

What Makes an Effective Virtual Learning Experience for Promoting Faculty Use of Technology?

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Abstract

The main objective of this project was to provide a Web-based tool that included practical resources for faculty in education at one Canadian university who were seeking ways to make effective use of learning technologies to enhance learning environments. The site includes online tools and resources and integrates ideas from people in the faculty and other education institutions about various ways to enhance teaching and learning through the use of technology. A study using the think-aloud strategy investigated the views of four faculty members about the effectiveness of the site for their own professional development.

Résumé

L'objectif principal de ce projet consistait à offrir un outil sur Web qui incluait des ressources pratiques pour la faculté en éducation d'une université canadienne qui recherchait les façons de faire une utilisation efficace de technologies d'apprentissage pour améliorer l'environnement d'apprentissage. Le site comprend des outils et ressources en ligne et intègre des idées de personnes de la faculté et d'autres institutions d'éducation concernant diverses manières d'améliorer l'enseignement et l'apprentissage par l'utilisation de la technologie. Une étude utilisant une stratégie d'échange d'idées a interrogé quatre membres de la faculté concernant l'efficacité du site pour leur propre développement professionnel.

Introduction

The Faculty of Education at the University of Alberta, Edmonton, is one of the largest teacher preparation facilities in Canada. The Faculty Technology Council in this institution has taken steps to encourage the use of computer technologies in the learning experiences of preservice teachers by creating a Faculty Technology Plan and by identifying the places where the government-mandated Information and Communication Technology (ICT) Outcomes Program of Study from the Ministry of Learning (Alberta Learning, 2000) are currently being addressed in teacher education courses. Some significant attempts have been made by individual faculty to enhance their undergraduate teacher education courses with the use of technology. However, the challenge still remains to find ways to en-

courage all instructors in the teacher education program to use technology in their teaching in order to prepare students to address ICT outcomes in their future classrooms

Over the 2003-2004 academic year, the Teaching with Technology in the Faculty of Education (FTTE) Web site [<http://www.quasar.ualberta.ca/tfce>] was developed. The intent of the Web site was to provide a professional development model that included practical resources for faculty seeking ways to make effective use of learning technologies. We wanted the tool to be relevant, meaningful, and supportive for all possible users in our faculty, ranging from early adopters looking for new ideas to relative nonusers. Therefore, we included a variety of online tools and resources as well as video vignettes from people in our faculty talking about why and how they use specific technology tools to support their teaching and their students' learning.

Relationship to Existing Research Literature

Many beginning teachers graduate from teacher education institutions with limited knowledge of how technology can be used in their professional practice (Jacobsen, Clifford, & Friesen, 2002). Teacher educators are beginning to use technology in their teaching, but this is occurring slowly (Glenn, 2002). Although teacher educators are beginning to use technology in their teaching, much more attention to technology integration is needed (Mason et al., & Dralle, 2000). Student teachers are more frequently being required to demonstrate their ability to address technology learning outcomes in their practice in schools. Thus teacher educators must be prepared to integrate technologies into their courses in all subject areas in order to model the appropriate use of technologies throughout the curriculum (Bolick, Berson, Coutts, & Heinecke, 2003). The challenge facing teacher educators is to become both knowledgeable about and proficient with a wide variety of technologies as well as with the possibilities that these tools offer for enhancing their students' understanding of how best to use them in their future classrooms. Professional development experiences for faculty can play an important part in supporting faculty in these endeavors and therefore should be a high-priority issue (Amburgey, 2001).

In a survey of postsecondary educators across Canada about faculty use of technology, Cuneo, Campbell, and Harnish (2002) found that most faculty professional development at the postsecondary level tended to be of an ad hoc nature. It usually involved an interested individual who sought a personal need for a particular technology use and who sought the help of someone more skilled with computers. To date, there have been few attempts to formalize these mentoring experiences. Faculty members

often claim that lack of confidence in how best to use technologies (Schuck, 2002), lack of time and fear of appearing incompetent (Schoon, Weber, Hecht, & Singler, 1999) are the main reasons for minimal use. Other reasons that have been found are a reliance on traditional methods of delivery (McNeil, Smith, Stringer, & Lin, 2002), a lack of support and incentives (Gladhart, 2002a, 2002b), and professional development that does not address the pedagogical practices and content needs of faculty (Bai & Lehman, 2003).

