The e-teaching collaborative : a unique partnership assisting medical faculty to adopt innovative educational technologies and methodologies

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AIM

Introduction

The School of Medicine (SoM) exists within the Faculty of Health Sciences at Queen's University in Kingston, Ontario, Canada. Having successfully graduated students for 150 years, the SoM is now facing two immediate challenges. The first is a government mandated increased enrolment. From 1999 to 2002, the in-coming class size increased from 75 to 100 students and further increases are anticipated over the next five years. Additionally, the SoM is being challenged to adopt new approaches to teaching. Indeed, as part of the accreditation process, the school has been strongly criticized for the heavy emphasis on utilizing a traditional lecture based format. Although over the past few years a number of faculty members have adopted technology as a way to enhance their teaching, a systematic process for encouraging and supporting the adoption of technology-based innovations was lacking. Given the challenges currently facing the school, it was decided that developing such a strategy would be a timely initiative. The e-teaching collaborative (etc), an interdisciplinary team which provides medical faculty members with one-stop access to support for electronic learning resources, technological tools, and educational methodology emerged as a central feature of this strategy.

This paper begins by describing how the etc evolved from the recognition that support for technology enhanced teaching was being provided through a number of different departments and separate initiatives including librarians, technology specialists and educational developers. The partnership was developed based on the assumption that together we could provide a much better service by working collaboratively. Although it is a natural partnership, it is also one that required vision, nurturing and cooperation in order to bring it about and make it successful. This paper then continues by describing the process used by the etc to develop such a unique partnership. Highlighted are the specific tools used by the etc as they support faculty in their adoption of new technologies and teaching practices. Recognizing that acting as agents of change is a large part of the role of the etc, we also adopted a specific model of change to guide our activities. After describing the model, the paper concludes with a case study illustrating the work of the etc. As our partnership continues to strengthen we anticipate gathering further evidence regarding the effectiveness of the etc in addressing ongoing teaching challenges in the SoM.

METHODS:

Formation of the e-teaching collaborative

The Medical Education Technology Unit (MEdTech) in the SoM was established in October 2003. The Director of MEdTech envisioned the purpose of the unit as enhancing teaching and learning through the use of technology. To this end, a Web Developer was hired in January 2005 to assist faculty interested in using technology in education. As this activity became established, in the fall of 2005 the new Director for the Office of Health Sciences Education (OHSE) began focusing on enhancing teaching and learning through innovation and scholarship. These two units worked together and created the Faculty Technology Learning Community (FTLC). Drawing from the literature[1] the FTLC was established to explore the possibility of disseminating best practices in integrating technology into teaching throughout the undergraduate medical curriculum. An Educational Developer was hired in 2006 to assist faculty with innovations in curriculum development and teaching methodologies.

At the end of 2005, a Health Informatics Librarian was hired at the Bracken Health Sciences Library (Bracken) for the purpose of assisting faculty with the integration of digital resources into their teaching. The following year Bracken filled a new position, the Digital Resources Assistant, to support the Health Informatics services. The Digital Resources Assistant would be working closely with the Health Informatics Librarian to help faculty incorporate images, video and other multimedia into their teaching, and to support faculty with other special projects requiring web or other technological expertise.

The introduction of these services in Bracken resulted in concern regarding the possibility of overlapping or competing responsibilities with web development in MEdTech, and confusion on the part of faculty seeking assistance. This situation could have resulted in boundary protection and entrenchment of the two units, but fortunately, it was agreed that we needed to work collaboratively and in fact, also with the Office of Health Sciences Education to ensure appropriate educational approaches to any technological changes proposed in the curriculum.

All of the individuals involved at the beginning were like-minded, had good will and interest in working together, and a common desire to provide faculty with the best possible integrated services. There was excitement - and relief - that our combined strengths would deliver a better service than anyone one of us could do in isolation. We identified three main objectives:

- To overcome working in silos, isolated from one another.
- To avoid potential overlap in roles, and in fact, complement the work of each unit.
- To communicate effectively with faculty who are large in number, distributed in various sites and only teach for short periods during the year.

