REPORT OF THE PROVOST'S SPECIAL COMMITTEE ON INSTITUTIONAL INNOVATION IN COLLABORATIVE TECHNOLOGIES FOR LEARNING

January 2009
REPORT OF THE PROVOST'S SPECIAL COMMITTEE ON INSTITUTIONAL INNOVATION IN COLLABORATIVE TECHNOLOGIES FOR LEARNING (the Learning Technologies Committee)

"Never has the need been more pressing for the University of Michigan to examine its relationship to information and communication technologies." 1 So begins the President's Information Revolution Commission Report, a document submitted to then President Lee Bollinger in April 2001. That claim is even truer in 2009. In the eight years since the report was written, the world has changed dramatically. Access to the Internet is ubiquitous. Current technologies provide flexibility in communication, and this flexibility allows transactions that are independent of time and geographic location. The presence of web 2.0 and the advent of 3.0 technologies are enhancing interactivity while at the same time reducing institutional boundaries. Network speed and data capacity continue to increase, and other advances in cyberinfrastructure offer the underlying technical environment for ensuring long-term sustainability. The proliferation of collaborative information and communication technologies are not only rapidly altering the way individuals relate to and communicate with each other, but within the academy they are having deep impacts on learning and teaching and promise to have profound effects on the future of academic institutions and on education in general. Given the rapid pace and evolution of communication technologies, how do we, as a university, respond in order to demonstrate effective leadership in this arena, provide coherent institutional support for innovation, and reap maximum benefit from common practices, economies of scale, comparative advantages, and sustained and effective knowledge transfer?

Background

The University of Michigan, like most institutions of higher education, has fully embraced technology as a tool that helps us do better what we already do well: create and share knowledge. As an institution we no longer question whether advances in communications make it possible to improve the ways in which we disseminate knowledge and collaborate with students and colleagues. But the transformation wrought by changes in communication technologies is far more profound than that. The continuing explosion in information technology has not simply improved communication—it has broken barriers to communication that have existed throughout history. Without those barriers, we socialize differently, we learn differently, we trade differently, and we do business differently. Without those barriers, we see that traditional educational approaches are not necessarily dictated by the mission of the academy, but rather by the modalities of communication that once constrained us. At an institutional level, our university needs to embrace the truth that current technologies are not simply tools for doing the same things better, but can in fact be used to do things in a different way entirely, in closer alignment with the university’s core mission.

Our mission as an institution is to prepare new generations of learners to be global citizens, scholars, and leaders. The world in which they will do so—in which they are already doing so—uses tools of practice in the pursuit of knowledge, commerce, and social well-being, which are evolving at a pace that jeopardizes the relevance of some aspects of the university learning experience. Increasingly, our new students attempt to inform their learning environments using information and communication technologies they accept as everyday practice. They enter the university with well-formed expectations for collaboration, peer-learning networks, and modalities of knowledge-transfer that they do not see reflected in the culture of this institution. As our peer institutions become more adept at advancing technology-enabled learning that is commensurate with an emerging technical culture in the world outside academia, our ability to recruit students and faculty will become increasingly challenged. Our competitive advantage will progressively decline if we can’t or don’t adapt quickly to these rapid changes in the environment.

We need to competently apply emerging technologies to existing learning environments, but it is insufficient to do only this. Nor is it necessary to so restrict ourselves. By engaging the entire university community—faculty, students, and staff—we can create a technology-rich environment in which interactive, collaborative learning flourishes. In so doing, we can place the U-M as a globally recognized leader in the transformation of learning.

The pursuit of this vision will require an institutional commitment to accelerate the presence and improve the quality of transformative learning practices. Quoting again from the President’s Information Revolution Commission Report: “With adequate investment in human capital and physical infrastructure, strong leadership, and coordinated, campus-wide involvement, the University can take the lead in redefining higher education in light of the information revolution. Without such commitments, our longstanding position of strength—not only in the application of information technology, but also in virtually all areas of research, scholarship, and teaching—will erode.”

In the eight years since this report was written, the university has continued to invest in physical infrastructure, has provided strong leadership in the area of information policy, and has continued its historical investment in human capital. In this and other ways the university has fostered an environment conducive to successful independent experimentation in the area of learning technologies.

The many innovative and promising learning tools that emerge on campus, developed and implemented by faculty and students, are a testament to the catalytic working atmosphere at our institution and to the quality of people that this atmosphere attracts. This environment, which invites experimentation with new ideas, is crucial to the health of the institution and must be preserved.

While we have fertile ground for local innovation, there are serious gaps in the process of innovation and development that hinder us from realizing our full potential in this arena.

---

2 Ibid.
We have many of the resources needed to move innovative learning technologies to the appropriate levels of adoption, but the university has not applied these consistently and efficiently, and in alignment with its articulated strategic vision and priorities. Some specific examples of gaps that impede innovation are the following:

- Incentives for the innovator, in the form of potential university resources, to lower the threshold of entry to institutional adoption;
- Institutional support for the complex stages of evaluation, incubation, and implementation;
- Consistent criteria and staffing to provide the institution with a sense of the level of adoption appropriate for any given innovation, and a means of assessing the investment and institutional capacity to support it;
- The resources to free innovators from the significant effort of meeting compliance, security, and intellectual-property standards sufficient for institutional adoption; and
- Early advice and direction regarding technology selection that will enable cost-effective development of a sustainable learning-technology resource.

