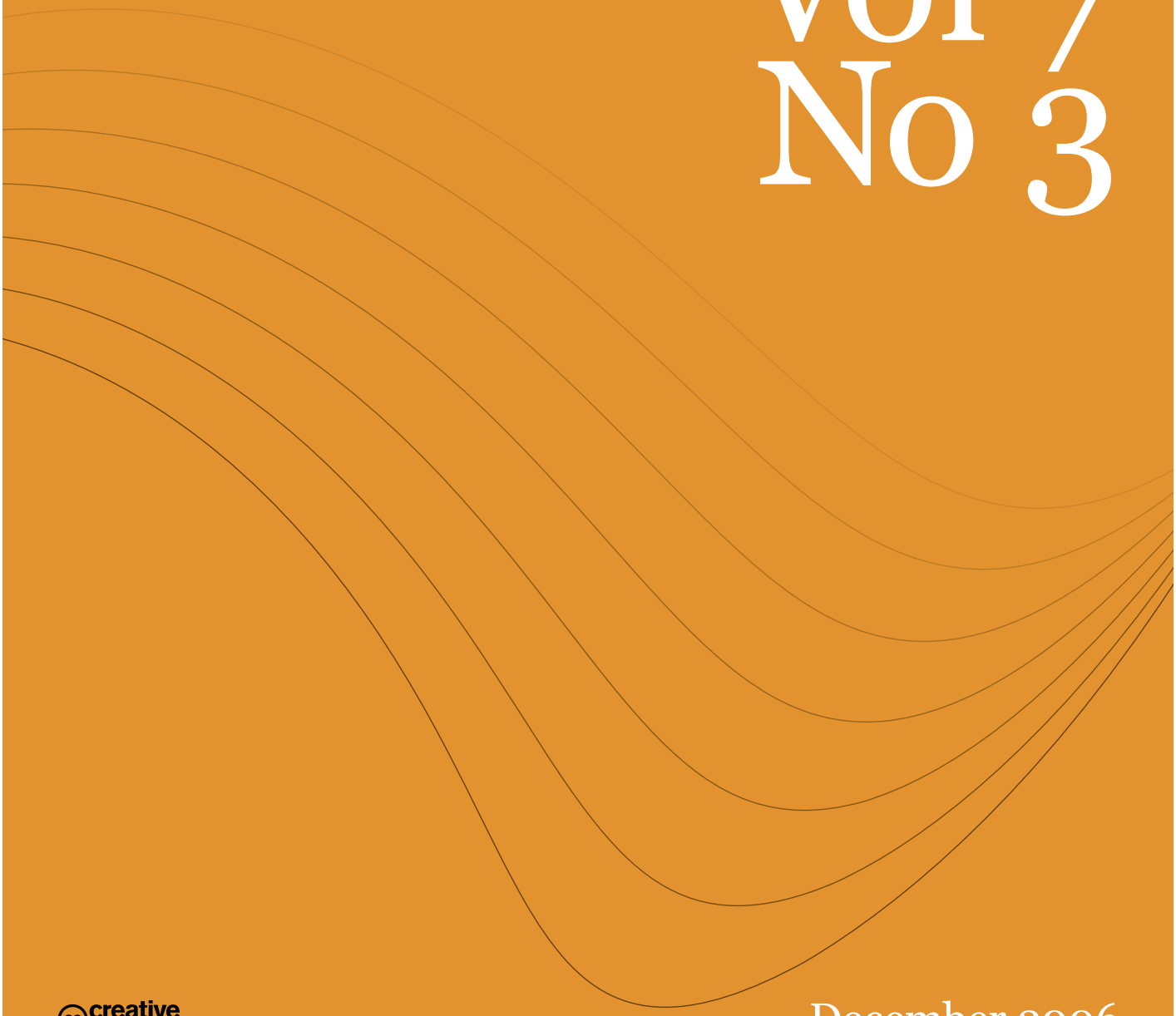
IRRODL

THE INTERNATIONAL
REVIEW OF RESEARCH IN
OPEN AND DISTANCE LEARNING

Vol 7
No 3



December 2006

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Editorial

Environmental Scan: Results of the IRRODL User Survey

Terry Anderson

First, I'd like to thank the 118 readers who completed our first IRRODL user survey. We have published a summary of the results here as feedback to the respondents and as guidelines for ourselves, our reviewers, and editors, as well as to others currently publishing Open Access Journals.