As a group we reviewed potential collaboration models. For example, Queen's University through the Centre for Teaching and Learning had experimented previously with the formation of Learning Technology Teams[2]. In this model interdepartmental teams were formed specifically to support individual projects and then disbanded once the project was completed. In

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[1] Cox, M.D. (2004). Introduction to Faculty Learning Communities. New Directions for Teaching and Learning. No. 7, p. 5-23.

[2] Laverty, C. et al. (2003). Enhancing the classroom experience with learning technology teams. Educause Quarterly 26 (3) p. 19 – 25.

our case however, we wanted to establish a systematic process that would be sustainable over the long term. Thus, the e-teaching collaborative (etc)[3] was born.

The overall aim of the etc is to provide one-stop access to expertise in electronic learning resources, technological tools and educational methodology. To accomplish this aim, three immediate goals were identified:

- To encourage faculty to try new approaches to teaching.
- To improve faculty awareness of options for innovation in education and technology.
- To help faculty find out more about their colleagues' initiatives.

Technological Solutions

The etc has employed a number of technologies in achieving its goals of helping faculty become more innovative in their teaching, and providing a single access point for all of its services.
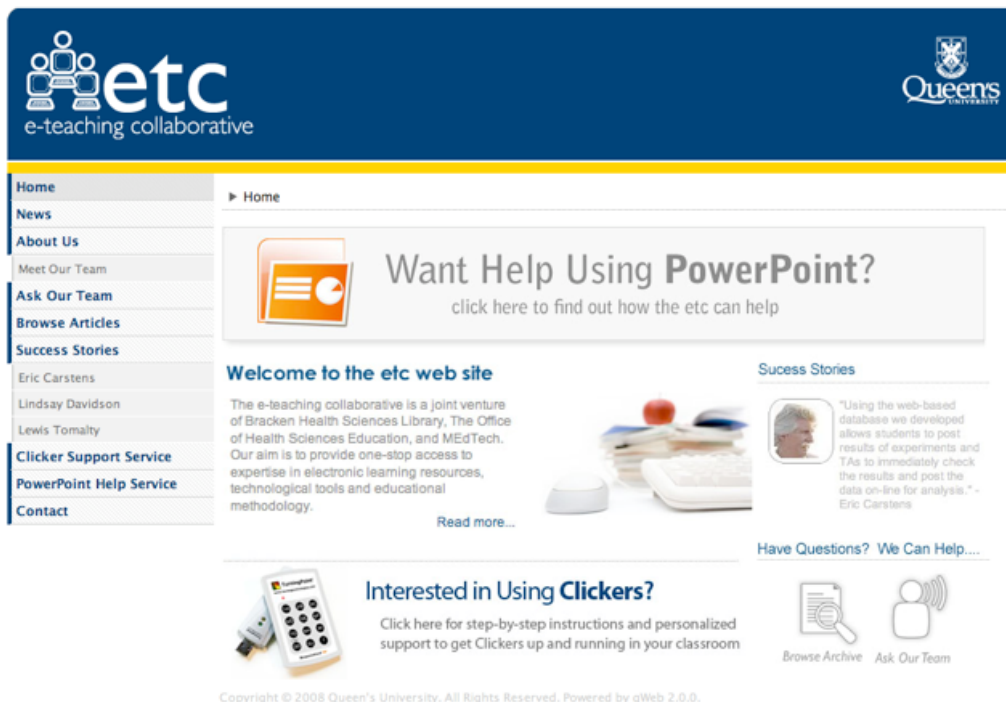
<u>Web Site</u>

The etc web site was designed to provide one-stop access to expertise in electronic learning resources, technological tools and educational methodology. The web site provides access to etc services through a visually designed home page as well as a standard text-based navigation menu. The site contains information on etc Clicker and PowerPoint support services, success stories from faculty who have worked with members of etc, a link to a knowledge base of articles, contact information as well as a generic support request form.

