



Academic Technology Plan

A Roadmap for the Future

College of Sciences

09

Executive Summary

In order to facilitate effective use of technology within the College of Sciences several goals have been identified and strategies to accomplish them designed. The goals are as follows:

1. Achieve competence in the use of word processing, presentation and spreadsheet software such as Microsoft Office, Sun OpenOffice and Apple iWork.
2. Achieve competence in effectively communicating using email.
3. Achieve competence with online course management software.
4. Improve general computer literacy.
5. Provide a basic grounding in technology-related ethics.
6. Make productive use of distance education software and tools.
7. Promote competence with research technologies and databases.
8. Maintain classroom technology and provide sensible upgrades such as Smartboards and other emerging technologies where appropriate.
9. Promote the regional lab concept to allow greater sharing of resources.
10. Encourage and assist departments to make full use of university-provided resources to produce cost savings and better service for students, faculty and staff.
11. Implement comprehensive, secure and sustainable data storage and protection policies at the college and department levels.
12. Establish a standard purchasing plan, possibly in conjunction with other colleges or ITS, to improve maintenance and reduce costs.
13. Actively seek out new sources for funding college technology needs.
14. Promote interdepartmental collaboration and resource sharing.

The college should work to create an environment in which these goals might be accomplished. This will require that the college create financial incentives for departments to pursue projects in line with these goals, work more closely with CATS and ITS and encourage interdepartmental communication to create greater opportunities for resource sharing and training.

Contents

Executive Summary.....	2
Introduction	4
General Technology Literacy and Competencies.....	5
Goal 1. <i>Achieve competence in the use of word processing, presentation and spreadsheet software such as Microsoft Office, Sun OpenOffice and Apple iWork.</i>	5
Goal 2. <i>Achieve competence in effectively communicating using email.</i>	5
Goal 3. <i>Achieve competence with online course management software.</i>	6
Goal 4. <i>Improve general computer literacy.</i>	6
Goal 5. <i>Provide a basic grounding in technology-related ethics.</i>	7
Special Skills and Competencies	8
Goal 6. <i>Make productive use of distance education software and tools.</i>	8
Goal 7. <i>Promote competence with research technologies and databases.</i>	8
Infrastructure Development	10
Goal 8. <i>Maintain classroom technology and provide sensible upgrades such as Smartboards and other emerging technologies where appropriate.</i>	10
Goal 9. <i>Promote the regional lab concept to allow greater sharing of resources.</i>	10
Goal 10. <i>Encourage and assist departments to make full use of university-provided resources to produce cost savings and better service for students, faculty and staff.</i>	11
Goal 11. <i>Implement comprehensive, secure and sustainable data storage and protection policies at the college and department levels.</i>	11
Goal 12. <i>Establish a standard purchasing plan, possibly in conjunction with other colleges or ITS, to improve maintenance and reduce costs.</i>	11
Funding and Budget Issues	12
Goal 13. <i>Actively seek out new sources for funding college technology needs.</i>	12
Goal 14. <i>Promote interdepartmental collaboration and resource sharing.</i>	12
Implementation of Technology Plan.....	13
References	15

Introduction

Centuries ago, the introduction of slate and blackboards dramatically changed the manner in which information could be delivered in a classroom. The integration of the new display technology, blackboards, did not change the academic content but it did require professors to teach differently and for students to acclimate to the use of an additional format for instruction.

The concerns associated with the current integration of electronic technology and resources in the academy may seem more dramatic; however, it is likely that the academy of centuries ago faced some of the same challenges. Assuredly, the resolve to provide the most appropriate academic experiences for students, the anxiety that comes with learning new technology and concerns about the resources to ensure that appropriate technology is available as needed has been shared across generations.

Technology and electronic resources have changed many aspects of our academic, research, and service endeavors in higher education. Ready and reliable access to the Internet for communication, work, study, and entertainment is the expectation of faculty, students, and staff. Technology and electronic resources are essential to the educational mission of the college and university.