We are flattered by the results, which has rekindled our sense of 'mission' thanks to the many positive responses. In addition, we now have feedback to use to improve IRRODL.

We were slightly surprised to see that nearly 40 percent of the respondents are relatively new (less than one year reading of IRRODL), indicating a healthy growth in readership. Seventy percent were subscribers and the rest probably arrived at the website through recommendations or search engine referral. Only 17 percent of respondents used the RSS feature to remind them of new postings. RSS Feed's relatively low usage is understandable given the emerging nature of this push technology (which enables the RSS Feed users to receive only information that interests them – clearly a handy screening device given the amount of content published on the Internet daily!)

We were especially interested in the response to the addition of MP3 audio files affording ability to listen, in addition to reading, our articles. Only 31 percent of respondents felt that MP3 listening was important to them, but with the increasing use of podcasting and MP3 playback devices, we anticipate that interest will grow and continue to make the effort of converting content to audio format worthwhile. We were also pleased that only two readers felt we published too often; 75 felt we had the right number (about three issues per year), while 31 felt they wanted more!

A full 92 percent of respondents were satisfied with the breadth of coverage, 95 percent with the quality, and 94 percent with the currency of content published in IRRODL. Email push to subscribers was the most popular way (54%) that readers found out about articles with 29 percent finding them through Google or other search engines. As expected, the Main Section scholarly peer reviewed articles were read more extensively than Research Reports, Book Reviews, or the Technical Evaluation Reports.

Readers indicated to us that they were most interested in research findings (81%) with applied practice (88%) and distance education theory at 62 percent of respondents. Topics of interest were diverse leading with distance education pedagogy (88% of readers expressing interest),

instructor development and support (70%) and interest in qualitative studies (70%) as compared to quantitative studies at (56%). When queried about additional technologies that could be used to enhance IRRODL only threaded discussion (tried with little success in early issues) exceeding the response that no other technologies are needed.

Surprisingly 56 percent of respondents read the articles online with only 38 percent regularly printing the articles. Demographically, respondents were generally highly educated with graduate level education (Bachelor 8%; Masters 45%; Doctorate 36%). Respondents came from every continent, except Antarctica. As expected the largest response was from North America (53%) followed by Europe (18%) and Asia (11%).

Responses to the open-ended query of '*things liked most*' were wide and tended to be complementary, with availability and open access being the single most popular response. There were also many suggestions for improvement including formatting and screen layout improvements (a new site layout is in design mode now). We also had suggestions for more (and less) coverage of particular regions. These opposing regional suggestions makes me think we have reached a typical Canadian compromise – one in which no one is satisfied!

To end on a positive note, the survey reaffirmed the value of IRRODL and provided us with concrete suggestions for improvement. Thank you to those who shared their comments and insights, your input and feedback is invaluable.

Now for an overview of this, our final issue for 2006!

Overview: Volume 7, No. 3.

In this issue, we bring you seven Main Section papers, which we hope you will enjoy and – more importantly – will use to inform your scholarly pursuits and practice. We also provide one Research Report and one Technical Evaluation report.

Our lead article is from Canada and entitled: *Learners' Perspectives on what is Missing from Online Learning: Interpretations through the Community of Inquiry Framework*. In this paper, Canadian scholars Emma Stodel, Terrie Lynn Thompson, and Colla MacDonald report on an inquiry (using a community of inquiry framework to interpret their results) on learners' perceptions of what is missing from online learning contexts. Conducted within a constructivist perspective, this paper reports on a qualitative study of ten who were asked about "what they missed most when learning online as compared to face-to-face learning?"

Next is a fascinating paper from Australia entitled: *Designing Websites for Learning and Enjoyment: A study of museum experiences*, by Aleck Lin and Shirley Gregor. In this paper, Drs. Lin and Gregor explore the world of online museums and their public/ pedagogical personas on the World Wide Web. Clearly, museums play an important role for enrichment to formal education as suggested by the authors. However, an ever growing contribution is the provision of both knowledge and community for lifelong learners spread through the Net.

Next we have a paper from The Netherlands entitled: *Feedback Model to Support Designers of Blended Learning Courses*, by Hans Hummel. Effective feedback has long been associated with all forms of quality education – including that delivered at a distance. Hummel reports on a pilot study that examined six-phases of a feedback model developed for blended learning courses. Research examining the usability and value of the model with practicing developers and teachers

are outlined. While this research indicated that the overall quality of this feedback model to be sufficient, it was also reported that revisions are necessary before the model could be implemented in practice. We do need theorists and designers to develop new methods and models, but equally important are those testing and evolving them for efficacy in the field.