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[3] Unbeknownst to the group, another unit on campus, the Emerging Technology Centre or ETC, was being formed at the same time. Thus the e-teaching collaborative chose to use lower case to distinguish it from the other unit

(referred to by etc members as "the big ETC").

Figure I – etc main web page

The etc web site (see Figure I) was designed by the Web Developer and was implemented using the QWeb content management system (http://meds.queensu.ca/medtech/solutions/qweb). Each team member has access to log in and edit the site using the WYSIWYG (What You See Is What You Get) authoring interface provided by QWeb
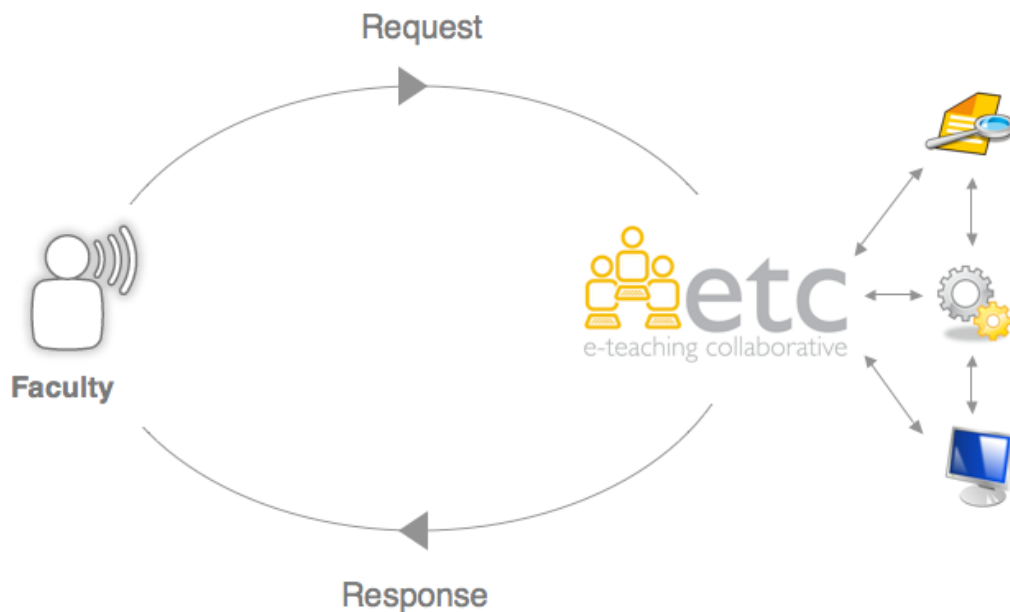
Knowledge Base

The knowledge base contains a collection of articles answering frequently asked questions that the etc receives. The articles contain instructions, often accompanied with screenshots, on how to use software as well as tips on how to teach with technology. The articles are organized by categories, which include PowerPoint, Copyright, Online Discussion, RSS and Videoconferencing and each article can be rated or commented on. The knowledge base was initially populated with frequently asked questions that team members had received and is continually updated as new questions or issues arise. One of the main benefits of having the knowledge base is that team members can refer to existing articles when providing support instead of having to craft a new response or handouts every time information on a topic is required.

The knowledge base was implemented using a custom web application called Lore (http://puresw.com/products/lore/). Each team member has access to log in and create an article using the WYSIWYG authoring interface provided by Lore.

The support request form was designed to allow faculty members to send a request to the etc without needing to know to which team member they should send their request. The support request form asks them to provide their name, email address, category of request (Technological Tools, Pedagogy, Resources), and a description of the request. When the form is submitted, an email is generated and is sent to the etc email address. This email address is managed by the Web Developer who either forwards the email to the most appropriate team member or coordinates a group response if the input from more than one team member is required.

Figure II – etc response process

The support request form was implemented using a PHP script on a web page within the etc web site. The Digital Resources Assistant wrote the script and the email address is managed by the Web Developer.

