

THE CHALLENGE OF PARTICIPATORY TECHNOLOGIES
FOR TEACHING AND LEARNING
AT ONTARIO UNIVERSITIES

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OVERVIEW

Universities, like many other organizations in modern society, have become highly computerized. University finances, student recruitment and registration, library resources, information storage, clerical work, lab equipment, analytical tools, as well as classrooms have all been influenced by and restructured to adapt to computer technologies. The effects of computerization on the university have been many, but we are only at the beginning of a long process of adjustment and development (Fallis, 2007, p. 197).

Although there are still some young people who have neither the access to nor the facility with digital communication technologies, the pattern for the segment of the population that attends university is one where communication technologies are accessed, understood, used and indeed assumed. Universities expect their students to word-process their assignments, access online resources or use computers as analytical tools. Conversely, many university students are coming to expect that their university education should include a significant computer dimension. An informal discussion with a small group of students on this topic at Laurentian University in 2007 revealed that students who were regular users of information and communication technologies (ICTs) felt more at ease with professors who were also willing to use these technologies. They believed that these instructors were keeping in touch with the world as it changed and less likely to regurgitate information found in textbooks, a task that students believe they could do themselves. Whether these feelings are shared across Ontario is a question worth investigating.

Participatory technologies – communication technologies that facilitate interpersonal interaction and communication – drive major sites for recreational and social computing within the university student population. E-mail, instant messaging, and online social networking tools such as Facebook and YouTube are part of the undergraduate student culture. Just as content retrieval technologies on the Internet provided challenges for universities and students regarding document validity, sourcing and integrity, social participatory technologies present another challenge to universities because they are altering the dynamics of student interaction and collaboration.

In this paper we discuss the impact of computerization with a focus on participatory technologies and how these technologies might be affecting teaching and learning. Understanding how social participatory technologies are changing the environment is an important first step for universities in harnessing these technologies for effective pedagogy. We begin from the premise that increased use of technologies does not necessarily improve pedagogy; rather, technology is an enabler that can provide new ways to improve learning if it is engaged appropriately.

A fundamental responsibility of faculty is to be critical of new teaching methods and to challenge students. Many new technologies may not be suited to the classroom nor hold enough long-term promise to make them feasible to implement. However, when new technologies which affect patterns of communication and collaboration become commonplace within the student population, these technologies cannot be ignored, and their relationship to pedagogies that emphasize communication and collaboration should be examined.

We need to establish the standards of good practice, the usefulness of various information technologies to improve learning, and what is needed by learners to operate in this environment of change. We also need to discover ways to encourage the adoption of best practices in teaching that include these technologies in support. The appearance of participatory technologies has forced us to reconsider pedagogy, and to rise to the challenge of assessing when and how these new information technologies should be applied. The universities that respond to this challenge and effectively integrate information and communication technologies, including participatory technologies, into their academic practices will be able to increase the relevance and scope of students' educational experiences, will have a competitive advantage in attracting students, and will have a stronger case in demonstrating their impact in a time of increasing accountability.

PARTICIPATORY LEARNING

To say that a technology is participatory is to classify it by its function or use. There are many different functions or uses for information technologies at universities. For example, digital record keeping is one of the many organizational technologies that have greatly affected university practices. Student information systems make it possible to audit degrees quickly. They also make it possible for students to check their degree progress as well as track their progress in courses that use online grade books, thereby enhancing visibility and access to their grades. These new student record-keeping technologies have replaced the practice of posting student grades in public places on pieces of paper sorted by student ID, but they have also created a need for privacy and access controls. University practices are now focused on responding to the outcomes of these electronic information systems. There are many other functional areas where computing technologies have affected university practices and processes including accounting, scheduling, advertising, research, writing, publishing and teaching, to name a few.

