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The Effective Use of Academic Technology at the University of Tennessee

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PROJECT TITLE: <u>The Effective Use of Academic Technology at the University of Tennessee</u>

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I have reviewed this completed senior honors thesis with this student and certify that it is a project commensurate with honors level undergraduate research in this field.

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Academic Technology

At

The University of Tennessee

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Senior Honors Project

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Contents

For a millennium, mankind has tried to find educational tools to improve and assist in the learning process. This search snowballed in the 20th Century with the rapid development of technology as part of the Information Age. Educational institutions have struggled to keep up with a technology frontier which is continuously in flux. A wide variety of options are now available in the education sector with everything from wireless classroom applications to online portals offered. Unfortunately, many schools, especially colleges and universities, have found it difficult to use these new tools effectively in the classroom. Academic technology is one of the most exciting but least understood fields of the information technology (IT) industry. No company or school has yet to find the perfect formula for the use of academic technology; it is still very much a process of trial and error.

Before a discussion of academic technology can begin, the field must be defined. Academic technology, also known as instructional or educational technology, is the use of technology to aid in education. It can include things such as computer-based lectures, internet usage, multimedia, and even e-mail.[1] According to research from Dr. Kenneth Mayer, computer usage in higher education is on the rise. Data compiled in 1998 showed that forty-five percent of courses in higher education used e-mail and twenty-five percent used the Internet for course materials. The use of e-mail in 1994 was only 11.5%, thus its use increased a staggering 400% according to date from the Campus Computing Project.[2]

So why use academic technology? It requires more training, uses additional financial resources from strained academic budgets and is difficult to implement. Studies are inconclusive but surveys show that students enjoy classes more when academic technology is adopted. In Mayer's study, ninety-five percent of students said instructional technology made the lectures more interesting and ninety-four said

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[1] Kenneth Mayer, "Student Attitudes," *PS: Political Science & Politics* Sep. 2000.
[2] Mayer "Student Attitudes"

it improved note-taking.[3] A study taken by the Valley City State University in North Dakota had similar results; in 2001 the data showed that seventy-seven percent of students there agreed or strongly agreed that academic technology makes it easier to be involved in the learning process and seventy-eight percent feel it makes it easier to work in groups.[4] Different students learn in different ways; researchers have identified a multitude of learning styles. Unfortunately, it is impossible for a professor to adopt educational practices that will engage all students. The gap can be bridged by the use of academic technology. "Technology adds choices as to how, when, and where students access learning opportunities," writes Dr. Karen Smith, a researcher in instructional technology.[5]

The University of Tennessee's main campus in Knoxville has not been immune to the diffusion of technology throughout the academic environment. As an institution, UT is in many ways far ahead of its peers in some academic IT areas while in others it lags behind even mediocre schools. Many of the University's struggles stem from an ongoing budget crisis; nevertheless, changes can be made to vastly improve the effectiveness of academic technology at UT without an infusion of new money. The University of Tennessee has been a leader at finding innovative ways of using and distributing technology. This approach needs to be continued and expanded in the field of academic technology. The University of Tennessee is at a crossroads; it is time to seize the moment and push UT into the forefront as the leader in academic technology.

Problems Facing Higher Education

There are a plethora of problems facing the proper use of academic technology in institutions of higher education. First and foremost is a lack of central planning and communication among various departmental IT staffs. In many cases,

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[3] Mayer "Student Attitudes"

[4] Kathryn Holleque, *Technology and Education* (Valley City: Valley City State Univ., 2002) 3.

[5] Karen Smith "Preparing Faculty," *Cause/Effect* Fall 1997: 44.

an institution will have an Information Technology department and then individual academic departments will have their own IT staffs. Academic decisions are made by a third administrative group such as a Curricula or Undergraduate Council.[6] With decisions spread among so many groups, it is not surprising that academic technology suffers.

Another problem facing all institutions, no matter how effectively they use technology in an academic environment, is how to keep up with the ever-changing technology frontier. Institutions are hard pressed to find the time and resources to keep pace with the flood of technology. Yet despite this, many try. Universities attempt to stay ahead by having the latest and greatest tools deployed instead of utilizing existing resources to their maximum benefit.