Roberts and Associates (1999) recognized the dearth of professional development opportunities in ICT for university faculty in schools of education. They stated, "It is essential that faculty present models of teaching in which technology plays a role but it is difficult for them to do so if they do not have models of ICT practice readily available" (p. 8). More sharing is needed of these examples of faculty professional development experiences of the integration of computer technologies.

Some suggestions arising from the research on successful faculty PD to assist teacher educators in developing technological skills and understanding call for: (a) community-building and collaborative initiatives such as the development of innovative teams who share ideas (Fisk & Nolan, 2004); (b) capitalizing on pockets of change among faculty (Carney, Bohl, Snyder, & Roberts, 2002) including innovators sharing their expertise with other faculty (Chatel, 2002; Walsh, Riley, & McCay, 2001); (c) encouraging faculty and knowledgeable graduate students to work in teams (Messenheimer, Bombich, Madger, & Fischer, 2002); (d) instituting of incentives (Hannafin & Hanny, 2000); (e) using videos of faculty demonstrating a variety of technology uses in classrooms (Rankin, Freitas, & Kelly, 2003); (f) using demonstration sites in schools (Wischnowksi, Perrault, & Abas, 2004); (g) using Web-based delivery (Gladhart, 2002a); and (h) providing workshops and courses (Callaway, Matthew, & Letendre, 2002; Kalkman & Cummings, 2002; Regan, Lennex, & Cole, 2003). Overall, according to Fischer, Garcia, Wineberg, and Rose (2002), professional development for faculty should "reduce faculty anxiety, demystify technology, show faculty the instructional potential for infusing technology into their teaching and provide opportunities for faculty to reflect on their teaching" (p. 710).

The findings from this review of the research literature were taken into consideration when designing the professional development Web site that is discussed below.

The TTFE project

The TTFE Web site is based on an architectural metaphor. The home page of the site features a picture of our faculty building. The user "enters" the

faculty building by clicking on the elevator icon. Each of the remaining pages of the site is framed by the elevator image, including a sidebar directory, floor selection buttons, and a floor indicator on the top of each page. The choice to go with this metaphor was based on Imel's (2001) finding about the need for a nonthreatening, safe learning atmosphere. We believed that having a familiar working environment would make this a less threatening, more user-friendly site. Once in the elevator, the user can select from six floors.

On the main floor, users can learn more about why the use of computer technologies should be an integral part of teaching and learning. Here there is an *About This Site* section that describes the purpose of the site. The *Some Theory* section provides a brief synthesis of constructivist learning theory. The *ICT Outcomes* section contains an overview of the technologies featured in the Alberta government's ICT outcomes and a direct link to the provincial *ICT Program of Study* document. There is also a video-vignette of a government representative who talks about what these outcomes are and why they are important to the education of children in the province. Users can also view a site map and gain navigational information about the site. Finally, there is an option to provide feedback on the site using an online form.

The content of each of the remaining five floors is organized around categories of use. As recommended by Loveless (2002), these categories "reflect the ways in which people work with ICT for particular purposes. They focus on the reasons for using ICT, not on a list of specific applications, software or resources" (p. 13). Under each category users can examine three examples of how to integrate technology related to the particular category of use (Table 1).

While visiting each of these floors, users can access several specific technology-related activities. The Department Office includes information about the specified activity. The Instructor Office has a video-vignette of a faculty member who is currently using that activity in his or her teaching. The Lab provides a set of instructions about where to begin using such an activity in one's own teaching. These instructions are given in varying degrees of difficulty from beginner to advanced. The Lounge has a discussion area where users can ask questions about the activity. The Library gives the user access to a number of sites that provide further examples of the activity.