If one accepts conceptually that there are participatory technologies, there are also non-participatory technologies. If we look at learning technologies, some of these technologies have been characterized as passive and definitely non-participatory. For example, the fictitious condition of death by PowerPoint helps to highlight the numbing and passive nature of much lecturing with presentation technologies. It is easy to characterize presentation packages as passive with students acting as consumers of content delivery. However, students can also be given the task of creating computer presentations. A technology that can be used to deliver passive content also can be highly participatory if students use the technology's authoring feature. Conversely, there are many interpersonal computer communication technologies, the oldest being e-mail, listservs and bulletin boards. These technologies can be used interactively with students communicating with each other and instructors. Online messaging systems can be used to encourage student questioning and collaboration, or they can be used in a non-participatory manner to deliver passive content. Students can be messaged by instructors in a one-way content delivery mode with dates, assignments and lecture notes.

Messaging technologies have become the dominant form of personal computer use in the broader society today. The overarching experience with Internet technologies for many young people is messaging as a participatory technology. Students' familiarity with participatory technologies presents universities with an opportunity to piggyback participatory learning on this wave of technology.

Modern technology did not invent the lecture or participatory learning. And there are a number of both participatory and non-participatory technologies available for faculty and universities to select from to reinforce or expand any number of pedagogies. However, these new technologies change the context of learning. Participatory technologies also require participatory forms of educational design. Courses focused on lectures would have little use for them.

Participatory technology development (PTD) is an approach to learning and innovation that was first used in international development as part of projects and programs relating to sustainable agriculture, and that was later espoused as an opportunity for higher learning using technology as an enabler. Technology is not necessarily a requirement for participatory learning; however, in a world where students are increasingly participating in distance learning and information is shared electronically, participatory technologies can add value to participatory-style teaching approaches. Participatory learning is defined as "the full participation of people in the processes of learning about their needs and opportunities, and in the action required to address them." It challenges prevailing biases and preconceptions about people's knowledge and methods for acquiring knowledge. Among the new methods being proposed in participatory learning are visualization, games, interviewing, group work, and segmenting course content for flexibility in learning. The common theme is the promotion of interactive learning, shared knowledge, and flexible yet structured analysis (International Institute for Environment and Development, 2005). Another term that is often used to refer to this approach is collaborative learning, and there has been much discussion around the idea of computer-supported collaborative learning (Strijbos et al., 2004) using participatory computing.

Clegg and Heap are among a number of researchers that have identified that tools do make a difference in any learning environment:

In previous generations, the faculty member lectured, the students took notes, and the learning process unfolded within a relatively limited and discrete environment of tools and technologies. The learning environment is considerably more complex today, including a network in which all students and faculty have access to powerful digital tools for communication and research. The first wave of laptop universities rolled out in the mid-1990s and were followed quickly by a wave of wireless and Web-enabled cell phones, and we are now in the middle of a third wave of mobile and hand-held digital tools. A learning environment in which all learners and faculty have their own personal laptop computer and other mobile tools such as iPods and PDAs transforms teaching and learning experiences. Meanwhile, students have discovered the community-building and networking power of instant messaging, discussion boards, online forums, blogs, and wikis while still occasionally using e-mail. These tools are dramatically changing the communication patterns and relationships between learners and the faculty (Clegg and Heap, 2006).

The disagreement that we could have with the above statement is the necessity for these new technologies to change the relationships between learners and faculty in any particular direction, or perhaps more correctly to prejudge which direction any of these changes may take. These changes could entail a realignment of faculty roles and student learning activities.

In an environment infused with these tools, the faculty member moves from the center of the class communication pattern – as is common in the traditional transmission mode of learning – to the periphery. In turn, the anywhere/anytime access to communication tools makes it easy for students to go outside the organized course structure and content. Another significant design impact of these tools is the ease by which students can customize their own

learning experiences as the content boundaries of a course dissolve. Readily available mobile tools now support information access and flow in real time, enabling current events, global perspectives, and far-flung resources to be brought into immediate and fresh relief. Every statement by a faculty member is subject to challenge, addition, or confirmation from a student's Google search. Many teachers have been surprised by the shifts in learning dynamics and relationships created by these tools; at the same time, many teachers are now enthusiastically embracing these changes as they recognize the many benefits of learners becoming more engaged and active in their learning (Boettcher, 2007).