We cannot know the extent to which the lack of a more complete environment for innovation has resulted in lost opportunities—lost opportunities that might range from more cost-effective and timely development of new institutional capabilities to truly transformative advances in teaching and learning. With only distributed support for new tools, innovators initially devise those tools to meet their specialized needs and do so with few and limited resources. Consequently, as examples in the attached Appendix C illustrate, tools are often designed without the appropriate conditions for adopting them on a campus-wide scale, should it prove desirable to do so. In the absence of such conditions, a useful tool might spread virally throughout the university while lacking the architecture to make it sustainable in the long run.

By providing a common vision and coordinated support and incubation for efforts such as these, the university could achieve solutions that comply with appropriate requisites for widespread use and at the same time provide a platform for tailoring these efforts to specific needs. By finding the appropriate means of coordination to promote effective and efficient technology transfer, and by engaging the whole campus in the process, the University of Michigan can acquire the missing piece that will allow this institution to take the lead in redefining higher education.

**Charge to the Committee**

It is evident that academic technologies for learning are playing, and will continue to play, an increasingly important role in the life of the university. It is essential that we take a serious look at how we embrace these technologies so that we not only embrace them, but do so in the most efficient way possible. In order to do this, we need to make a firm
commitment to becoming leaders in the understanding, development, promotion, and dissemination of the best technologies for learning, teaching, and research.

To accomplish this in a coherent way, we need to determine the core resources that will best lead us to achieve these goals. It was to this end that the Provost charged the Special Committee on Institutional Innovation in Collaborative Technologies for Learning. The main goals of the committee were to consider:

- What kinds of environment will foster our leading the search for innovative ways to create and disseminate knowledge in the information age;
- What kinds of structures will support such an environment; and
- Once such an innovation has been proven useful, what type of structures will facilitate our disseminating and scaling it up to the institutional level.

The charge as given covers a wide spectrum of activities designed to foster, study, disseminate, and sustain innovations in technologies for learning. We have made recommendations that we hope will provide the necessary conditions for these activities to flourish at the university.

While the committee name speaks of “collaborative technologies for learning,” we have chosen to use the shorter “learning technologies.” We use this term to designate a broad range of information and communication technologies in support of learning.

The complete text of the committee’s charge can be found in Appendix A.

**Methodology**

To conduct its work, the committee met regularly during the summer and fall terms of 2008. The committee engaged in focused discussions to identify university needs in the area of learning technologies and recommendations for how to fulfill those needs. The committee’s deliberations were informed by meetings with and presentations from the following key interested parties on campus:

- John Williams, Executive Director, Digital Media Commons
- Constance Cook, Director, Center for Research on Learning and Teaching
- Paul Courant, Dean, University Library
- John King, Vice Provost for Academic Information
- Academic Technology Commons (AT Commons)
- Academic Computing Support Forum (ACSF)
- Neighborhood Group (representatives from AT Commons and ACSF, who belong to the U-M’s 14 smaller schools)
- Instructional Designers Group
Additionally, key references, which included readings, websites, and videos, were available to the committee via our CTools site. A bibliography can be found in Appendix D.

Learning Technologies Needs at the University of Michigan

The university has many unmet needs in the area of learning technologies, and these needs often vary by client population. Faculty on the cutting edge of learning technologies, for example, have different needs from faculty who are just starting to use new technologies in their courses. We have tried to organize these collective needs into three broad categories:

1. The need for increased attention to the future of learning technologies and strategic planning;
2. The need to discern when an innovation, emanating from the U-M or elsewhere, should become part of the infrastructure of the U-M;
3. The need for increased support for the dissemination of ideas and innovations, whether emanating from the U-M or elsewhere, across schools and college at the U-M.

I. Increased attention to the future of learning technologies and strategic planning

If we are to think ahead and plan strategically for the future of learning technologies on our campus, we must:

- Formulate a coherent vision for the university in the area of learning technologies;
- Monitor the internal and external environment so that we can anticipate challenges and opportunities; and
- Develop an organization with the knowledge and responsibility to recommend university-wide directions in learning technologies.

II. Ability to discern when an innovation, emanating from the U-M or elsewhere, should become part of the infrastructure of the U-M

We need the capability to track the innovations taking place across campus, provide proper incubator space for them, and determine if and when they should be scaled up to receive campus-wide support and dissemination. That is, we need the ability to decide what becomes part of our educational infrastructure, and when. Doing so will require:

- An effective, structured means of sharing ideas and knowledge among units;
- Incentives for learning-technologies staff to share their expertise among themselves;
- An understanding of how our students, faculty, and staff use and benefit from technology, and the implications of this for teaching and learning;
- Research on designing and understanding new technologies that leverage our best knowledge about how people learn;
• Facilitate collaborations among researchers on campus that study the relationship between technology and learning;
• Mechanisms for taking small-scale technology innovations and bringing them to scale, so that they can be available to the whole institution;
• Ways to keep institutionally supported technologies robust and accessible to faculty, staff, and students; and
• A commitment of support for the entire life cycle of a product, i.e., for both its development and dissemination, and then for its widespread usage.