The Study

A qualitative interpretive inquiry approach was used to describe the experiences of individuals using this TTFE Web site as a professional development tool (Creswell, 1998). In the fall semester of 2004, four faculty

Table 1
Plan of the Web Site

<i>Category of Use</i>	<i>Examples</i>
Retrieving and synthesizing Information	Online searches Scavenger Hunts Virtual field trips
Communicating and collaborating	Discussion boards Videoconferencing Telecollaborative projects
Critical thinking and problem-solving	Concept mapping Webquests Simulations
Designing instructional materials	Presentation software Creating course Web sites Digital media
Assessing and evaluating	Online assessment methods Electronic portfolios

members of the Faculty of Education were interviewed using a think-aloud strategy (Branch, 2001). The purpose of these interviews was to gather information and impressions on the TTFE site's user-friendliness and potential effectiveness as a professional development tool. The think-aloud strategy requires participants to say what they are thinking as they perform a task (in this case, an exploration of the TTFE Web site) and how they are problem-solving during this performance (Ericsson & Simon, 1993).

Method

Each session, which lasted approximately an hour, was audiorecorded and transcribed for further analysis. Participants were asked to introduce themselves and then describe any experience they had had with technology in their personal, academic, and teaching lives. Following this, the participants were introduced to the TTFE Web site. They were asked to move through the main floor and then thoroughly examine at least one of the 15 areas. This was to ensure that participants had a chance to view each type of resource included in the site. They were then asked to explore the rest of the site as they wished for the remaining time. This part of the process was done with minimum intrusion from the interviewer. The think-aloud was interrupted only if they asked a question that required an explanation, they were having technical difficulties, or needed to be reminded to speak aloud and say where they were as they moved through the site. After 50 minutes, or when they felt they were finished looking at

the site (whichever came first), the participants were asked to stop exploring to answer two questions. The first was how useful they felt the site was and the second was whether they could see themselves visiting the site on their own time and why or why not.

Participants

Participants were selected to represent both sexes and varying levels of technology experience. Two men and two women were asked to participate in the evaluation and of each gender pair, one was an "expert" technology user, whereas the other was less experienced with technology, especially in the areas of teaching and professional use.

Participant 1 was the male expert technology user. He had used technology extensively since his days of working with mainframe computers just out of high school. He had had experience as a programmer, researcher, and university academic in the area of technology and technology integration. In addition to teaching university-level courses in the areas of instructional design and programming, he had also done extensive research relating computer instruction to learning theory. Participant 1 had used technology extensively in almost every area of his teaching life for everything from managing marks, to submitting assignments, to online development, to performing search operations.

Participant 2 was the female expert technology user. It was one of her main areas of research, and she also taught university-level courses on the subject of technology and technology integration. She had used technology extensively in her teaching, academic, and personal life. She had also used a number of types of hardware and software in her classes for organizing information, online activities, data-gathering, and data analysis.

Participant 3 was the male beginner technology user. Although he had obtained his first personal computer in the early 1980s, he had used personal computers only for the same basic tasks such as Internet searches, library searches, and word-processing. This participant had limited his technology use to his personal life and a little of his academic life, but had not taken the time to integrate technology into his teaching practices.

Participant 4 was the female beginner technology user. She had a good basic foundation in personal computing and had used technology regularly in her personal and academic life. She felt that she was somewhat limited in how she integrated technology into her teaching although she had used a number of technology tools in her academic life including word-processing tools, citation tools, data analysis programs, and spreadsheet programs. In her experience as a teacher, she had used technology primarily as a method of communication and to help build exams and

other assessment tools. She expressed a desire to learn more about effective and pedagogically sound technology integration techniques because of lack of experience integrating technology in an actual classroom.

Findings

The four participants agreed on a number of issues about the TTFE site, but also had an equal number of differing opinions. Some elements that one user might have liked for one particular reason might not have been appreciated by another user for another reason. It is important to point out that just because a user did not say something aloud during the interview, it does not mean they had a differing opinion. For example, if we say that three of the four users expressed the opinion that the site was wonderful, it does not mean that the fourth user did not think that the site was wonderful, only that individual was not moved to express an opinion about it as he or she navigated through the site. Five core areas of data emerged as a result of the think-aloud interviews:

- Amount of information;
- Quality of information;
- Ease of use;
- Appearance;
- Usefulness of information.