The approach taken by Boettcher advocates the importance of learning as a social process, offering possibilities for collaboration with other learners, for interaction with the content and for guidance from teachers, trainers and tutors, many facilitated by technology. "These learner-centred approaches put the learners back in command, with a wealth of learning resources at their fingertips, customised to their individual needs. Teachers and trainers, however, continue to play a central role, using virtual and traditional face-to-face interactions with their students in a 'blended' approach" (Europe's Information Society, 2001).

Whatever name is given to this proposed transformation process, we, as a system in Ontario, still need to identify the role of educators and students in participatory learning and participatory technology; guidelines or standards of good practice; how we stimulate adoption; the usefulness of various information technologies to improve learning; and what is needed by learners to operate in this environment of change.

THE NET GENERATION

It has been proposed that we are living in a chaotic technological environment whose impact can no longer be predicted. The new Net Generation is a population that is both self-guided and in need of guidance (in terms of their educational experience) and skills (to deal with this environment of continuous change). Media literacy-wise, education is happening now after school and on weekends and when the teacher isn't looking – in text messaging, MySpace pages, blog posts, podcasts and videoblogs that technology-equipped digital natives exchange among themselves (Prensky, 2001). College students today not only multitask (Wilber, 2007), but they also layer sensory experiences and communication avenues one atop another, moving between tasks and ideas quickly. The contexts of schools themselves have changed, growing from a set of static buildings on a single campus to include satellite campuses and distance courses; the tools of higher education now include digital technologies hardly dreamed of even 20 years ago which, in turn, demand new literacies from students. The concept of "multiversities" is discussed in a book by Fallis (2007).

Howard Rheingold, reported on a website by Good (2006), is one of many who has written extensively about the very real uses people make of mobile and digital media, about the ways that these technologies have been deployed in online collaboration and to direct political action, and about the impact they are having on the lives of young people across the planet. Rheingold's and many others' call to action is that higher learning institutions provide the critical thinking skills that are needed by students to put to better use the Internet and other learning technologies. His book, *The Pedagogy of Civic Participation*, identified that participatory media is changing the way we communicate, engage with media and each other and even our approaches to teaching and learning. The generation of digital natives – those who have grown up immersed in digital media – take all of this for granted (Prensky, 2001; Zimmerman and Trekles Milligan, 2007). There is nothing strange, new or even transformative about the interactive, participative landscape of blogging, social networking and Web 2.0 Read/Write media for them. This is the starting point, the background canvas on which they live their lives. Saffo (2005)

and Thompson (2007) are among those who have written about the rise of the Internet as a personal medium which, according to Barnes et al. (2007), means that students will soon arrive at colleges expecting a new form of education, defining new learning styles for Net Geners.

The Net Generation is only one of the reasons why researchers are putting forward the argument that new transformative processes are needed in the way that education is being delivered. ICTs and globalization factors have transformed the world of business forever, and new approaches are called for to deal with this change. For example, the internationalization of our student population is bringing new challenges and requirements in communication and teaching methodologies; new requirements for flexibility and accessibility are promoting exponential growth in distance education and continuing education. This new mix of students wants new and exciting ways to learn, collaborate, interact and network; employers are continually requesting new approaches to education where graduates are able to demonstrate improved interpersonal skills, collaborative and action-oriented skills, critical thinking skills and project-management skills. Meeting all these requirements could mean that universities will need new methods to prepare students for the workforce, as well as a review of relationships between colleges and universities and between high schools and universities. It calls into question the relevance of current systems given the changing landscape. As explained by Phillip (2007), the Net Generation's exposure to interactive media has prepared them for heterogeneous, distributed systems that characterize tomorrow's learning organizations, but they still need to learn the processes of innovation, creativity and collaboration. Some technology tools are adequately suited to promote these understandings, and in some cases it is pedagogy that must change its focus to meet the new needs of the workplace. In fact, a number of researchers have argued that the key to incorporating technologies and a transformative change in pedagogy into the classroom is to give students a greater voice in shaping their education and the ways that technology works for them (Morrison and Frazier Bowen, 2005; Sword and Leggott, 2007).