One of the biggest problems in the implementation of academic technology is the time professors must take to learn to use the new tools and also, more importantly, the time it takes to modify lectures and adapt teaching methods to the new technology.[7] Graduate students and computer experts generally must be used heavily in the process, thus taking the professor away from the course design. Dr. Smith states this leads to two negative consequences. First, there is a split between what the professor wants and what is ultimately developed. More ominously, when the personnel who design these courses transfer or retire the course must be either retooled or dropped.

Another problem is that of access. Technology resources are finite and professors who know how to use these tools must compete for what is available.[8] As more equipment, tools and training become available, the problem is alleviated. Unfortunately, as new technology is adopted the process repeats itself.

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[6] Susan Metros, Personal Interview, 3 May 1999.
[7] Smith 44.
[8] Smith 44.

There is very little incentive for faculty to use academic technology. Very few institutions have any sort of reward system in place to encourage its use.[9] In fact, the extra training required and the time needed to use academic technology and adopt it to a specific course is more of a bane than a boon to instructors.

Problems Specific to the University Of Tennessee

A severe budget crisis haunts the University of Tennessee and other state-affiliated institutions in Tennessee. A deadlock in the state legislature over how to raise revenue leaves UT with little choice but to cut funding in many areas, among them academic technology. Although students pay a technology fee, the money collected must be spread among several areas and is not enough to cover needed expenses and upgrades.[10] Without new state revenue an alternative funding source must be devised such as raising the technology fee or tuition to cover improvements to academic technology.

Older faculty members tend to have difficulty adjusting to and are opposed to changing classroom protocols to support new technological innovations. Once faculty members have tenure, they have little incentive to keep abreast of new academic technologies. While many professors wish to use any tools they can, there are some faculty who will not change without being required to do so.

The University of Tennessee lacks a single, institution-wide vision for the use and application of technology in the academic environment.[11] Without a specific framework in place, it is difficult for the University to know when its goals for academic technology are achieved.

There is not enough contact between academic departments and the University's Office of Research and Information Technology (ORIT). The academic units of UT are operated under a separate administrative structure from the

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[9] Smith 48.

[10] Technology Advisory Board meetings. Jun 1999 – Apr 2002. University of Tennessee.

[11] Metros.

information technology divisions of the campus.[12]   Although the Innovative

Technology Center (ITC) exists to facilitate the use of academic technology, the

command structure causes difficulties when it comes to facilitating ventures across

the various undergraduate and graduate academic units. ITC is given the difficult

job of providing academic technology to campus even though a tight budget can

potentially make it difficult to keep the faculty trained in current and emerging

instructional technologies.

In a similar vein, coordination among academic and administrative

departments has been very poor. The administrative split between the information

technology and academic aspects of campus hurts in several ways. Moreover, the

academic units of campus are further split. Thus the Computer Science department

or the College of Business may be doing something very innovative with academic

technology but those advances go unnoticed by both ORIT and other academic units.

Some professors say new classroom innovations have been poorly publicized

and faculty members are not trained on how to use these resources effectively. ITC

announces the implementation of new technology and the free training associated

with this technology but there are professors who have said they are not aware of

the vast amount of resources at their disposal. "I didn't know anything about it,"

said Dr. William Lyons, professor of Political Science.[13]   Professors are inundated with

information and thus can be unaware of the training ITC offers.

There is a large gap between the level of technology at UT and the level of

expertise on how to use it. Unfortunately, this problem was not tackled until the

past year. Discussions between various student groups and divisions of the Office of

Information Technology (OIT) have led to a renewed look at how technology is

deployed. Ms. Faye Muly, acting head of OIT, has stated that she would like to see

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[12] Office of the President. *Organizational Chart*. University of Tennessee, 2001.
[13] William Lyons, Personal Interview, 8 Oct. 2001.

more resources devoted to improving the use and understanding of existing technology at the University of Tennessee.[14] The question is whether the IT division should be devoted to hardware/software or to services. It is still being answered in various administrative committees such as the Technology Advisory Board.