We return to Canada with a paper entitled: *Partner Power: A study of two distance education consortia*, by Anne Banks-Pidduck and Tom Carey. Distance and Open education systems seem likely candidates for partnerships in which collaborative input is used to create greater output than that possible by individual partners. Despite this potential advantage, most of us are as familiar with failed partnerships and collaborations that never "took off." In this study Pidduck and Carey examine the process by which two Canadian distance education consortia picked their partners. Considerations of compatibility, culture, status, and convenience prove to be as determinant factors as desire to work together. The two distance education consortia examined also reveals the complex nature of Canada as a highly heterogeneous nation state built on pluralist values.

Next we leap to India, one of the fastest developing countries with a wealth of distance education practice and tradition. *The Study of the Factors Responsible for the Dropouts from the BSc Programme of Indira Gandhi National Open University*, by Bharat Inder Fozdar, Lalita S. Kumar, and S. Kannan looks at the perennial issue of attrition in distance programming. Their study focuses on the particular challenges of science education, with the need for laboratory experiences (virtual or classroom based) that often create challenges for both educators and students. The study reveals several clusters of variables associated with dropout – many of which are familiar from the literature. However, the study uniquely views the importance science students place on non-institutional factors such as cost associated with travel and distance involved in attending face-to-face laboratory classes. The authors conclude with recommendations for IGNOU (and I assume many other distance education institutions) to enhance completion rates for students in science programming delivered at a distance.

Our sixth main article examines problem-based learning (PBL) supported through computer conferencing. The article, *a Pilot Study of Problem Formulation and Resolution in an Online Problem-based Learning Course* by Richard Kenny, Mark Bullen and Jay Loftus provides a strong rationale for the inclusion of PBL in online contexts – even when students do not meet face-to-face. Kenny and colleagues report on an exploratory study designed to investigate student problem formulation and resolution processes in an undergraduate Agricultural Sciences course. The authors used a content analysis instrument designed originally for face-to-face PBL to measure problem formulation and resolution (PFR) processes in online asynchronous discussions. While there is some evidence that these students do engage in problem formulation and resolution (consistent with the PBL processes and pedagogy), in this institutional context, PBL problems remained tied to marked assignment structure, which tended to restrict full development of PFR processes.

We wrap-up the Main Section of this issue with a paper from the Canary Islands entitled, *Online Faculty Development and Assessment System (OFDAS)*, by Luis Viller and Olga Alegre. Using statistical analysis, the authors report on current 'best practices' of student online assessment, and a circular professional development model they developed (OFDAS). The OFDAS model – designed to serve double duty as a faculty development tool and a classroom learning environment assessment – was used by two universities in the Canary Islands. Findings reported illustrate that the OFDAS helped faculty to reflect on their teaching practices, which were in turn guided by student feedback on their classroom experiences. Viller and Algre then go on to discuss implications of the process of online teaching and knowledge acquisition, to build a

comprehensive view of faculty teaching attitudes and their relationship to student's perceptions of their classroom experience at these two Canarian universities.

Research Notes and Technical Evaluation Report

For the Research Notes we provide overviews of two emerging technologies by Master of Distance Education students at Athabasca University. The first is a personal account (in diary format) of Wendy Elliot's investigation of radio and podcasting for distance delivery. Though grounded in Canadian radio history, similar audio education has (and continues to) evolve in many countries. *The Audiocast Diaries: Reflections on radio and podcasting for delivery of educational soap operas* is a nice change of formatting pace for a scholarly journal, but I am sure you will both enjoy and learn from Wendy's diaries.

Our Technical Notes section contains a technical evaluation report by Steve Swettenham, who examines five open source RSS feed creation tools. The article ties back nicely into data collected from the IRRODL user survey outlined above. If you are not familiar with this important new technology and how you might be able to use it to your advantage, this Technical Report will be a good starting point.

Peace and Best Wishes to all our readers and their students!