III. Increased support for the dissemination of ideas and innovations, whether emanating from the U-M or elsewhere, across schools and colleges at the U-M.

We need to take a more aggressive stance in promulgating the use of advanced learning technologies in teaching and learning on our campus. Simply making information available isn’t sufficient for its dissemination. Specifically, we need:

• Increased faculty engagement with learning technologies;
• Incentives for faculty to develop new instructional applications;
• Support for faculty and students seeking individual help on design and implementation of novel learning technologies;
• Mechanisms for keeping faculty informed about innovative learning technologies as they become available; and
• Increased support for faculty to use new and existing learning technologies effectively.
Recommended Strategies for Fulfilling the Needs

An examination of the existing environment reveals several overarching themes regarding current structural deficits: the lack of an organizational structure that reflects and enables the flow of an institutional vision regarding learning technology; the lack of a comprehensive approach to the facilitation of innovation; and the lack of an organizational structure that enables different stakeholders to come together.

Faculty, often working with limited time, and, in some areas, limited technological expertise, require a user-friendly environment in which to acquire information about new possibilities, and guidance in the deployment of these resources. Other faculty, who possess ability to be leaders of innovation in the area of learning technology, need to be able to find support that is appropriate for the scope of their projects, and eventually a means to move their innovations into infrastructure. All members of the university community benefit from the availability of informed advice, evaluation, and collaboration.

Our first recommendation below speaks to the vision: what should it be, where should it come from, how should we sound the clarion call signaling to faculty and staff that we are poised to make a key transformation. For this piece we look to key thinkers from within and without the institution to advise the Provost.

Our second and third recommendations are based on a belief that we need an organizational structure that provides conditions in which transformative learning technologies can flourish. We believe that the creation of a new unit for this purpose would be inefficient, given the number and quality of resources already available to us. In particular, there are three existing units that do not reside in any school or college, that have ties to all of the schools and colleges, and whose missions each have strong components related to learning technologies: the University Library, the Center for Research on Learning and Teaching, and the Digital Media Commons. They each have unique capabilities to bring to the needed structure and we recommend a solution capitalizing on the strengths of all three.

The University Library has long partnered with all of the academic units on campus. It has an existing physical presence and a service model in the major academic loci of the university. It was a significant leader in the critical area of institutional stewardship for scholarly knowledge in a time when the preservation and dissemination of that knowledge required print, and it has continued this leadership into the digital age. The CRLT has vast experience in leading the campus in the actual classroom deployment of new materials and evaluating the impact on a course-by-course basis, and educating faculty on the use of new technologies. Finally, the Digital Media Commons is adept at fostering and incubating innovation, and through its years of doing so has amassed expertise in the skills needed to scale an innovation to the institutional level.
I. We recommend the creation of a strategic advisory council, consisting of leading thinkers both internal and external to the University, to provide strategic advice to the Provost on matters related to transformative technologies in learning environments.

Specifically, the strategic advisory council should work with the Provost to:

- Challenge U-M’s default practices and assumptions regarding learning practice in our transformational age;
- Think strategically about where education is headed and how learning technologies fit into that picture; and
- Recommend strategic goals for learning technologies at the University.

II. We recommend that the University Library be charged with fostering and enabling a more efficient and rapid deployment of transformative learning-technology and related pedagogies at the U-M. In this role the library should identify, incubate, and implement across the University those most promising learning technology ideas suited to campus wide deployment, including new ideas prototyped by our faculty, students, and staff, and ideas from outside the University.

IIa. In the context of this recommendation we see advantages to having the Digital Media Commons be administratively part of the library. We therefore recommend that discussions be undertaken, with the North Campus schools and colleges that currently rely on the Digital Media Commons for their educational programs, about the potential benefits of making the DMC organizationally part of the University Library. If these units agree that their needs can continue to be met, then we recommend that this change be made. This will help provide the Library with a domain of skills necessary to accomplish its new charge, and provide the DMC with large scale support for partnerships throughout the University communities.

IIb. We recommend the creation of an operational advisory council on learning technologies to advise the Dean of Libraries on tactical and strategic planning and on the adoption and institutionalization of learning-technology innovations. Key stakeholders and leading thinkers from across campus should serve on this council.

Discussion of Recommendation II

The library should anticipate and advance the scholarly application of new information and communication technologies that reflect the tools extant and emergent in the world at large, and it should develop the internal structures necessary to aid the entire scholarly community in this mission. As a learning-technology nexus, the library will draw on the
vast technical and educational resources of the U-M to foster, identify, and promote learning technologies that enhance our ability to educate our students and to collaborate with research colleagues at all location and levels. By doing so, the library will consequently fulfill one of the missions of this nexus: to position the U-M as a leader in this area.