Let's remember, however, that "technology by itself does not ensure the coming of the virtual society; rather it is an enabler and shaper" (Igbaria et al., 1999). There are countless examples where the attempt to use technology without a corresponding plan around course delivery systems can create more problems for instructors and for students. For example, initial attempts to use videoconferencing to connect students in remote locations to conventional classrooms were fraught with challenges, such as controlling the virtual classroom, dealing with breakdowns in telecommunication systems, and training instructors and students to use the technology. Sanders (2006) noted that a radical adoption of virtual interaction fails to appreciate the distinctive pedagogical value and results in a failure to consider the importance of knowledge as a cumulative process of reflection, interpretation and inquiry; and it can obscure informed decisions on the suitability of technological innovation. It is how we structure programs that will make the difference.

This should not mean that we should disregard technology – there are many positive reports on collaborative e-learning structures that work in almost any field of study. For example, an online writing course reported that peers were called to edit each other's work through democratic spaces online. The professor found that the experience led to more learner autonomy over the writing process and allowed students to develop professional skills in argumentation, clarity and writing standards that they may not have developed through a conventional instructor-delivered program (Guth, 2007). The New Media Consortium (NMC) Campus exists in the 3D virtual world of Second Life, and is home to a great many successful experiments in learning. SecondLife.com promotes a 3-D interactive gaming environment that allows people to re-live history, build models and alter decisions to learn outcomes (Good, 2006). In Europe, a mobile game-based learning environment stemming from a research project in 2005 with funding from the European Commission was successful at improving the effectiveness and efficiency of learning among young people using various game formats (Shahin et al., 2006). Similarly, in the business programs of universities, many are using epistemic games as a way to help students learn to think like professionals (Williamson, 2005), such as the Business Strategy Game, where more than 25,000 students worldwide compete in running a shoe manufacturing operation

at any given time. Gaming is increasing in popularity with instructors who believe this teaching method can motivate students and assist in retaining and applying knowledge. In many of these examples, online students are allowed to benchmark their capabilities against students in other parts of the world. Many more successful experiences using a wide variety of technology tools were reported in online articles published by *Innovate: Journal of Online Education*.

According to Boettcher (2007), the role of the faculty is to design and structure the course experiences, direct and support learners through the instructional events, and assess the learner outcomes. "In theatre terms, the faculty member is the director of the learning experience, not the 'sage on the stage' who transmits knowledge. When the faculty member is acting as the 'sage,' it is the faculty member who is reaping the benefits of working with the content, structuring the content, and communicating the content. One goal in designing effective and efficient learning environments is to get the students to work this intensively with the content. Strategies that support this shift in perspective include having the students moderate discussion forums, prepare concept summaries and share examples with other students, and assume greater responsibility as front line moderators for the course" (p. 3).

CHALLENGES AND OPPORTUNITIES

While transformative processes may be desirable, in today's universities there are a number of challenges and questions that remain unanswered:

- The desires of the student population with regard to change, their perception of technology and their level of readiness.
- The impact of faculty receptiveness.
- The pace, cost and value of change.
- The best practices in implementing solutions.

Student Perception and Readiness

Our universities are attended by a student population who has a wide array of learning styles, who now come from a wider variety of cultures and who has the ability to quickly adapt to many technology applications. Technology, at minimum, is allowing more flexibility in adapting the learning process to this changing environment. The Pew Internet & American Life Project reported that, as of 2002, three out of five children younger than 18 years of age and more than 78% of those from 12 to 17 go online (Levin and Arafeh, 2002). At the college level, 20% of students had begun using computers from the ages of 5 to 8 and, by 16 to 18 years of age, 100% of these students were using computers with 85% who owned their own. However, another report stated that half of college students were reporting their first use of the Internet when they started college (Jones, 2002). These types of statistics raise the question of where Ontario students fit into this trend and, in particular, what knowledge and expectations they bring to our universities. Students are not a homogeneous group, and a much deeper understanding of their needs and of best practices are necessary. Older students and international students, for example, may not have the same level of comfort with technologies.