Terry Anderson
December 19, 2006

Athabasca University

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Learners' Perspectives on What is Missing from Online Learning: Interpretations through the Community of Inquiry Framework

Emma J. Stodel
University of Ottawa

Terrie Lynn Thompson
University of Alberta

Colla J. MacDonald
University of Ottawa

Abstract

Despite the success that instructors and learners often enjoy with online university courses, learners have also reported that they miss face-to-face contact when learning online. The purpose of this inquiry was to identify learners' perceptions of what is missing from online learning and provide recommendations for how we can continue to innovate and improve the online learning experience. The inquiry was qualitative in nature and conducted from a constructivist perspective. Ten learners who had indicated that they missed and/ or would have liked more face-to-face contact following their participation in an online course were interviewed to elicit responses that would provide insights into what it is they miss about face-to-face contact when learning online. Five themes emerged: robustness of online dialogue, spontaneity and improvisation, perceiving and being perceived by the other, getting to know others, and learning to be an online learner. Garrison and colleagues' (Garrison, Anderson, & Archer, 2000) community of inquiry framework was used to interpret the findings.

Keywords: Online learning; learners' perspectives; community of inquiry framework; cognitive presence; social presence; teaching presence

Introduction

Emerging technologies are offering alternative ways to conceptualise and deliver education and in the process are revolutionising how learners work, think, and build knowledge (Anderson & Elloumi, 2004; McConnell, 2002; Salmon, 2000). Technology is becoming integral to the teaching-learning process as ongoing advancements offer new avenues for learning (Burge & Haughey, 2001; DeBard & Guidera, 2000). Online learning and the use of computer-mediated communication (CMC) tools are fast growing in popularity in higher education contexts (Burbules & Callister, 2000; Kanuka, Collett, & Caswell, 2002; Rovai, 2002). However, the adoption of this medium in the teaching-learning process has quickly outpaced our knowledge regarding how it might best be used (Garrison, Anderson, & Archer, 2001; Garrison, Cleveland-

Innes, Koole, & Kappelman, 2006; Pawan, Paulus, Yalcin, & Chang, 2003). This chasm in understanding needs to be bridged if we are to develop and deliver effective online learning.

The three authors have designed, developed, and taught graduate and undergraduate university courses online since 2002, as well as developed online learning for healthcare, the business sector, and international social development initiatives. This paper focuses on our work in the university context. We have extensively evaluated each class we have taught in order to improve the design and delivery of the course and gain insight into what makes an online learning experience successful. The courses have proved successful; learners indicated that they enjoyed the courses and met the learning objectives (MacDonald & Thompson, 2005). Other indicators of success include strong university teaching evaluations, almost zero attrition, and twice receiving the *WebCT* Exemplary Course award. Despite the success of these online courses as assessed by these more common and obvious indicators however, learners often reported that they missed face-to-face (F2F) contact when learning online. The present inquiry was motivated by our intrigue to discover what it is about F2F contact the learners missed. That the learners were still longing for something when the obvious indicators of a successful course were present made this question even more captivating for us. Perhaps these indicators are not the only signs we need to consider when evaluating online learning. There is much to learn by delving into the experience of learning online. Understanding the online experience from the learners' perspectives by gaining insight into how, if at all, learners try to make sense of the 'disconnect' they feel due to lack of F2F contact provides important insights into how online learning environments can be better designed and facilitated. Consequently, the purpose of this inquiry was to identify learners' perceptions of what is missing from online learning and provide recommendations for how the online learning experience might be improved.

The Concept of Presence when Learning Online

Concerns surrounding the lack of physical presence in an online learning environment have led researchers to investigate the concept of presence when learning online (Bibeau, 2001; Garrison & Cleveland-Innes, 2005; Tu & McIsaac, 2002). Early work focused on social presence and the idea of participation and belonging (Garrison, 2006). Social presence is a factor that contributes to building a community of learners (Aragon, 2003; Bibeau, 2001; Garrison, Anderson, & Archer, 2000, Rovai, 2002; Tu & McIsaac, 2002) and some believe that social presence is one of the first components that must be established to initiate learning online (Aragon, 2003).