Specific activities of the University Library in institutionalizing instructional technologies include:

- Provide centrally located physical spaces on Central and North Campuses, and an institutional focus point for faculty collaboration and exploration of new models for teaching and scholarly literacy in the digital knowledge environment
- Convene a campus-wide instructional technology tactical advisory council, and convene, as need arises, campus groups and units providing support for instructional technology
- Coordinate with CRLT, as a resource for faculty, relevant campus groups (Teaching with Technology Collaborative, AT Commons, etc.) and units to communicate observed campus needs that could broadly affect teaching and learning with technology across the institution or affect domain-specific teaching in critical ways
- Provide consultation, referral and direct support to: faculty seeking to identify and explore new technologies for instruction; to the campus community on use rights for content in the educational context; to faculty and campus authors who want to explore new scholarly publishing models to share innovation and research related to teaching and technology
- Recommend policies, functional needs (technology or otherwise), licensing models, etc., designed to promote access to content for teaching and research needs
- Collate input from all sources and coordinate review within, and recommendations from, the tactical and strategic advisory councils, responding to the needs and opportunities; communicate these needs to the University administration and serve as a forceful advocate for institutional response

Under the direction of the Dean of Libraries, and with the guidance of the operational advisory council, the library should help to foster and enable learning technology–related activities and operations at the U-M. The library should provide core-level infrastructure to support the identification, incubation, and implementation of transformative learning technologies. This activity cannot replace existing efforts by individual scholarly entrepreneurs, departments, units, or others who are advancing learning with new information and communications technology, or remove needed resources from individual units. Rather, the Library will provide another comprehensive environment for innovation. It will provide a visible presence that can attract and identify promising initiatives and stimulate new experiments that might not otherwise surface for lack of a “home” or the promise of a coherent path to viable development.
Strategic thinking about where education is headed and how technology fits into that picture is taking place in many academic units across campus, and occurs both as research into learning per se and as research into the effectiveness of specific tools applied to specific course content. As with the learning technologies themselves, there is no locus through which the community can come together while studying these issues. We can envision a future in which the University Library functions as a "next-generation" learning commons where faculty from all units on campus can join their peers in using particular technologies and can share their experience regarding the use and effectiveness of such technologies.

It cannot be over-emphasized that the committee sees the need for the university to continue its support for decentralized innovation. At the same time, we believe that centralized coordination can help encourage more local innovation: a nexus such as we envision can devise signals and incentives with which to unleash more creative energies throughout the university and to accelerate and broaden our base of innovation. By setting a tone, by establishing innovation in collaborative technologies for learning as an administrative priority, this learning-technology nexus can help spark new innovations to join with the transformation of learning already underway.

**Discussion of Recommendation IIa**

The Digital Media Commons has long been in a position to foster innovations in learning technologies. Its environment is one in which several principles for managing the promotion of distributed innovation and the incubation of new learning technologies have been institutionalized. These include:

- The development of an infrastructure and a professional staff that scaffold the efforts of faculty researchers and instructors to make their innovative work more productive;
- An increase in the opportunities for and visibility of student-initiated research as a source of distributed innovation, particularly as a way of understanding how rapidly the learning space of undergraduate students is evolving through contact with new communications and information technologies from outside the university;
- The development of both a programmatic and physical infrastructure to support research projects;
- Responsive support for and management of ongoing services that require investment in and management of high-capital, high-churn, shared technical infrastructure among large user constituencies;
- The management of resources to enable high availability and accessibility to user populations (e.g., operating labs and studios for 24/7 access); and
- The proven ability to manage resource demands as a non-academic, campus-wide facility (like the University Library)
The Digital Media Commons has lacked the resources with which to disseminate innovation and provide large-scale support for the campus-wide implementation of innovative learning technologies incubated in its programs. It is for this reason that we recommend that consideration be given to the organizational transfer of the Digital Media Commons into the University Library. We feel that such a transfer will enable more efficient partnerships across campus and among innovators and practitioners, and will promote the quick translation of innovations to the learning environment, together with sustainable, ongoing support for faculty and students.

A further advantage of the transfer would be the expansion of the University Library’s portfolio to include a new skill domain to support emerging learning-technology experiments on campus.

Despite the advantages that could accrue from the transfer of the DMC to the Library, such a change should be carried out with due discussion among the North Campus Deans whose students rely on the DMC for facilities critical to their education. We envision that the DMC will maintain its place among the arts and technology schools on North Campus, while seeking ways to support instructional technology innovations across the entire University.

**Discussion of Recommendation IIb**

The operational advisory council will work with the Dean of Libraries to:

- Advise on investments in learning technologies;
- Facilitate partnerships among academic units;
- Enable an internal economy for sharing learning-technology services and support;
- Advise as to when an emerging technology needs evaluation of its potential for scaling up to institutional deployment (like Ctools); and
- Provide leadership for the learning-technology nexus mission of the Library.

This council should include representatives from across campus from each of the following constituencies: innovators of learning technologies, early adopters of these technologies, learning technology staff that support these technologies, researchers interested in questions about how learning takes place and how these technologies support that process.

**III. We recommend that the Center for Research on Learning and Teaching (CRLT) be charged with conducting the evaluation of the effectiveness of new technologies for learning and teaching; that the CRLT continue in its established role of educating faculty and GSIs about the effective use of new learning technologies.**
technologies and of incentivizing their use; and that the CRLT work in close collaboration with the University Library to help foster innovation in learning technologies across our campus.