The Pew reports identified the following key findings:

- Internet-savvy students rely on Internet for schoolwork to complete projects more quickly, have access to up-to-date information, and correspond with classmates and share tips.

- Students view the Internet as a virtual textbook and reference library, as a tutor and study shortcut, as a virtual study group, as a virtual guidance counsellor, and as a virtual locker and notebook.
- 79% of college students agree that the Internet use had a positive impact on their academic experience.

It would then appear that many students want challenging, technologically oriented instructional activities, as mentioned in the Farris-Berg's report (2005) on student views about education. College students noted the features of course management software which were used the least by faculty – such as sharing materials with students, faculty feedback on assignments and online readings – were in fact the features which students indicated had contributed the most to their learning. Students claimed that their schools and teachers have not yet recognized – much less responded to – the fundamental shift occurring in the students they serve and in the learning communities they are charged with fostering.

Kvavik and Caruso's (2005) report on an EDUCAUSE survey indicated that 41% of the students surveyed said they preferred instructors to make moderate use of information technology, while 27% wanted extensive use and 26% preferred only limited use. In light of the rapid expansion of Web 2.0 technologies in the daily lives of students, such preferences are likely to become even more pronounced in newer generations of learners wanting a greater use of technology by faculty.

There is a philosophical argument that universities should be responsible for ensuring the use of information technology and the promotion of a knowledge-based workforce, one that can innovate around information technology. At a societal level, a number of communities around the world, called "Intelligent Communities," are concerned about the development of knowledge workers as a key component of future economic growth (Intelligent Community Forum). These communities are working tirelessly to ensure broadband access to all citizens and the development of a culture of use to facilitate innovation and economic development around ICTs.

These communities, which support e-learning and online collaboration as an important component of growth, are multiplying in number each year. The intent of a networked community is to develop and nurture knowledge workers. E-learning and online collaboration are tools for this purpose. Universities will be called upon to play an ever-increasing role in developing the knowledge worker.

Faculty and Collective Agreements

On the other side of the medal is the knowledge and types of applications made by faculty. Kopyc (2007) and Lohnes and Kinzer (2007) argue that there is no universal phenomenon when it comes to technology adoption. Workload issues, collective agreements and tenure are among the challenges to enacting a wider adoption of participatory technologies and participatory learning in universities. There is virtually no control mechanism that would urge faculty adoption of participatory approaches in teaching or learning. Participatory learning is a nebulous concept and, historically, there has been fear of encroachment on academic freedom.

There are other jurisdictions, such as in the case of Tallinn, Estonia (Intelligent Community Forum, 2007), where the government had mandated increased use of participatory technologies in classrooms and, as a result, was able to document a transformation in its economy over a relatively short period of time (five to 10 years). In Ontario, there is no such opportunity to affect sweeping changes in a short period of time; the approach must be collaborative and must entice faculty members to apply the time necessary to migrate more didactic processes toward more interactive learning systems when or where they are needed.

Seven years ago, the Campus Computing Project reported that over 600 two- and four-year public and private colleges and universities in the United States "identify 'assisting faculty integrate technology into instruction' as the single most important IT issue confronting their campuses 'over the next two or three years'" (Green, 2001, 10). When the same survey was conducted two years later, Green reported that only 33.6% of faculty use

course management tools for online course resources and just 37.4% place materials on the web despite wide availability of technology and support services (2003). In fact, according to Kopyc (2007), faculty argue that they have no time to invest in learning to use participatory technologies that stifles deployment. More recently, the *EDUCAUSE Core Data Service Fiscal Year 2004 Summary Report*, a survey about campus information technology environments at 890 colleges and universities in the U.S. and abroad, found that "only 19% of ALL campuses report that these systems are for all or nearly all courses" (Hawkins, Rudy and Nicolich, 2005, 36).

