms, and included visits, a hot-line telephone number, email and of-course the website. An online discussion list was also established specially for WebCT, thereby providing a mechanism of knowledge sharing by ACS technical staff as well as experienced faculty members.

As the number of faculty members using WebCT grew, support was also provided via another mechanism, the STA program, which assigned graduate student assistants to assist faculty members in creating materials for online courses on a one-on-one basis. Special focus groups were organized to quickly orient and train these assistants, and
ACS continues to provide support to them when needed. The STA program is run by the Center for Learning and Teaching (CLT).

**WebCT Statistics**
The following statistics illustrate the growth in number of faculty using WebCT, from Spring 2003 till Fall 2003. As shown, the current number of faculty using WebCT is 138.

The following statistics show a snapshot of the number of courses active in the Fall 2003 semester, showing the distribution of courses by department, in addition to the course sections. Course sections in WebCT have reached an all-time high of 304.
VII - Evaluation of Use

Faculty Survey Spring 2002
This survey was conducted a year after the launch WebCT. At this time we were using WebCT 3.6 standard edition which had some limitations, and most professors were still at the very early stages of using WebCT.

The following points summarize both negative and positive feedback that we received at that time. All problems and issues reported were duly tackled by the ACS support team as detailed above.

- “I need training for my teaching assistants so that they may work with me"
- “It is very time consuming.”
- “Assignment, mail and grade tools are extremely useful. It saves paper, easy access and helps in communicating the information to the students without fuss or chaos. “
- “Students got exposure to very useful web sources. WebCT offered the students a 'sheltered' research environment."
- “I was very wary of WebCT at first but after two semesters of using it, I feel that I am much more confident with it and can appreciate its possibilities.”
- “The amount of time taken to generate quizzes is very frustrating in addition to the inflexibility of the assignment tool like not being able to create un-graded assignments. ”
- “For WebCT to be effective, students must use it frequently.”
- “Need one-to-one hands on training.”

Student Survey Spring 2003
The student Survey was a joint endeavor between Academic Computing Services and CLT (Center of Learning & Teaching). The aim of this survey was to collect student feedback 2 years after the launch of WebCT.

An unexpectedly high number of responses -1221 - were received from students from different majors. The questions were formulated using the WebCT add-on tool Respondus, and were added as a separate course in each student's account.

The results and statistics generated showed that students regarded using WebCT in a positive light, and provided important and useful feedback regarding technical issues that they faced. The majority of students mentioned that all professors in the university should start using and applying WebCT in their future courses.

VIII - ACS Value Added Services

ACS provides ongoing value-added services to assist faculty in building innovative features and materials into their courses.

Add-on Tools
A major effort is expended in investigated valuable add-on tools that may be integrated into WebCT, adding new features to those provided by tools that are already available. Two such add-on tools purchased by ACS for the academic community are Impatica and Respondus.
Impatica is special software that seamlessly integrates PowerPoint presentations into WebCT and Web pages. Although other techniques exist, Impatica is unique in that it creates only two files in addition to the plug-in file, making downloading and playback of the presentation extremely efficient. The advantages include a compressed file size, as well as the added security of not having students download and alter the original presentation files.

Respondus is software that allows the creation of online quizzes for integration into WebCT courses. The software supports the formulation of multiple choice, true/false, short answer, matching and paragraph questions. This tool is extremely easy to use, and has been used successfully in many courses.

ACS provides training for both Impatica and Respondus upon request, and technical support whenever necessary.

Support for the Creation of Multimedia Materials
ACS supports the creation and integration of multimedia materials into courses, including audio, video and image files. ACS technical support staff work in cooperation with faculty members using state-of-the-art tools in creating such materials as could be integrated into courses to enhance the learning process. This service is provided on an appointment basis. Below are some examples of work already accomplished in cooperation with various departments.

A joint project between ACS and an instructor in the ELTTP department was the first to demonstrate the use of Audio in an English Course. The audio files used were either digitized from a cassette tape or were converted using a special speech synthesizer tool. Audio files were added to different quizzes used in this course, in addition to teaching materials used for further discussion with students during class time.

In coordination with ACS, a professor in the Mechanical engineering department integrated process animation movie clips that explain the process of creating materials. This process is otherwise extremely difficult to explain in class, and the materials created helped the students visualize the process and absorb the information quickly and easily.

Another project initiated by ACS demonstrates that WebCT is compatible for use by people with visual impairment. This project was created using different tools to test its feasibility of use. Five blind scholars were given accounts on WebCT to access the course and to fill and submit online evaluation forms to assess the overall structure and usage of WebCT. They used a powerful and specialized reading software that is used to access and use any computer or internet application named JAWS for Windows. From the evaluation forms that we received, the overall feedback was that they were satisfied with using WebCT, finding it easy to access its different tools, to send and receive online email messages and to submit online assignments.

A current on-going project in cooperation with the Arabic Language Institute is to build an elementary Arabic Course in WebCT, using various innovative multimedia techniques and tools. The aim of this project was to help Arabic Language Professors think in broader terms regarding best practices for teaching online Arabic courses using specialized course management tools such as WebCT.
Innovations included posting materials in Arabic text, which is supported in all tools in version 4.1 Campus Edition. Multimedia materials integrated included images, maps, tables, sound and video clips.

**IX. The Future of WebCT @ AUC**

Future plans for WebCT @ AUC for the coming academic year comprise two important enhancements, namely full integration with SIS+, (the Student Information System used by the registrar at AUC), and a major upgrade to version 4.1 Campus Edition, with an accompanying technical support and training program.

*Full Integration of WebCT with SIS+:* Full integration of WebCT with SIS+ implies that any change in the student records on SIS+ will be reflected instantaneously in WebCT. This integration has several advantages including:

- Drop/add will be automatically reflected in WebCT, making daily uploading of the system during drop/add period unnecessary. System uploading adversely affects system performance, and causes delays and administrative overhead.
- Automatic uploading of grades from WebCT to SIS+, thereby avoiding duplication of data entry and delays in grades submission. Currently, grades are fed into SIS+ manually, using scan able forms.
- Courses will be automatically created from SIS+, thereby avoiding human error and administrative overload. Courses are currently created in WebCT upon professor request.

*Upgrading WebCT to version 4.1:* WebCT 3.8 CE (Campus Edition) is the current version used at AUC. Upgrading to version 4.1 CE will be a major upgrade as the new version has overcome many of the problems that WebCT users have encountered and reported previously. This version has a more organized, better-structured and more user-friendly interface.

Several of the somewhat redundant navigation and action performance steps that existed in previous versions have been eliminated. Building courses on WebCT will become a more flexible and much simpler task. ACS intends to carry out this upgrade in the break between the Fall 2003 and the Spring 2004 semesters.

In tandem with the upgrade, ACS intends to conduct an intensive orientation program focusing on the differences in features between the two versions, to ensure a smooth transition to version 4.1. Technical staff will also be on hand to provide support to faculty as needed, with documentation and guides upgraded and made available via the web site. In addition, a self-running demo illustrating the difference between the versions will also be published.
References