The following discussion explores some of the points made about the Web site itself, as well as its usefulness as a professional development tool.

Amount of Information

The amount of information was a widely agreed-on aspect of the TTFE site in that three of the participants expressed the opinion that the site was too "text heavy" with two participants suggesting that the content be made into bullet points for easier readability. All four stated that they felt that the site would require a good amount of time to go through properly if they were truly interested in learning about a particular skill or technology integration technique. One of the advanced participants suggested that this large bulk of information might be overwhelming to the average beginning technology user. Two participants also noted that although the amount of information on the site was thorough, there were no instructions for finding further help if the user had questions or needed additional information.

Quality of Information

A number of differing opinions were expressed about the quality of information on the site. Two of the participants said that they liked the frequent uses of "local" (i.e., University of Alberta created) resources. However, it

should also be noted that one user was not able to recognize some of the resources from our own institution. This user expressed confusion about a number of programs and technology tools that were available on campus, but that he was not using in his teaching. For example, he was not aware that WebCT was our learning management system on campus and did not understand what WebCT was, where he could find it, or what it would do for him as an instructor.

Two of the participants initially expressed opinions against using external links and tutorials (i.e., sites and tutorials created outside the University of Alberta). However, both of these users commented that they had changed their minds by the end of the hour and felt that the resources listed were obviously thoughtfully chosen. All four participants commented that they felt that the quality of the tutorials and resources was high and that they appeared to have been carefully and thoughtfully chosen for inclusion on the site. One of the advanced users felt that the inclusion of advanced-level tutorials was not really practical or viable for most faculty members to learn in a self-directed way. She added that the inclusion of advanced tutorials did not seem to fit with the stated purpose of the Web site, which was to inspire and provide a starting point for users interested in integrating new technology into their teaching. Furthermore, although two users felt that the categorization of tutorials into advanced, intermediate, and beginner levels was useful, one beginner user noted that he did not like being branded a beginner even though he was one.

Ease of Use

A number of ease-of-use issues came to light through the think-aloud interviews. Three participants found the entry page confusing and did not know if they should click on the image or the *enter the elevator* button. Two expressed the opinion that they would be more inclined to click on the picture of our building rather than look for another button to click.

Once inside the site, only one of the users took the time to read the navigation instructions. The other three participants experienced some confusion during the first few minutes of navigating the site. Two began navigating more easily after only a couple of minutes, whereas the third did not appear to use the navigation structure effectively until about half-way through the interview and repeatedly expressed confusion about what things did and where he was.

Although there was some confusion at the beginning, by the end of the interview, all four expressed an appreciation for how the site was organized. All four said they liked the consistency of the floors, and three stated that the layout made it far easier for them to know where they were

in the site at any time. In the end, all four expressed the opinion that the site was easy to use and navigate.

Appearance

All four participants made positive comments about the clean layout of the site and said that this made the site easier to navigate. Two users also stated that they found the color scheme of the site visually appealing, and two commented positively about specific colors chosen for various floors. However, it should be noted that two participants felt that the Web navigation scheme felt "backwards." Web navigation schemes typically move downward, but the numbers on an elevator typically start at the bottom and move up. It was decided to have the navigation on the TTFE site move downward as it would be more intuitive to Web users. However, two participants pointed out that they would expect the navigation scheme to move upward like a real elevator and not downward like a normal Web site.

Usefulness of Information

All four participants commented positively about the usefulness of at least one of the types of resources on the site. All said that they liked the idea of the video-vignettes, although the two expert users felt that they could have had more content and been more than just "talking heads." It should be noted that during the think-alouds, three of the four participants took the time to visit each of the 15 instructor offices on the site just to see which instructor had been chosen to be interviewed for each of the sections.