Wiki

The wiki was designed to support collaboration in between meetings and to act as an archive of etc resources. The wiki is used to collaboratively create meeting agendas and post minutes, jointly authored documents (abstracts, papers, and presentation/workshop outlines), store group resources (presentations, logos and other design files), and to keep track of feedback.

Using the wiki has been beneficial to working together as a team; however, there were some initial challenges. There was a slight learning curve in order to learn the wiki mark-up language and posting to the wiki did require a change in behaviour (the Web Developer needed to remind everyone to "put in on the wiki") since many team members were accustomed to collaborating on

documents by sending Word files back and forth via email.

The wiki was implemented using an open source wiki application called Dokuwiki (http://www.dokuwiki.org/dokuwiki . The wiki is password protected and can only be viewed or edited by etc members.

Concerns-Based Adoption Model

Initiating innovation and supporting faculty as they undertake change is an important role of the etc. Therefore it was important to ensure that our activities were framed within a process of change that faculty would encounter when exposed to an innovation. The concerns-based adoption model (CBAM, pronounced "seebam") provided us with such a framework. Developed by Hall and Hord[4], CBAM identifies seven stages of concern that faculty move through as they try something new (see Table 1, 1st column). Within this model Hall and Hord describe the role of a change facilitator to "provide interventions that increase the potential for the success of the change or allow it to fail" (p. 105). CBAM provided the etc group with a useful way to match our activities and interventions to specific stages of change (see Table 1), in order to recognize stages of change, move change forward and assess our progress.

For example, undertaking departmental presentations addresses the need to develop **awareness** about the innovation as a first step in the change process. Workshops allow us to provide faculty with **information** regarding the various computer-based tools and the key considerations for effective integration of the technology into their teaching. **Personal** concerns are met by providing one-on-one support to faculty as they implemented their particular innovation. Through the etc we are able to assist faculty with finding or developing the required resources. This helps to address any **management** concerns that faculty might have regarding the amount of time required to adopt something new. Providing assistance with evaluating the impact of the innovation helps to address any concerns over the **consequence** of trying something new. Moving beyond the individual faculty member, the need for **collaboration** is addressed. Here we can work with teams of faculty, or work in teams beyond the etc. Finally, the results of the evaluations as well as exposure to alternative approaches assist faculty who may be interested in **refocusing** their activities.

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[4] Hall, Gene E. & Hord, Shirley M. (2001). Implementing Change: Patterns, Principles, and Potholes. Boston: Allyn and Bacon.

Figure III: Use of Concerns Based Adoption Model by the e-teaching collaborative (etc)

Stage	Level	Interventions and Activities
0	**Awareness:** Little concern about or involvement with the innovation is indicated.	**Departmental Presentations:** Let faculty know that they have options and support for innovation in their teaching programs.
1	**Informational:** A general awareness of the innovation and interest in learning more detail about is indicated. The individual seems to be unworried about himself/herself in relation to the innovation. She/he is interested in substantive aspects of the innovation in a selfless manner, such as general characteristics, effects and requirements for use.	**Workshops:** Teach faculty about characteristics of particular tools and strategies for effective integration of technology in education.
2	**Personal:** Individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and his/her role with the innovation. This includes analysis of his/her role with the innovation. This includes analysis of his/her role in relation to the reward structure of the organization, decision-making, and consideration of potential conflicts with existing structures or personal commitment. Financial or status implications of the program for self or colleagues may also be reflected.	**PowerPoint and Clicker Services:** Provide faculty with tailored support depending on their confidence and/or need.
3	**Management:** Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, scheduling, and time demands are utmost.	**Online Learning Module:** Meet with faculty member over an extended period to improve a pre-existing teaching session.