The College of Sciences expects its faculty, students and staff to have the technological literacy and competencies to function and compete in the rapidly changing global community. The curricula should reflect the knowledge and skills that students will need for successful lives after graduation and reflect best-in-class programs. Faculty access to appropriate technology for teaching and research is essential for our commitment to excellence in both of these areas. The administrators and staff members of our department and college offices should demonstrate appropriate technology competencies to support the academic programs.

Additionally, the College of Sciences must ensure that proper resources are provided to faculty, staff and students. This includes working with the rest of the university community on infrastructure and software issues and carefully managing resources to maximize what is available for research programs and coursework.

General Technology Literacy and Competencies

While it is appropriate that each department define its own discipline-specific technology competencies, a set of common competencies was identified by department chairs and faculty. These competencies are listed below along with descriptions and rationale for their inclusion.

While common among faculty, staff and students in different departments, many of these items apply differently to individuals in different roles. For example, a student would be expected to understand how to use an online course environment like WebCT to turn in assignments but would clearly not be expected to be able to manage a course using the software.

Training in many of these areas is already provided by Center for Academic Technology Support (CATS) and Booth Library. Therefore, it should become a priority for the college to increase the number of faculty, staff and students who take advantage of these training sessions. This will require increasing awareness and providing incentives for individuals who choose to enhance their skills.

Goal 1. *Achieve competence in the use of word processing, presentation and spreadsheet software such as Microsoft Office, Sun OpenOffice and Apple iWork.*

Given the ubiquity of office software and the importance of such tools in academic life it is critical that students and faculty be well-versed in the use of such software. Since all of these tools employ similar concepts and interfaces the choice of a specific software package is not particularly important. Thorough understanding of any of these tools should enable an individual who is generally competent using a computer to switch between them with relative ease.

College staff members should have a particularly strong understanding of these software packages since they are used extensively in the administration of the academic programs.

The college should seek to ensure that every student, faculty and staff member has the opportunity to enhance their skills with these tools and is informed of such opportunities when they exist. Opportunities already available include training sessions through CATS and Booth Library. These opportunities should be exploited fully and augmented with specialized training when necessary.

Goal 2. *Achieve competence in effectively communicating using email.*

Email communication is one of the great achievements of the computer network revolution. It has fundamentally altered the way we exchange information in terms of frequency, quantity and accuracy. However, email can also be misused both accidentally and maliciously.

It is important that all faculty, staff and students be comfortable using email, either through a desktop client such as Mozilla Thunderbird and Microsoft Outlook or through a web-based interface such as Yahoo! Zimbra and Google Gmail (preferably both).

Understanding how to use the software is only one piece of the puzzle, however. Effective and professional email communication requires that users remain mindful of their recipients and practice

proper etiquette.¹ For example, students should avoid familiar language and slang in emails sent to their professors.

It is also important that email users be aware of the potential dangers of email communication and understand how to protect themselves from the myriad of scams and malicious software that may circulate through email messages.

Limited training on email software is available through Booth Library. However, the college should work with CATS to develop more comprehensive training to satisfy this goal.

Goal 3. *Achieve competence with online course management software.*

Students and faculty in particular should become comfortable with the course management software made available by the university, this is currently WebCT. These software packages allow instructors to distribute and collect assignments, facilitate class discussions and keep track of grades using a web-based system. This encourages better communication between instructor and student and helps to extend learning outside of the classroom.

To facilitate adoption of the WebCT package CATS provides training for faculty who would like to employ it in their courses. Training is also available on a department-wide basis.

Goal 4. *Improve general computer literacy.*

In order to support the other core competencies, it is important that the college encourage general computer literacy among students, staff and faculty. It is unreasonable to expect individuals to effectively make use of academic technologies without having a solid grounding in the fundamentals of computer use.