All four participants also commented that they felt that it was useful to find quality tutorials and exemplars. Three participants liked the idea of the TIP sheets, and two said that they would find them personally useful. The TIP sheets were short, one-page getting-started guides to give instructors step-by-step instructions on how to start using a particular technology integration technique, specifically in the context of the Faculty of Education. Three of the instructors also noted that they felt that this site would also be a good resource for their students.

User Summaries

Participant 1 felt that the site would be useful for people without a great deal of background in technology integration, but who would wish to develop their skills more and had the time to do it on their own. He felt that users probably would not have the time to go through the site in much detail. When asked if he would use it on his own time, he said that he would use it to look for resources and for ideas for his classes.

Participant 2 felt that although the focus on the site was beginners, the average beginner would need more face-to-face time. She said that she did not see the site as a viable starting point, but did believe that it would be useful for the in-between user (e.g., a relative beginner with some degree of knowledge of technology and its potential uses). This user said that she probably would not return to the site on her own time because she knew most of the content already and covered most of the topics in her courses.

Participant 3 felt that site would be overwhelming to most users in terms of content. He said that although he was generalizing, he did not think that most people (including him) would take the time to work through the site. He said that he would use the site for a shopping. When he had a topic about which he needed information, he would go to the site to visit links and educate himself. When asked if he would return to the site on his own time, he said that he would return to find information on PowerPoint™ presentations.

Participant 4 felt overall that the site would be useful for people who although they might use computers all the time, used them in limited ways and wished to expand their areas of use. She also believed the site was useful because it was created and housed locally, which she felt gave the impression that technology was an area of interest and importance to the faculty beyond the Web site and that further support would be available to her. When asked if she would return to the site, participant 4 said that she would return when she was ready to learn how to make a Web page, which she said she wished to do in the near future. Furthermore, she said that the site "made a strong impression on me in terms of I know exactly where to go when I need to access that information."

Discussion

Although all four participants found the resources and vignettes useful, only three said that they would probably return to the site on their own time. The participant who expressed the most enthusiasm and willingness to return and use it was participant 4. This participant was not a computer expert and had no prior knowledge of effective and pedagogically sound technology integration, but did have a strong basic understanding of computers and their capabilities. The other two users who said that they would return to the site said that they would use it to find resources. Participant 2 also warned that she believed that the site had limited usefulness for absolute beginners:

The people that are absolute beginners are probably the people that need to have somebody talk to them face to face and sit down with them. So in a lot of ways, this site is set up for beginners, introducing them to it, and I don't

see *this* as a starting point for them. I think something has to happen before anybody shows them the site.

Participant 4, herself a beginner in integrating technology in her teaching, echoed this sentiment. She said that the site was "very useful for someone like myself who, again, maybe uses a computer all the time, but for fairly limited applications, but really wants to be able to use the technology more in a couple of different ways." However, this same participant expressed the opinion that the site did allow one to explore and learn as one goes without bias. She stated,

So what I like about it is that it's very user-friendly, and it takes into consideration that people who are here as instructors and as students could very well be beginners, and so it lays it out in a way that the information is accessible, but also organized around the assumption that you're learning, and I like that because it doesn't intimidate me.

Concluding Remarks

The results of this and other feedback sessions have proved advice about possibly redesigning certain components of the TTfe Web site. Input was also taken from the results of a focus group study, as well as an online evaluation form that users can fill out on the main floor of the Web site. On the whole, the feedback was positive. Minimal adjustments were made such as correcting a few spelling errors and providing a Help contact. Interested instructors are now being encouraged to visit the site by the technology professional development support personnel in our faculty. We continue to receive positive feedback about the helpfulness of the site, particularly from new instructors.

Glenn (2002) has called for viable technology professional development models for faculty and instructors in teacher education programs. It is hoped that this Web site might move our faculty forward as faculty and sessional instructors gain a better understanding of how to integrate technology into their teaching. We also hope that those from other institutions who read this article and visit the TTfe site will be inspired to attempt similar professional development projects.

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