The Center for Research on Learning and Teaching (CRLT) has vast experience across the U-M campus in evaluating pedagogical innovation, from the course to the curricular level. The assessment of the potential impact and strategic value of emerging technologies is an important component in the transformed teaching and learning environment. To fulfill that role, CRLT will:

- Develop metrics for evaluating the effect of new technologies on student learning;
- Provide evidence-based support for best practices in learning technologies;
- Partner on its evaluation work with other units, such as the School of Education and other schools and colleges, the University Library, and information-technology units.

CRLT has an established reputation for disseminating best practices and working with faculty as they adopt pedagogical innovations and share results of their work with others on campus. To support and disseminate innovations in instructional technology CRLT will:

- Offer seminars and workshops on teaching with technology in close collaboration with the University Library;
- Coordinate campus-wide discussion of issues related to teaching with technology;
- Provide consultation on course design and pedagogy for face-to-face, hybrid, and online courses;
- Partner with faculty to explore new ways of teaching with technology;
- Provide funds to support the exploration of the integration of technology into teaching, including the creation of new technology tools;
- Work with faculty to engage in scholarship about the use of existing technology in teaching (e.g., investigate aspects of student learning in courses, programs, and curricula);
- Publish and disseminate research and evaluation on teaching and learning through its Occasional Papers series that summarize research and best practices on a range of topics in teaching and learning, including instructional technology. Occasional Papers are distributed widely on campus (through campus-wide events such as New Faculty Orientation, GSI Orientation, Provost’s Seminars, and Enriching Scholarship) and are available on the CRLT website. The Occasional Papers series offer a well-established mechanism for disseminating results of research projects and evaluation work conducted on campus as well as summaries of studies published elsewhere.
Appendix A. Charge to the Committee

UNIVERSITY OF MICHIGAN SPECIAL COMMITTEE ON INSTITUTIONAL INNOVATION IN COLLABORATIVE TECHNOLOGIES FOR LEARNING
April 18, 2008

Motivation: Collaborative information and communication technologies are continually emerging and are rapidly altering the way individuals relate to and communicate with each other. These technological advances are having a deep impact on learning and teaching, and promise to have profound effects on the future of academic institutions and on education in general.

These collaborative technologies are proliferating rapidly at the University of Michigan. Academic units across campus have made efforts to develop and assimilate them into their programs. This pattern of distributed innovation produces many good ideas and demonstration projects, but there is no coherent institutional support for innovation. This makes it difficult to benefit from common practices, economies of scale, comparative advantages, and sustained and effective knowledge transfer.

The university needs sustainable institutional capability in this area. The Provost’s Office wishes to explore the options for creating such capability. Doing so could remediate the inefficiencies mentioned above and help us reach a future in which we are both more efficient and more effective.

Charge of the Committee: The committee’s charge and responsibility is to:

- explore the viability of creating a capability to engage proactively the academic units in the effective use of collaborative technologies in learning;
- identify the resources that would be required to establish such a structure;
- and explore appropriate business models to sustain the proposed structure.

This capability should be able to monitor the field for the emergence of relevant technologies, evaluate the fitness of those technologies for the academic missions of the university, recommend cost-effective, scalable solutions across campus, and support the recommended solutions with sound pedagogical approaches while encouraging continued innovation. This capability might take different organizational forms, but special attention should be given to the possibility of establishing the capability within an established unit of the university with broad reach across disciplines and programs, as well as institutional strength in sustained support (e.g., the University Library).

The committee will produce a report with its recommendations to the Provost by December 19, 2008.
Appendix B. Members of the Provost's Special Committee on Institutional Innovation in Collaborative Technologies for Learning

Chair

David Mendez, Associate Professor of Health Management and Policy, School of Public Health

Members

Nancy Allee, Deputy Director, Health Sciences Library

Amy K. Brooks, Executive Director, Information Technology Central Services

Constance Cook, Associate Vice Provost and Executive Director, Center for Research on Learning and Teaching

Monika Dressler, Senior Manager, LSA Instructional Support Services

August Evrard, Professor of Physics and Professor of Astronomy, College of Literature, Science, and the Arts

Thomas Finholt, Associate Dean, Research and Innovation, School of Information, Director, Center for Information Technology Integration, Director, Collaboratory for Research on Electronic Work, and Research Professor, School of Information

Barry Fishman, Associate Professor, School of Education and School of Information

Patricio Herbst, Associate Professor of Mathematics Education, School of Education

James P. Holloway, Associate Dean for Undergraduate Education, College of Engineering, and Arthur F. Thurnau Professor, and Professor of Nuclear Engineering and Radiological Sciences

Barbara MacAdam, Associate University Librarian for Public Services, University Library

Robert Megginson, Associate Dean for Undergraduate and Graduate Education, College of Literature, Science, and the Arts, Arthur F. Thurnau Professor, and Professor of Mathematics

Margie Morris, Special Projects Librarian, University Library
Homer Neal, Director, UM-ATLAS Collaboratory Project, and Samuel A. Goudsmit Professor of Physics

David Potter, Arthur F Thurnau Professor and Professor of Greek and Latin, Department of Classical Studies, and Chair of the Senate Advisory Committee on University Affairs (SACUA)

Valerie Suslow, Associate Dean for Degree Programs and Professor of Business Economics & Public Policy, Stephen M.Ross School of Business

John Merlin Williams, Director, The James and Anne Duderstadt Center, and Executive Producer, Digital Media Commons
Appendix C. Case Studies in Learning Technologies at the U-M

There are many examples of teaching and learning innovation from the university community. They represent the use of technologies to increase productivity for the teaching and learning community, and the development of transformative practices of learning. These case studies provide some insight into the advantages, economics, and risks of providing or not providing consistent university vision for:

- Incentives to promote a diverse base of innovation;
- The advantages of managed incubation to provide a platform for pedagogical evaluation;
- The selection of sustainable technologies;
- Cost-effective sourcing; and
- The proper level of support for scaling innovation to institutional use.