4	**Consequence:** Attention focuses on the impact of the innovation on clients in their immediate sphere of influence. For faculty, this includes impact upon their teaching as well as impact upon student learning. The focus is on the relevance of the innovation for clients, evaluation of outcome including performance and competencies and changes needed to increase client outcomes. .	**Teacher Consultation:** Emphasize a client-focus to ensure that the faculty member chooses the best approaches and innovations for their specific class. Review after session to evaluate relevance and outcomes. Seek student input.
5	**Collaboration:** The focus is on coordination and cooperation with others regarding use of the innovation.	**New Curriculum Development:** Collaborate with multiple stakeholders to innovate and incorporate new topics into the existing curriculum in a number of places. Cannot be accomplished unilaterally.
6	**Refocusing:** The focus is on the exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. Individual has definite ideas about alternatives to the proposed or existing innovation.	**Renewal Based on Evaluation:** Explore ways to improve learning outcomes after successful integration of innovations. Re-evaluate and explore new technological and educational tools for use in implementing new teaching techniques.

In combination, these activities and interventions allow us to act as change agents by supporting faculty concerns at any stage in the change process. The following case study provides a detailed example of a faculty member whose information needs had been addressed through a workshop and now required support in relation to management and consequence concerns.

RESULTS:

Taking Action: The Case of the Enquiring Teacher

In late February 2008, Dr. Karen Schultz was thinking about her teaching sessions coming up in April. As an instructor in dermatology at Queen's School of Medicine, she was interested in making her sessions more interactive so that students would be more engaged in learning. Dr. Schultz attended an etc workshop on teaching with technology called, "From Ideas to Action: Enhancing your Teaching with Technology" where she got some ideas about using technology to make her teaching more integrated, relevant and more interactive.

At home, she thought about which technology applications she'd like to try and why. Then she contacted the etc for advice. She started by contacting the team through their PowerPoint Help Service on the etc website; the Health Informatics Librarian reviewed her PowerPoint slides and discovered powerful multimedia images and suggested resource websites for the students, the Web Developer made suggestions about her slide design, and the Educational Developer contributed a series of suggestions around building in a case to focus the session, moving out some content, having a quick review, and adding clicker questions in specific places.

Dr. Schultz was ready to take action. She had a meeting with the Educational Developer and the Web Developer to discuss how to use three innovations: an online case with questions as a pre-session required reading assignment, clicker questions for use during the session and an online quiz to allow students to self-assess their ability to determine specific skin conditions after the session. She met with the Digital Resources Assistant to install the Turning Point software (http://www.turningtechnologies.com/) for clickers, to get a tutorial on how to use the technology and to arrange with him to come to her first class to help out.

Over the next few weeks, following from that initial meeting, Dr. Schultz worked on specific aspects of the session with feedback and examples from the Educational Developer and the Web Developer. She created a wonderful case featuring WMS (Worried Medical Student) complete with photos and questions around a diagnostic process and posted it on MEdTech, the school's Learning Management System, for pre-session reading. She planned to use the case throughout her session to help the students understand the diagnostic process.

Dr. Schultz designed a series of clicker questions (5 in all) to allow students to get immediate feedback on their ability to recognize specific skin disorders and to comment on the approach they would take as physicians. Two additional clicker questions allowed Dr. Schultz and the team to get feedback on the effectiveness of the clickers and of the case study. Finally, Dr. Schultz and the Web Developer created an online interactive quiz, using a new tool called eXe (http://www.exelearning.org/), an eLearning XHTML editor, that allowed students to test their knowledge of skin conditions and the diagnostic approach.

All of these innovations were put into practice; the Digital Resources Assistant came to the class to help set up the clickers as part of the etc clicker service and the Educational Developer came to observe as part of her role as Educational Consultant. The innovations were successful. 83% of the students indicated that using clickers "made the lecture more interesting and helped in learning" while 17% indicated that clickers "made the lecture more interesting but did not help in learning." Regarding the use of the case and checklist for pre-class reading, 23% found them very useful, 36% found them "useful," 8% found them "not very useful" and, unfortunately, 33% admitted they were not able to get to the reading prior to class. Anecdotally, the students came to Dr. Schultz after her session with interesting questions about the diagnosis of Worried Medical Student. [A number of students took the interactive quiz after class. One emailed for further information and said they definitely would be using the quiz to help them study for the exam.] Dr. Schultz plans to look at the results of the course evaluation to see how the use of technology impacted upon the students' perception of learning.