Pace, Cost and Value of Change

The perspectives on the value of technology in the classroom are contradictory. Research performed by Abrami et al. (2006) indicates that attitudes toward e-learning, reflected by scholarly and academic reviews, generally range from neutral to positive. Since much of the research is qualitative or anecdotal, it is difficult to provide a real measure. Some researchers have found that these technologies were effective in language lessons and in displays of animations of medical and chemical processes, or were successfully used for polling and testing as well as serving as a gateway to larger learning resources (Prensky, 2005). There are similar stories concerning technologies such as blackboards, video-conferencing and iPods. It is important to note that one piece of technology will never cure all ills or apply to every discipline. A careful analysis of how participatory technology can assist participatory learning will identify the tools that are more likely to enhance and assist rather than direct the learning process. Technology can and does interfere with learning if it is not properly planned and used.

Abrami et al. (2006) have unveiled the following list of positives and negatives in participatory classroom technologies:

NEGATIVE ELEMENTS	POSITIVE ELEMENTS
Threatens formal education	Increases access to information
Creates an imbalance between computer skills and essential academic and thinking skills	Provides access to a richer learning environment
Fosters technology dependencies and isolation rather than independent and interdependent learners	Increases opportunities for active learning and interconnectivity
Erodes the joy and motivation to learn, replacing it with frustration because of failed equipment	Enhances student motivation to learn
Questions the usefulness of information and communication technologies (ICT) that parallel their attitudes toward any change to teaching and learning	Increases opportunities for feedback
Is a source of problems such as cheating, wasted time and class avoidance	Acts as a catalyst for change

The Program in Course Redesign (PCR), an effort funded by the Pew Charitable Trusts in 1999 to demonstrate the use of technology where technology makes sense, worked with 30 diverse universities, four-year colleges and community colleges to focus on improving the quality of high-enrolment introductory courses, which would impact a significant number of students, and on substantially reducing costs. The results were dramatic – of the 30 schools, 25 were able to improve learning in the redesigned course over the traditional (usually lecture-based) course, and the other five showed learning equivalent to the traditional format. Of the 24 schools that measured retention, 18 showed measurable increases. All institutions demonstrated cost savings, with an average of 37% (Graves and Twigg, 2006).

El-Rady (2006), in an article on large enrolment classes, examined the use of electronic classroom voting systems to administer quizzes and pose class participation questions. In a large-enrolment biology course, the technology allowed instructors to receive instantaneous feedback on student answers to questions and integrate active learning components to the traditional lecture formats. PCR has five distinct course redesign models and a replicable methodology for the course redesign process available on its website (via the National Center for Academic Transformation). The Pew results, while specific to high-enrolment introductory courses, demonstrate another positive impact of ICTs in the classroom.

Information technologies are also well-suited to supporting knowledge management, allowing for some level of standardization in learning. Faculty can choose the relevant shared teaching materials and tools and, according to a knowledge media laboratory project from Liyoshi, Richardson and McGrath (2006), can “create compact and engaging representation of teaching knowledge, experiences, ideas, and reflections.”

Despite these benefits, there are many other elements for universities to consider when using participatory technologies in the classroom, including classroom design, faculty training and development, the diversity of students and their level of preparedness. Some cultural examples cited by faculty included the fact that distance learning practices did not always take into account the needs of aboriginal students, and that international students were arriving unprepared to use technology thereby creating a barrier to access. Careful thought must be given to implementing participatory technologies and, of course, the costs associated with stepping up their use at Ontario universities. Implementation of these technologies is made that much more difficult because of contradictory points of view concerning their benefits to the classroom – perspectives that can be based on case studies rather than real research. Regardless, our institutions must come to some resolution in order to move forward.

Implementation Issues and Research Directions

Students feel they face several roadblocks when it comes to using the Internet in schools including the quality of access (which includes network speeds and wireless availability) and the instructor’s use of online tools to make assignments available (Levin and Arafah, 2002). These are cost and resource issues that would need to be considered for implementation.