CTools

Originated in concept as a unit-initiated innovation by the U-M Stephen M. Ross School of Business and the School of Nursing to more efficiently manage online delivery of course content and teaching/learning workflow.

- An incentive to take this concept to the Office of Instructional Technology (OIT) existed in a multi-year AT&T grant to sponsor innovation in this sphere.
- The CourseTools pilot attracted additional units to participate. By 1999 more than 10,000 students on campus were served by CourseTools.
- In the absence of a robust technical evaluation during the incubation period for CourseTools, an architecture was selected that later proved unsustainable.
- By late 2000 the Provost’s Office, through the OIT, was the business owner of the incubator space and was able to view CourseTools as a model for a cost-effective institutional alternative to commercial offerings of course-management systems.
- Development of the current CTools environment, begun in late 2002, was supported by institutional “second-round” funding that enabled the project to gain visibility as an inter-institutional effort called the Sakai Project.
- The Sakai Project attracted investment by private foundations (both the Mellon and Hewlett Foundations) who contributed approximately $3 million to its development.
- The resulting software architecture is supported by 120 institutions (including more than one-third of the Top 100 universities in the world) that share in the ongoing community development of Ctools.
- Worldwide press coverage has provided economic benefits (grant funding and funding by institutional and commercial partners) and elevated the U-M’s standing as a leader in IT-enabled learning infrastructure.
- Institutional-scale development of CTools was begun in January 2003 and launched in the fall term 2005 with 25,000 users in its first semester of use.
• Funding from the Provost’s Office supports ongoing development and operations support, which in turn enables the U-M to have a high-reliability system with redundant capability, archiving, back-up, and disaster-recovery systems.
• More than 7,000 class sites are created in CTools each year; total users per month exceed 45,000, maintained within a robust application environment.
• Ongoing evaluation and vision are needed to identify a future path to a more advanced learning environment that can enhance or replace CTools.

Remote Student Response Systems (Clickers)

Over the past decade, CRLT has taken a lead in successful adoption of clickers at the U-M, including exploring the use of clickers in teaching, providing guidelines for effective uses, and evaluating student attitudes towards the clicker and its possible impact on teaching.
• CRLT funded the early explorations of clickers in teaching large classes in Physics and Mechanical Engineering in the late 1990s.

• CRLT events (e.g., seminars and roundtables) featured early adopters of clickers and connected interested faculty across campus. Clcker technology has been featured at New Faculty Orientations and Enriching Scholarship.

• CRLT purchased a loaner set to feed faculty exploration.

• CRLT worked with LSA to evaluate different models of clickers and helped with standardizing clicker system and support, and evaluation.

• CRLT surveyed students on clicker uses in large lectures to evaluate their use in teaching and document student reactions and best practices. CRLT shared the aggregated survey data with faculty who use clickers, support staff and other interested faculty members.

• CRLT wrote and distributed an Occasional Paper on clickers with recommendations summarized from the clicker literature and student survey data; the Paper guides faculty use of clickers at U-M.

• The result of these initiatives has been wide usage of clickers and institutionalized support for them on campus.

Examples of Lecture Capture Initiatives

A. Web lecture capture and archiving are clearly key and growing components of modern instructional strategies. Students find archives of their classroom lectures to be useful study and review tools, and various analyses suggest that web lectures recordings can very positively impact student learning. Special utility of the archives can be found among students for whom English is a second language, given the enormous capability to navigate a lecture at one’s own speed, and the ability to repeatedly review concepts not
initially clear. In the same vein, the navigational options offered by web lectures can provide improved learning experiences for the hearing impaired. Moreover, web lectures are vitally important tools for training tutorials and for the archiving of special campus events and lectures, some of which may provide unparalleled learning tools in the future.

The CARMA Project, launched in Fall 2008, has demonstrated that a large campus demand exists for web archiving services, having booked over two hundred hours of recording requests in its first few months. It has shown that such a service can even be supported from revenues received directly from units requesting that particular events be recorded, even though the availability of the service has had only limited campus advertisement. CARMA offers a campus unit the opportunity to request the recording of any event for a fee, with the commitment that the event will be hosted on a server for a minimum of five years, with whatever access criteria the originator desires. Services have been requested from a diverse range of entities, from CRLT, the School of Public Health, the School of Information, the Ford School of Public Policy, LS&A, the School of Medicine, etc. There have been occasions where more than five requests have been received by CARMA for recordings on a single day, a level of activity that has required CARMA to reject additional worthy requests because of capacity limitations. The CARMA team strongly advises the campus to respond to this demonstrated need.