Strengths of Academic Technology at the University Of Tennessee

Despite these drawbacks, UT is a leader when it comes to the deployment of technology. UT is far ahead of its peer institutions when it comes to its technology infrastructure. Due to the funding provided by the technology fee and the aggressiveness of various OIT departments, UT has stayed on the cusp of cutting-edge hardware and software. Moreover, refreshes to the network infrastructure and a desire to stay on top have allowed UT to be among the foremost in both wired and wireless network solutions.[15]

Academic resources can be coordinated from a central department, ITC, which is itself part of UT's Office of Research and Information Technology. UT has developed a department whose purpose is to improve and extend the use of academic technology. Although difficulties remain in keeping ITC in charge of and coordinating academic technology for the various academic departments and units, the structure is in place. ITC has developed a platform of tools and services for professors to teach them how to use technology in their classes, in other words, to teach the teachers.[16]

UT's new administration including Provost Crabtree and President Shumaker has expressed support for more classroom innovation, including the use of technology to enhance learning. Provost Crabtree has expounded his desire to improve the classroom environment, especially through the effective use of

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[14] Faye Muly, Personal Interview, Jan. 2002.
[15] Technology Advisory Board.
[16] Metros.

technology.[17] In a 1997 speech to Kentucky Governor's Scholars, then University of Louisville President Shumaker noted that an institution must use technology to be a leader.[18] Now that Dr. Shumaker has been appointed President of the University of Tennessee, he will have the chance to further that idea of using technology to create a leading academic institution.

What Other Institutions Are Doing

One way of improving academic technology is seeing what other schools are doing and implementing what works while avoiding what does not. Many times UT looks to its peer institutions to gauge performance but in a field such as academic technology, it is imperative that the best schools are used for comparison. Why? Academic technology offers a level playing field. The use of these tools is not limited by educational background of the student body. There is nothing that keeps UT from being as good as or better than an Ivy League school in this field.

The Emory University School of Law has been innovative in simplifying the process of final exams. In most schools, final exams are either given as a hand-numbing in class essay or an extensive take-home project, neither of which are appealing to the professor or the student. Emory has pioneered the use of online exams. Essays are typed and submitted online to the professor, who then has the option of reading them on screen or printing the results.[19] The online essay system saves time, paper and tends to improve the quality of essays, according to University officials.

The California Institute of Technology (CalTech) has long been recognized as one of the nation's cutting edge schools. CalTech's use of academic technology ties students, professors and research together into its six academic divisions. Each class has an online presence. Syllabi and other pertinent materials are posted

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[17] Loren Crabtree, Address, Student Leader's Retreat. 12 Oct. 2001.
[18] John Shumaker, Address, Centre College KY Gov.'s Scholars. 19 Jul 1997.
[19] Emory University School of Law, Campus Visit, 14 Dec. 2001.

online; instead of printing out copies to be lost all of these materials are readily available to students on a round-the-clock basis.[20] Each professor also has a page which has links to their classes and a downloadable information packet about their research interests.

A similar system is also in place at Georgia Tech. A conversation with Georgia Tech student Damon Amos in the summer of 2000 revealed that Tech has a system where students log on and electronically submit homework projects in certain subjects such as math and computer science. Mr. Amos logged onto the system and showed how these submissions are graded immediately and the score is instantly available to the student.[21]

The University of Michigan's academic technology is coordinated by the Instructional Technology Computing Environment (ITCE), part of the Information Technology Division. The ITCE has an online site where professors can make reservations for the University's technology-equipped classrooms, either for a semester or for a one-time occurrence. It also allows professors to make specialized software available to their students. The site has a Classroom Handbook that professors can use to see how to best use the technology classrooms.[22]

The University of California – Los Angeles (UCLA) has a unit entitled Academic Technology Services. From the ATS website, professors have access to a wide variety of resources. ATS provides the Visualization Portal, which allows wide-screen showings of classroom information; iMedia, that provides internet related media content; and even designs specialized software for classroom use.[23] The ATS acts as a central repository for all instructional technology at UCLA; professors can even get

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[20] Prochazvka, Aurelius, California Institute of Technology, http://www.caltech.edu.
[21] Damon Amos, Personal Interview, Jun 2000.
[22] Campus Computing Sites, University of Michigan, http://www.umich.edu/~sites/instrtech/.
[23] Academic Technology Services, UCLA, http://www.ats.ucla.edu.

information about software license agreements and utilize resources to allow students with disabilities to get the full effect of classroom technology.