General computer literacy should include things like:

- Awareness of the basic concepts behind a computer operating system (security, programs).
- Familiarity with web browsers and the internet.
- Understanding of the metaphors and abstractions behind user interfaces (desktop, files, folders) and concepts such as file sizes.
- Knowledge of how to make certain useful configuration changes (printers, software installation).
- General understanding of image editing.
- Understanding of network storage capabilities (Xythos, network shares).
- Awareness of risks present online and how best to counter them.

The pursuit of this goal will augment progress in all other areas by ensuring that students, faculty and staff are competent computer users. This means that they will be less susceptible to problems (viruses, configuration issues) and more able to learn new software packages when necessary.

¹ (Google Search: email etiquette business)

This type of training is not currently offered. However, it should be possible to develop appropriate modules in collaboration with CATS and/or Booth Library or independently if necessary. The college should also develop and implement a plan to encourage faculty, staff and students to participate in these training sessions and monitor progress in order to improve the training in the future.

Goal 5. *Provide a basic grounding in technology-related ethics.*

The modern academy has been transformed by the wide availability and easy storage of massive quantities of data. Research, teaching and administration have all been improved by the internet and modern computers.

At the same time, technology has presented a number of new ethical challenges that must be faced nearly every day. These challenges include file sharing, information privacy, and copyright infringement and attribution.

It is important that faculty, staff and students have at least a basic understanding of these issues so that they can make better use of the resources technology presents and more effectively represent the university while doing so.

To this end, the college should seek to implement a basic training program and/or literature that would educate faculty, staff and students about these issues and should provide incentives for completion.

Special Skills and Competencies

Beyond the general competencies detailed previously it is necessary for some faculty, staff and students to acquire and maintain special skills in order to pursue their research interests or specific university programs such as distance learning.

Most of these goals will only apply to certain groups of individuals as opposed to the entire college. Some of them should be supported at the departmental level although the college should, of course, facilitate this support to the greatest possible extent.

Goal 6. *Make productive use of distance education software and tools.*

The university, through CATS, supplies several software packages and services that are useful for implementing distance education courses. These include Elluminate, Course Cast (Spring 2009) and the ability to place streaming and other media online in the form of podcasts and weblogs (blogs).

Departments or faculty members interested in developing distance education courses and materials should understand all the tools available to them before they begin. Faculty members who are already teaching distance education courses should continually update their knowledge and skills so that they can offer the best possible experience to their students.

The college should take advantage of programs offered by CATS to complete this goal.

Goal 7. *Promote competence with research technologies and databases.*

One of the major purposes of any university is to pursue a research program that contributes to the wider body of human knowledge and augments the instruction offered to its students. To this end, it is important that the college ensure that appropriate research-oriented software and hardware tools are available to faculty and students.

These tools may include computers for data collection and processing, instruments for measurement and data collection, software packages for analysis and categorization of data and article and data indexes. While the college lacks the resources to provide every piece of research software and equipment that might be useful, efforts should be made to provide the greatest value using the resources available. At the same time, alternative sources of funding (internal and external grants, departmental collaboration) should be harnessed whenever possible.

Some examples of research tools include:

- Statistical and data analysis packages such as Stata, SPSS and SAS.
- Data collection and analysis tools such as Labview and arcGIS.
- Article indexes such as JSTOR, SSRN, Lexis-Nexis, THOMAS, EBSCO, PubMed and Scitation.
- Simulation and mathematical tools such as Matlab, Mathematica and Maple.
- Publication and document formatting tools such as Latex, Origin, gnuplot and Endnote.

In order to maximize the value of the research tools available, students need to become familiar with their use. By the time they graduate, students should be familiar with the major analytical and research tools employed in their respective fields.

In conjunction with other research tools, students must understand how to find high-quality information on the internet. This should include the ability to evaluate the reliability of various sources and effectively use search engines such as Google and Yahoo! to find the most relevant information possible.

CATS and Booth Library already offer training on many of these topics. However, the college should work to make sure that any gaps in coverage are filled in and that the training modules offered correspond to the needs of departments within the college.