CARMA grew out of an initiative in the ATLAS Collaboratory Project in Physics, using technologies that were primarily developed for high energy physics research training and lecture archiving. There the challenge was how to quickly disseminate in a lecture setting complex information to several thousand physicists distributed around the globe, where the primary common link was the internet. One could expect that a broader campus-wide effort in this area could result in even greater system efficiencies for applications in the academic community.

The value of web lecture recordings in supporting pedagogical research also needs to be stressed. In the MSCRIBE Project, launched through the collaboration of the ATLAS Collaboratory Project (ACP), CRLT, and the Center for the Study of Higher and Postsecondary Education, it became clear that a whole new world of research was available when one had our technology, which permitted researchers to observe student study habits (how much time they spent on individual slides, for example) and to correlate that information with actual course performance. Even complicated slide-switching patterns, which could be observed as identified students access our servers to review the lectures, can tell faculty what concepts represent special obstacles to student learning.

The ATLAS Collaboratory Project Team continues its work on finding a way to record web lectures without the use of a camera operator. The concept is that a lecturer wears a small, unobtrusive device (e.g., a small battery-operated infrared LED), which is observed by a small fixed receiver which sees only that source (e.g., infrared) and, in turn, directs a video camera where to point. A successful year-long study was conducted on such a system by MSCRIBE, and new avenues of development have been defined to take the technology to the next step in robustness. The ACP Team continues its work on
this problem because it sees that a breakthrough here could eliminate the expensive need for a camera operator and make web lecture recording an ubiquitous part of the teaching/learning experience – and, indeed, finally make it feasible for every lecture on campus to be automatically recorded and posted on CTOOLS (should professors desire). Again, a concerted campus effort on such a problem could hasten development and possibly have a huge impact on the way higher education instruction is delivered nationwide.

B. The College of Engineering has deployed a lecture capture system in 10 College classrooms. This system provides to faculty and students a near zero effort system that synchronizes powerpoint presentation, audio, powerpoint thumbnail navigation, and video of a class lecture. Students increasingly use the system for review of lecture and to refine their understanding of lecture points, a learning strategy made possible by the simple thumbnail navigation. As in other learning technology experiments, it is often discovered after the fact how students can benefit from the system. For example, in their use of lecture capture systems students report that the video of the instructor is not important. Rather is it the synchronized capture of audio and powerpoint that matters, and the ability to navigate easily through the lecture content.

C. CRLT, in collaboration with the School of Education, has evaluated the use of MScribe (the lecture capture system now called CARMA) for teaching and student learning. The MScribe research has provided insights for the lecture capture tools’ development and selection, as well as useful guidance for faculty use of lecture capture tools in the classroom.

CRLT featured faculty use of lecture capture and podcasts at CRLT events (e.g., its roundtable series) and engaged interested faculty in discussing challenges and implications of lecture capture on teaching and learning.

CRLT is reviewing lecture capture literature and summarizing best practices and recommendations to guide faculty use of lecture capture at U-M.

CRLT is continuing working with faculty to evaluate the use of lecture capture in teaching and will be disseminating guidelines for effective usage.

**Video-conferencing systems**

The use of web conferencing at UM has been growing significantly in recent years. Unfortunately, the fragmentation of efforts to introduce web conferencing has led to individual departments choosing different technologies, and thus not taking advantage of substantial savings that could be realized through more efficient use of licensing specific to products in this category. (Web conferencing systems are licensed per “seat”, i.e. concurrent user, therefore the most cost-effective use of such a license is when many users are able to use the same “seat” in subsequent sessions.) Currently, the web conferencing tools in use at UM include: Saba Centra, ePop, Adobe Connect, and Live Meeting, at substantial cost to the supporting departments. One of the successful attempts to share this expensive resource is the partnership established in 2004 between School of
Information and the School of Public Health, for support of Saba Centra. While SI covered the initial cost of most of the "seats", SPH contributed additional licenses and the schools agreed to split the cost of ongoing maintenance. Soon thereafter, other departments expressed interest in being part of this, and a consortium was formed, encompassing the School of Nursing, ISR, and ICPSR, in addition to SI and SPH. The members of the consortium are contributing equally to the cost of maintaining the technology at UM, at ca. $2,300 per year, with no limits on use. Needless to say, were they to maintain the system themselves they would be faced with a cost several orders of magnitude higher. The availability of Saba Centra has made possible the establishment of robust (and growing) distance education programs at SPH and the School of Nursing. This system is being used to conduct highly interactive class sessions online, but also for "virtual office hours", keeping in touch with staff in remote locations, meetings of international research teams, and more. Its synchronous features are a perfect, and often necessary, complement to the asynchronous environment of CTools. Unfortunately, in its current state the consortium would not be able to accept additional members.

**Advanced classroom lecture interaction**

Professor Perry Samson of the College of Engineering has created LectureTools ([https://www.lecturetools.org/](https://www.lecturetools.org/)) to support a more interactive technology enabled mode of interaction in large classes. Learning in large introductory classes is a challenge in today’s college environments. Students in these classes often feel anonymous and disconnected from the class experience, which may affect their ability and/or motivation to learn. Instructors likewise grapple with the low degree of interaction and inability to reach students individually.