Creighton University makes use of a public-private partnership to further instructional technology. Creighton has developed an Academic Development and Technology Center whose goal is the "improvement of instructional quality at the University through the technological enhancement of faculty teaching skills."[24] The center is funded by an endowment from US West. Each year ten "eFellows" are selected to do research in the center. The money allows US West to test and have research utilized on its communications technology.

The Academic Technology Center at Cornell University brings together several different aspects of academic technology into a single department. ATC provides consultants (available even during walk-in assistance), access to technology facilities, training and course technology including the CourseInfo templates and audio and video streaming.[25] The center allows faculty, graduate students and even staff to use its resources.

The Center for Instructional Technology provides academic technology at the University of North Carolina at Chapel Hill. The center's mission is to assist faculty, staff and GA's by providing them with support for various instructional technologies.[26] Its services are akin to those provided by technology centers at other schools. It also has several publications on instructional technology that serve to foster the adoption of such technology in the academic environment.

The University of California at Berkeley takes classroom audio and visual services and combines them with online course site resources to create Educational Technology Services. Berkeley's services are extensive; they include online course design, classroom technology services, video services, and even webcasts of classes

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[24] ADATC Center at Creighton, Creighton University, http://mentor.creighton.edu/htm/descrip.htm.
[25] Academic Technology Center, Cornell University, http://www.cit.cornell.edu/atc/.
[26] CIT: About the CIT, University of North Carolina, http://www.unc.edu/cit/about.html.

(which can be very beneficial in distance learning initiatives).[27] Berkeley also offers

training and teaching grants to help faculty use academic technology.

In 1997, the Provost of Harvard University created a new committee to

improve the use of academic technology.[28] This committee, the Harvard Academic

Computing Committee (HACC), has several responsibilities including the coordination

of academic IT strategies, faculty programs involving technology, create standards

and goals for academic technology, and overall create a unified forum for academic

technology on Harvard's campus. The HACC is composed of representatives from

Harvard's student body, faculty, administration and IT staff. It also has regular

workshops and conferences to help facilitate coordination and adoption of academic

technology.

Truly Interactive Learning

One vastly under-utilized aspect of academic technology is its ability to

provide truly interactive learning. UT is even more blessed in this regard because of

its involvement with Internet2. With recent cutbacks, many experiments and

demonstrations can no longer be afforded. Fortunately, academic technology can

help the situation. An educator anywhere, for instance an archeologist on a dig in

Israel, can communicate in real-time with a class. Moreover, students in the

classroom have the ability to ask questions. Instead of watching a video or

slideshow, the action takes place live and more importantly, interactively.

Even more compelling is interaction within a classroom. In a class of thirty it

is simply a matter of directly asking the professor a question. This becomes more

difficult in a class of a few hundred. One of the benefits of the new wireless network

is that students can communicate directly with the professor or do additional

research in what would be a non-interactive classroom setting. A real-world example

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[27] Welcome to Educational Technology Services, UC-Berkeley, http://media.berkely.edu.
[28] Harvard Univ. Academic Computing Committee, Harvard U., http://www.provost.harvard.edu/hacc/.

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arose in an International Law class taught by Dr. April Morgan. When the question of what a nautical mile is was brought up, no one knew the answer. Instead of Dr. Morgan having to go home and look the question up, it was answered with a quick internet search via the campus wireless network.[29] With instant access to information around the globe, learning is accelerated and enhanced.

What Professors Think Should Be Done at UT

No discussion of academic technology would be complete without input from professors. After all, it will be the faculty who are the ones who utilize these tools. Moreover, academic technology solutions must be tailored to individual professor's needs and subject matter. The ability to control machines from a wireless device would be practical in engineering but useless in English.

One complaint from professors at UT who utilize ITC training is that there is a lack of follow-up. Dr. Thomas Broadhead, geology professor, laments the fact faculty are trained on how to utilize tools such as Blackboard but after that there is nothing – no follow-up a week or a month later to see if the training was effective.[30]

Faculty members also complain they are not consulted when changes are made that affect them. Presentations and reports are not generally made to Faculty Senate and there are only token faculty members on the various technology administrative committees and boards.[31]

Professors would like to see more postings of what is offered. Instead of disseminating information through departments, some faculty members suggest a more direct approach through mass e-mail or mass mailings.