Infrastructure Development

In order to make the best use of available technology, it will be necessary for the college to maintain proper physical infrastructure either independently or through Information Technology Services (ITS) and CATS. The key infrastructure needs are discussed below. Each is followed by some discussion of its importance and some ideas on how it can be met by the college.

Goal 8. *Maintain classroom technology and provide sensible upgrades such as Smartboards and other emerging technologies where appropriate.*

Classroom technology has changed the way students learn and teachers teach. Computers, projectors, document cameras and other in-classroom technologies have allowed lecture material to move beyond the chalkboard. Instructors can now provide interactive examples of concepts and use multimedia to enhance their presentation of complex ideas.

Given the wide adoption of many of these technologies, it will be important for the college that they be maintained and, in situations where it is appropriate, upgraded with devices like Smartboards and document cameras. Maintenance of existing equipment and upgrades are expected to be provided through CATS and student technology fees administered by the Academic Technology Advisory Committee (ATAC).

In order to increase effective use of these technologies the college will need to collaborate with CATS to ensure that adequate training exists and that the benefits of this equipment is clearly communicated to faculty members. However, the college should work to ensure that more traditional methods of instruction are not crowded out by the new technologies and that faculty members retain the ability to choose the most appropriate delivery method for their material.

Goal 9. *Promote the regional lab concept to allow greater sharing of resources.*

In order for students to gain hands-on experience with the tools and techniques they learn in class it is necessary for departments within the college to have access to computer labs. Since it is not always feasible (and sometimes wasteful even when feasible) for departments to maintain their own computer labs the concept of regional labs should be promoted to the extent possible within the college.

Regional labs would be run by ATAC and shared between several departments based on physical proximity and overlapping needs. This would allow departments to offload the responsibility and, perhaps more importantly, the costs associated with maintaining a computer lab.

There are significant challenges to implementing this concept, however. First and foremost regional labs would require collaboration between departments on scheduling and “open” times. Also, participating departments will need assurance that they will be allotted sufficient lab time to meet their instructional goals each and every semester.

Moving forward, the college should work with departments to identify possible lab consolidation opportunities and assist them to overcome the challenges discussed above.

Goal 10. *Encourage and assist departments to make full use of university-provided resources to produce cost savings and better service for students, faculty and staff.*

In order to avoid duplication of efforts and save money departments should, whenever feasible, make use of university-provided resources such as the Citrix and key servers and Xythos (coming soon).

The college should encourage departmental collaboration with CATS to provide useful software products through Citrix, the key server or other license-sharing arrangements; especially those with interdepartmental interest. This can lower costs for departments by creating opportunities for cost sharing between departments or with CATS.

The college should also find ways to make use of ITS-provided facilities such as Xythos, which has the potential to reduce the need for department and college file servers going into the future.

Goal 11. *Implement comprehensive, secure and sustainable data storage and protection policies at the college and department levels.*

Data storage has become an important issue for many departments. Research and teaching data keep growing as research projects and techniques become more sophisticated and academic technology continues to improve.

The current solution consists of a mix of self-managed solutions and departmental file servers. This is unsustainable in the face of continually expanding needs and complexity.

Therefore, the college should move toward standardizing on a limited set of solutions that make use of ITS-supplied hardware and software whenever possible. These solutions could include consolidating file servers using college-level disk arrays and shifting data to the upcoming Xythos system.

Goal 12. *Establish a standard purchasing plan, possibly in conjunction with other colleges or ITS, to improve maintenance and reduce costs.*

Currently departments are responsible for their own computer purchases. This is inefficient since it increases up-front costs by reducing volume and support costs by making standard support solutions for difficult to develop and implement.

The college should work to become a more cohesive entity in terms of computer purchases. This could be accomplished by creating standard configurations and providing incentives for departments to choose from among those configurations when making computer purchase decisions.

It should also be possible to work with the Academic Technology Advisory Committee (ATAC) through CATS to collaborate on computer specs and purchasing to achieve even greater savings and efficiency.