Dr. Schultz had this to say about the experience: "It was wonderful having the etc available to improve this lecture. Although I think the lecture has gone over reasonably well before, this year it was much more interactive. I think this enhanced the students' learning and certainly made the lecture much more fun to give. It was also exciting for me to find out about many more web based teaching tools from [the Web Developer] and [the Health Informatics Librarian], clicker technology from [the Digital Resources Assistant] and to have the educational expertise of [the Educational Developer] to make my lecture more effective, all things I will use with other lectures. Not being able to solve my way out of a computer program glitch if I tried it was also very reassuring to have [the Digital Resources Assistant] at the lecture to trouble shoot if needed (although everything ended up running very smoothly!). [The Educational Developer] also took the time to attend my lecture and gave me very constructive feedback promptly after. Everyone at etc was enthusiastic, friendly and very helpful—etc is truly a wonderful resource for us to have."

Dr. Schultz has plans for next year too: "For next year, my plans are to add some more on-line tools that students can use away from the lecture. I only had time to create one case for them to work through on approaching the patient with a skin disorder before the lecture this year. I am going to come up with a second case that they can do after the lecture to solidify their knowledge and understanding."

DISCUSSION:

Dr. Schultz's case is an example of how the etc was responsive to her needs, in providing a variety of services to assist in her educational goal of engaging the students in interactive methods. This example of the Consequences stage of the Concerns Based Adoption Model allows us to see the power of a team response with specific roles for specific requests, developed through our growth through Informational, Personal and Management stages. This case also illustrates our future directions: Collaboration and Refocusing. In collaboration, we affirm the effectiveness of the etc working with new stakeholders, such as the Office of Faculty Development to reach out beyond our own roles. Not only did Dr. Schultz's request spring from our Faculty Development collaboration, but the collaboration with Faculty Development now includes a series of workshops by etc members, from Interactive Teaching with PowerPoint to Developing Blended Learning and Online Quizzes.

Other types of collaboration have allowed us to expand our services with multiple stakeholders. Our work with individual faculty members is now supplemented by our work with curriculum teams in our revised Undergraduate Medical Education Curriculum, and our work on larger curriculum projects such as the Intimate Partner Violence Workshop and new strategies for teaching teams.

As well, Dr. Schultz's case is an example of how we are beginning to document our work, and evaluating the services and impact we have, as a part of our Refocusing stage in our growth. Through our documentation, we find that we have expanded and diversified the number of faculty interested in teaching innovations, we have increased the number of innovative teaching initiatives, and we have enhanced attendance at Faculty Development workshops.

Refocusing also encourages us to explore ways to improve learning outcomes after successful integration of innovations. Refocusing has encouraged us to launch some proactive projects to anticipate response and to meet a variety of needs we have observed. For example, the etc is planning to develop a database to house local online learning objects and to create a handbook with standards and procedures to guide the development of locally produced online learning objects.

Dr. Schulz's case came as the etc team grew developed to respond effectively to the needs of our faculty, and it indicates the growth that has flowed from such cases as the etc strives to meet teaching challenges, and advance our own growth.

CONCLUSION:

The etc grew from different offices desiring to effectively meet both resource challenges and teaching challenges. We have found the use of the Concerns Based Adoption Model effective not only to match our activities different stages of change, but as well to chart the growth of the etc itself and spearhead new growth of both resource and teaching challenges.

In our development as a team we moved from Information and Personal stages, where we came to understand our diverse roles and how we could work together, to Management where we developed a process to seamlessly offer service and support to faculty, and to communicate with each other. The etc is progressing from Consequences where we have developed a responsive process for a variety of needs, to Collaboration where we have reached out to include others in our work, such as Faculty Development and curriculum teams, and Refocusing, where we continue to grow, review and assess our processes, including sharing with others through articles and conferences such as this.

In meeting the resource challenges our university and faculty offered us, we have increased efficiency and reduced a duplication of services, we have increased our responsiveness and the quality of our support services and we have emerged as a supportive, creative learning community.