What Should Be Implemented At UT

The University of Tennessee needs to form a committee to draft a vision statement for academic technology. This statement should include a list of

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[29] April Morgan, lecture, 13 Nov 2001.
[30] Thomas Broadhead, lecture, 29 Apr 2002.
[31] Metros.

attainable goals, a plan on how to achieve those goals and a command structure for delegating responsibility to various departments to start implantation of the plan. This committee would operate similar to Harvard's Academic Computing Committee. Composed of representatives from the faculty, SGA, ITC, and the administration, it would serve as a central facilitator for coordination in academic technology. Perhaps it could even serve as a catalyst for improving all administrative technology committees. (See Note 1)

Technology needs to be viewed as a tool to enhance learning. In other words, technology should not be used for technology's sake. Tools that will not enhance learning should not be implemented, no matter how "cutting-edge" they are. If they will not improve the education of the student or help the professor in educating the student, then these tools must not be utilized. The money can be more effectively spent on other resources.

Instead of viewing things individually, technology should be seen as a sum of its individual components. For example, the new wireless technologies can be used to access library databases and support information while a student is in the classroom. Questions can be answered in real-time rather than a professor having to come back later and answer it. The new Blackboard course-management system can be used to integrate online learning into a simple, unified interface. Also, links to Blackboard (the Online@UT site) should be placed on the UT homepage, the Webmail page and even perhaps worked into the navigation bar present on many UT sites.

Faculty should be required to take technology refreshers every three years. Compulsion will be difficult to achieve but it is absolutely necessary to ensure that technology is used and used effectively. Unfortunately this will be a drastic step. The administration will need to implement this plan and a strong case will need to be

made. To help alleviate the tension, the student body should be in full support of the plan and it should be presented to the Faculty Senate for their review.

The plan to involve the faculty in mandatory training will require work by the student body. This can be achieved by working with Student Government representatives in passing legislation that would be in support of the training goal. This legislation would need to be very clear in stating that any changes would still provide professors will full academic freedom. (See Appendix A)

Even more important is to get the faculty in line with adoption of the training program. If a nucleus of support could be obtained in the Faculty Senate, it would go a long way toward the eventual adoption of the plan. If enough support is garnered, perhaps a bill could be passed in that body as well. (See Appendix B)

Innovation is key. As a university, it is UT's responsibility to experiment with academic technology. Different departments should offer pilots of potential technology uses to get "real-world" date on what should and should not be done. This is where collaboration and communication will be necessary. Academic units and OIT must work together to achieve the full benefit of these pilot projects.

On a similar note, there needs to be more transparency between OIT and the various academic units. Command structures need to be modified so that staffs of all units work as a cohesive group from the top administrative levels on down to the individual professors and IT staff members. More faculty need to be involved in IT meetings while IT staff need to be invited to and attend academic functions such as the Undergraduate Council, the Teaching Council and the Faculty Senate.

More dollars are needed to allow ITC to hire the staff needed to train faculty. Unfortunately, the short-term outlook is not good. Nevertheless, progress should not be kept in check because of the funding crisis limbo. If necessary, alternate revenue sources need to be found and utilized. Also, resources need to be pooled so that academic departments and IT units share the costs of training.

Part of the training professors receive should include follow-up a week later. Those who were trained should be contacted in some way to see if they need any additional help or if they remembered what they were taught. Short, periodic refresher courses also should be offered. In addition, more contact needs to be made directly with professors. OIT and especially ITC need to cultivate a relationship with the faculty, perhaps through an organizational structure such as Faculty Senate. At the very minimum, regular reports need to be made directly to faculty groups about what is going on and what is offered within ITC.

Although up-to-date hardware and software is needed to utilize academic technology, UT does not necessarily need the latest tools. Instead, a cutback in the refresh rate of technology could free up money for more training on existing resources. By lengthening the refresh cycle even six months or a year, a great deal of money would be saved.

Like Creighton, UT could try to engender partnerships with private corporations to obtain funding for academic technology. There are several media and technology companies in Tennessee that might provide funding or at least resources to help spawn a program. This would allow the University to move forward in the realm of academic technology despite the funding issues.