Numerous factors impact intentionality: learner experience (which may include student familiarity with the technology, culture issues, and past experience with the technology), department support, support network of colleagues, access to

mentors, the subject matter in relation to other departmental curricula, and potential barriers or “push back” factors in technology use. In addition, learning styles and technologies are changing and at different velocities too. The questions are how do we optimize technologies for knowledge gain, and how do we implement evaluation mechanisms to document their impact. For these reasons, the authors believe that each university need an implementation team for further analysis and consideration around implementation.

There are at least as many e-learning options as there are different learning sub-systems (school, higher education, vocational training, corporate professional development, adult learning, informal learning) and visions of the world that those in charge of promoting and designing e-learning systems had in mind, according to Carneiro and Nascimbeni (2007). They note that e-learning is barely scratching the surface of what is possible. Colleges, universities and secondary schools are delivering increasingly sophisticated programs to the home, as well as to the workplace, using video-conferencing technology, video streaming and web-based programming, sometimes simultaneously.

Within Ontario universities, there are a variety of structures to meet e-learning and technological innovations including e-learning centres, instructional media and computer services. Some answer to a dean or a teaching and learning office and have an academic focus. Others answer to computer services and have a technical focus. Based on a discussion with an e-learning centre and an instructional media centre, it appears that few universities have the time to evaluate the relevance of new and upcoming technologies and, in particular, to determine which disciplines could make the most effective use of the properties of each technology. These e-learning specialists also have few resources to push the e-learning agenda. One university estimated that only one-quarter to one-third of faculty used classroom technologies; however, it should be noted that the majority of Ontario universities are aware of the issue and are developing formal strategic plans on emerging technologies.

E-learning centres are needed that are properly funded and properly staffed, with specialized personnel and volunteers from faculty who can act as resources to other faculty members and gather data on effective delivery mechanisms in each discipline. Although some or perhaps most universities provide some form of online technology support and training to faculty, it is unknown the extent to which they evaluate and provide training on participatory technologies beyond typical applications such as WebCT.

CONCLUSION AND RECOMMENDATIONS

E-learning and participatory technologies are presenting both a challenge and an opportunity for Ontario universities. The reality of modern universities is that a participatory and collaborative undergraduate youth culture is growing on our campuses. University students are increasingly adept at operating in a computerized participatory environment where they share information and experiences. Ontario universities need to examine the most effective ways to incorporate these new technologies into their practices. The challenge is to harness these participatory skills by incorporating this dynamic into pedagogy.

In some cases, there is a need to encourage open dialogue among all of the stakeholders of technologies – researchers, developers and educators – to encourage the research and endorsement of technologies in the classroom. If we are convinced that participatory technologies are important, then perhaps we should follow a recommendation from Reilly (2005) who believes that technologically savvy scholars, in conjunction with IT professionals, should lead workshops and foster targeted technology use among their colleagues. “Each faculty peer would be uniquely qualified,” Reilly explains, “to select the tools and programs best suited to the discipline – and to openly evaluate them in the shared discourse of the profession.”

We believe that there is an opportunity to expand research into participatory technologies and learning within Ontario. There are a number of researchers in the field of e-learning and technology in the classroom, and a likely first step would be an evaluation of existing research and topics of interest to the Ontario university system in order to develop a research strategy. Further research could be accomplished through either 1) a new research institute with a provincial mandate; or 2) a virtual collaborative structure among researchers that may carve out and divide research streams for a more structured approach to the topic. The advantage of establishing a research institute is that said institute could also provide our universities with an effective support mechanism to implement participatory learning technologies and participatory learning models. The Institute of Participatory Technologies in Learning could:

- Collect and disseminate best practices in participatory technologies and participatory learning to Ontario universities.
- Evaluate the relevance of various technologies to Ontario systems, disciplines and teaching methods.
- Propose evaluation mechanisms to assess the impact of participatory technologies and participatory learning in Ontario universities.

It has been suggested that the Higher Education Quality Council of Ontario (HEQCO) could participate in this research since the outcomes would have a direct impact on quality. There is also an opportunity to link with the Canadian Network for Innovation in Education and align research objectives. Finally, COU unofficially pulled together a group during the 2007 COU Summer Institute on E-Learning who may be able to provide additional advice and assistance in furthering this concept.

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