Funding and Budget Issues

In order to maximize value in the face of ongoing budget cuts it will be important to identify and take advantage of extra funding and opportunities for resource sharing. The college will need to provide leadership in this area but it will also require a strong commitment to communication and potentially some compromise on the part of the departments.

Goal 13. *Actively seek out new sources for funding college technology needs.*

Given the reality of constrained budgets in the near to mid-term departments within the college will need to take advantage of any additional funding sources that present themselves. The college should attempt to coordinate these efforts and provide assistance wherever possible. However, the burden of identifying and promoting projects that are candidates for such funding will fall to the departments and faculty.

Goal 14. *Promote interdepartmental collaboration and resource sharing.*

The College of Sciences is a diverse collection of departments but there are still a large number of common technology and software-related needs. These overlapping needs create opportunities for greater efficiency through resource sharing and the college should work to take advantage of these opportunities.

The greatest challenge to doing this will be encouraging interdepartmental communication and collaboration. The college should work to promote such collaboration using several strategies:

- Work to inform faculty about what technology and software their colleagues in other departments are using to help faculty members identify possible collaboration opportunities.
- Provide a master list of technology and software being used in each department along with the potential for each to be shared with other departments.
- Keep track of departmental technology and software purchases more closely to help identify sharing opportunities in a top-down manner.

Greater collaboration has the potential to not only reduce costs but increase the resources available to faculty and students by allowing the college to maintain more equipment and software and make it available to more departments.

Implementation of Technology Plan

Naturally, the hardest part of any plan tends to be the execution. The implementation of the COS Technology Plan will be no different. Some of the goals enumerated in this plan are possible on a short time horizon, others may take years to accomplish.

In order to accomplish the goals detailed above it will be necessary to prioritize projects within the college based on how effectively they advance one or more of the goals. The college should also strive to assist in completion of these projects as much as possible. This can be accomplished in a variety of ways:

- *Provide financial incentives to departments for completion of projects that advance Technology Plan goals including integration of technology competencies and training into course and program requirements.*

The college should make arrangements to provide extra funds for departmental or inter-departmental projects that substantially advance the goals outlined above. This should include equipment and general funds and should be made available based on an assessment of how effectively (and efficiently) a given project advances one or more Technology Plan goals.

The college should also collaborate with departments where possible to integrate technology goals into the curriculum either directly through in-class instruction or through participation in training sessions.

- *Work directly with CATS and ITS at the college level to advance Technology Plan goals.*

The college should work with CATS to improve training opportunities and acquire additional software in line with Technology Plan goals. The college can also harness CATS resources in a number of other ways including audio/video production and streaming, web site design and management and course-delivery technology.

The college should also work closely with ITS and make use of any services or products they offer to the university community. The college should stay informed regarding the ITS planning process to minimize duplication of effort and simplify the transition to new technologies. ITS can also help the college generate substantial cost-savings by providing the ability to centralize many services such as storage and share those resources between departments.

- *Improve communication between departments to improve collaboration and allow college-wide solutions to be implemented where appropriate.*

The College of Sciences is quite diverse, but there is still a great deal of overlap between departments in terms of technology and training needs. These overlaps are a source of potential efficiencies but better communication between departments on technology issues will be necessary in order to realize them.

The college should provide opportunities for communication at a faculty level so that individual faculty members can work with their colleagues in other departments to identify similar needs and take initial steps toward filling those needs in a collaborative manner.

The Assistant to the Dean for Technology should work with departments and the college administration to make sure that these strategies are implemented and that progress is made toward completion of the Technology plan goals.

At the same time, department chairs and faculty members should be encouraged to take initiative in finding new ways to use technology more effectively and efficiently within their own disciplines or by cooperating with their colleagues in other fields.

To facilitate this sort of communication, the Assistant to the Dean for Technology should make efforts to work with faculty from different departments to identify ongoing concerns or needs and work to solutions. However, ultimately it must be the responsibility of departments to seek partnerships amongst themselves. These partnerships may then be coordinated by the Assistant to the Dean for Technology.

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