UT needs to stop viewing things in terms of what peer institutions are doing. To be cutting-edge, UT needs to see what the educational leaders are doing and stop settling for mediocre. UT needs to take quality ideas such as online exams and online research and implement them. Schools that are ranked at the forefront of academic technology should be used as examples, despite the protestations of the state legislators who say UT should not be a "Harvard by the river."[32] Unlike many universities, UT has the staff and infrastructure already in place to allow it to rise to new heights in the field of academic technology. If used effectively, those resources

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[32] Timothy Burchett, address, Sep. 1999.

could propel UT to the vanguard of a cutting-edge field which would bring prestige and ranking to the University.

Conclusion

Although it is difficult to keep up with the ever-changing climate of academic technology, UT has the resources available to become a leader in the field. It will take a concerted effort of the faculty, staff and administration, led by the staff of OIT, to do so. Many changes will need to be made, some are already in the works while others will take time and will need to overcome much resistance to be completed.

There are those who question the need for improving or even using academic technology. Yet it provides benefits, especially when used properly. As an institution devoted to education, UT cannot afford to sit back. Academic technology can provide the tools needed to train students; especially those who would otherwise struggle in the learning process (as noted earlier in research by Dr. Smith).

The field is a frontier and like any frontier, it is rough and ever-changing. Yet the University of Tennessee has one key strength to overcome the tumultuous nature of the academic technology cusp: the members of its IT staff. The individuals in OIT and ITC are trained and have the drive to stay ahead. Moreover, UT can look to other schools to see what works. Like old frontier towns, each university must work with the other to stay on top.

These are trying times. Budget cuts and turnover make things more difficult in a field that can be at times, exasperating. Nevertheless, with some perseverance UT will take a great jump into the future – a future that will indeed be bright.

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Appendix A

Sample SGA Bill for Requiring Professorial Training

Title: Academic Technology Training Refresh

Whereas, technology is continuously changing, especially the technological tools used in the classroom environment, and,

Whereas, the faculty of the University of Tennessee need to be kept abreast of these new developments, and,

Whereas, without a requirement it is unlikely that UT will ever get all faculty to accept training in new classroom and academic technology,

Be It Hereby Resolved, that the Student Government Association requests the administration adopt a rule requiring all faculty to take refresher courses every three (3) years on academic technology, and,

Be It Hereby Further Resolved, the Student Government Association respects academic freedom and that although all faculty members will be required to be knowledgeable when it comes to academic technology, this will in no way infringe upon their teaching and they will not be required to use their training in their classes.

Appendix B

Sample Faculty Senate bill

Title: Academic Technology Training Refresh

Whereas, it is often difficult for faculty to keep abreast of new offerings in the field of academic technology, and,

Whereas, the Faculty Senate has taken a strong stand in the past in support of innovations which will help improve the learning experience of their students, and,

Whereas, the Faculty Senate continues to support the academic freedoms and professorial license faculty members enjoy in the classroom, and,

Whereas, the Faculty Senate recognizes the need for training in the field of academic technology,

Be It Hereby Resolved, the Faculty Senate supports the requirement that faculty be trained and refreshed in academic technology every three (3) years, and,

Be It Hereby Further Resolved, the Faculty Senate recognizes and supports the fact that this will in no way infringe upon faculty rights inside the classroom and this training will not be a requirement in the classroom thus no professor will be required to modify his/her teaching methods to use his/her training.

Notes

Note 1:

The creation of an administrative committee to oversee academic technology could be couples with other changes. Currently, there are several faculty, student and administrative technology committees who work independently of one another and sometimes without knowledge of the work of other IT committees. A streamlined system would help improve the work of these various committees. A large, ultra-committee could be formed from all areas of campus life. From that committee, sub-committees could be chosen to work on various areas (i.e., Technology Advisory Board for technology fee, academic technology committee to oversee instructional technology, president's committee to advise the president on IT issues, etc.). Each sub-committee would know the work of other sub-committees. This could allow coordination and a better tackling of IT issues on campus.

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Dr. Dewitt Latimer, Executive Director of IT Infrastructure

Dr. Julie Little, Director of Innovative Technology Center (ITC)

Dr. William Lyons, Professor of Political Science

Ms. Susan Metros, Deputy Chief Information Officer at Ohio State University

Dr. April Morgan, Professor of Political Science

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SGA Technology Services Committee