LectureTools is designed to provide a class experience by:

- Enabling note-taking synchronized to lecture slides,
- Providing opportunities to pose questions electronically during lecture,
- Including a complete personal responder system to participate actively in class activities and
- Tools for self-assessment of confidence of understanding.

**Electronic and Open Textbooks**

Some areas of the University are seeing increasing use of electronic textbooks, such as the WileyPlus system ([http://edugen.wiley.com/edugen/secure/index.uni?protocol=http](http://edugen.wiley.com/edugen/secure/index.uni?protocol=http)). Such electronic textbooks combine some of the course management aspects of CTools with an online textbook. Their potential for improvements to student learning or for cost containment on textbook costs is still to be fully explored. But strategic decisions about how to work with commercial providers of these systems, or how to support faculty who need to create their own electronic texts, must be made.
Similarly, the Open Courseware movement demands decisions within the University. What are the goals of providing open courseware? Are the existing systems (e.g. http://ocw.mit.edu/) in fact of sufficiently high quality to be of use to their intended audience? Would efforts of the existing sort deserve the UM brand? If not, what would?

**SiteMaker** is a widely adopted application and operating environment for website development. It enables units and individuals to easily create web-based information and functionality typical of more complex web architectures but with less effort, and to leverage community-based support resources. There are nearly 7,000 U-M-affiliated SiteMaker sites, including many department and unit sites that rely on it for their core web presence.

- SiteMaker originated as a concept by a faculty member.
- Development was also supported by the existence of a grant program administered through the Provost's Office - the CARAT partners program - known on campus as a source of funding for the early development and incubation of learning technologies.
- CARAT grants covered the development and operation of SiteMaker through 2002, after which the original CARAT grant program was significantly reduced in scope (in 2003) and central funding for SiteMaker development and user support ended.
- Due to the large installed base, a core group of SiteMaker user groups successfully created a community-support model that has raised funds and provided end-user support, and therefore enabled wider adoption across campus.
- SiteMaker has emerged as a de facto piece of the U-M's institutional infrastructure.
- In the absence of a more developed model for sponsorship and evaluation of tools that might find widespread use on campus, SiteMaker is built on a software platform whose codebase is actively supported by few organizations.
- As a result, SiteMaker is reliant on a single commercial vendor (located in Canada) for ongoing development and operations.
- The modest operational costs supported by the Provost's Office are contracted to the vendor through ITCS. The funding line provides a thinly resourced infrastructure vulnerable to operations outages which, in turn, present a risk to campus users.
- The U-M user community has made a good-faith effort to establish basic security and privacy policy and to educate users.
- The absence of an institutionally designated business owner complicates the university's ability to govern the resources needed to develop and certify adequate U-M compliance standards.
ePortfolio has emerged as a promising framework for the transformation of learning and for the practical need of university units to gather and present information on learning outcomes.

- ePortfolio tool was a joint unit-innovation sponsored by the U-M Division of Student Affairs, School of Social Work, LSA (and UROPS), the Department of Internal Medicine, the School of Information, School of Education, and the Digital Media Commons.
- Absent incentives through funding or signs of support from academic leadership, the aforementioned community attempted to fund concept development that reflected a broad range of end-uses. As a result, early efforts required limited resources to be spread across many objectives, and thereby slowed the development of an evaluation process.
- The project lacked guidance from an entity to oversee the evaluation of the pedagogical impact of ePortfolio use. Such guidance might have provided clearer direction, encouraged investment to incubate a more focused pilot program, and made more efficient use of institutional resources to determine the potential value of ePortfolio to the U-M.
- Such recognition is now taking place, and ePortfolio development is taking place in a supported environment that is integrated with other sustainable and supported components of the university infrastructure and learning-technology investments.
Appendix D. Bibliography

Readings


University of Michigan Educational Technology/Distance Education Task Force Report at http://www.provost.umich.edu/reports/educational_technology/index.html

Videos and Slide Presentations


Wesch, Michael, “A Vision of Students Today.” Available at http://www.youtube.com/watch?v=dGCJ46vyR9o

Websites

Connexions at http://cnx.org/
“Connexions is an environment for collaboratively developing, freely sharing, and rapidly publishing scholarly content on the Web.”

CRLT Instructional Technology page at http://www.crlt.umich.edu/inst/inst.php

EduCause ELI homepage at http://www.educause.edu/eli/16086
The Educause Learning Initiatives mission is to “…is to help institutions advance learning through IT innovation.”

MIT’s OpenCourseware site at http://mit.edu/ocw/
“MIT OpenCourseWare makes the course materials that are used in the teaching of almost all MIT’s undergraduate and graduate subjects available on the Web, free of charge, to any user anywhere in the world.”

New Media Consortium at http://www.nmc.org/
“The New Media Consortium (NMC) is an international 501(c)3 not-for-profit consortium of nearly 300 learning-focused organizations dedicated to the exploration and use of new media and new technologies.”

Open Courseware Consortium site at http://ocwconsortium.org/
“The OpenCourseWare Consortium is a collaboration of more than 200 higher education institutions and associated organizations from around the world creating a broad and deep body of open educational content using a shared model.”