Social presence has been defined in a number of ways: "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short, Williams, & Christie, 1976, p. 65); "the degree of feeling, perception, and reaction to another intellectual entity in the CMC environment" (Tu & McIsaac, 2002, p. 146); "feeling intimacy or togetherness in terms of sharing time and place" (Shin, 2002, p. 122); "the ability of learners to project themselves socially and emotionally in a community of inquiry" (Rourke, Anderson, Garrison, & Archer, 1999, ¶3); and "the degree to which a person is perceived as a ‘real person' in mediated communication" (Gunawardena & Zittle, 1997, p. 9). Social presence is closely related to the concepts of immediacy (Wiener & Mehrabian, 1968) and intimacy (Argyle & Dean, 1965). The purpose of an educational experience, however, is usually more than the development of a social community; the goal is to achieve defined learning outcomes and promote cognitive development. Garrison and Cleveland-Innes (2005) argued that if learning is to occur, interactions must be structured and systematic, rather than loose and social, and a community of inquiry must be developed. Creating a community of critical inquiry essential for higher order learning presents a challenge for educators teaching in an online environment where the communication

medium is lean (Garrison et al., 2000, 2001). To help educators meet this challenge, Garrison et al. (2000) proposed a conceptual framework designed to guide the use of CMC tools to support critical thinking in education.

The community of inquiry framework developed by Garrison et al. (2000) is based on a model of critical thinking and practical inquiry. Garrison et al. (2000) suggested that learning occurs through the interaction of social presence, cognitive presence, and teaching presence within a community of inquiry that is composed of teachers and students. Based on content analysis of postings in asynchronous discussion forums they proposed a number of indicators for each type of presence (Anderson, Rourke, Garrison, & Archer, 2001; Garrison et al., 2001; Rourke & Anderson, 2002; Rourke et al., 1999).

Garrison et al. (2001) defined cognitive presence as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (p. 11). Based on Dewey's (1933) concept of practical inquiry, Garrison et al. (2001) delineated four phases of practical inquiry: triggering event, exploration, integration, and resolution. The second element of Garrison et al.'s (2000) framework is social presence, which they defined as the "ability of participants . . . to project their personal characteristics into the community, thereby presenting themselves to other participants as ‘real people'" (p. 89). The function of social presence is to facilitate the attainment of the cognitive learning objectives by supporting critical thinking in a community of learners, as well as the affective learning objectives by making the group interactions enjoyable and rewarding. Rourke et al. (1999) suggested that social presence in CMC is reflected by three categories of postings: affective, interactive, and cohesive responses. Finally, the last element in the community of inquiry framework is that of teaching presence, which supports and enhances social and cognitive presence and is "most directly under the control of teachers" (Anderson et al., 2001, p. 3). There are three categories of teaching presence: design and organisation, facilitating discourse, and direct instruction.

Given that some learners in our online courses reported they missed F2F contact when learning online, the purpose of this inquiry was to identify learners' perceptions of what was missing in their online learning experience. As physical presence is absent in an online environment, a theoretical model of online presence – Garrison and colleagues' community of inquiry framework (Garrison et al., 2000) – was chosen to allow us to interpret the findings from a theoretical perspective.

Methodology

Context

Introduction to Research in Education is one of ten courses learners must take to complete the M.Ed. program at this Canadian university and was designed to prepare learners to consult and use research in education. It is one of two courses learners can take online. At the time this research was conducted, the online and F2F versions of the course were offered in alternating semesters; therefore learners wanting to take the course in a particular semester were not able to choose the delivery format. The first and last authors designed and co-taught the course.

The first of the 13 units in the course was delivered F2F in a three-hour session that provided an overview of the course and an orientation to the technology. There was an additional optional F2F session in the second week of class to provide additional assistance to those students who wanted

it. The remainder of the course was delivered completely online using *WebCT*. While this course included a couple of F2F elements, and therefore could be perceived as a blended course, it was first and foremost an online course and regarded as such by the learners, instructors, and faculty. The email, discussion forum, and chatroom communication features of *WebCT* were utilised. Discussion forums were created for each unit, except one. Ten percent of the learners' final grade was based on their professional participation in the course. Learners were informed they were expected to act as learning consultants to each other by providing support and feedback on each others' work, be prepared to actively participate in the discussions, and facilitate one of the discussion forums as part of a facilitation team. The remaining 90 percent of the learners' grades came from written assignments they submitted to the professor for grading. Optional chat sessions were held with the professors every two weeks to provide the opportunity for real-time communication. Learners could use these sessions to socialise with the professors or ask questions regarding the course content.

Learners were guided through the course by an eSyllabus and a RoadMap that explained the course activities (e.g., readings, discussions, assignments) for each unit. Links from the RoadMap enabled learners to access the pertinent resources. Text-based e-Docs were constructed to deliver the course content and numerous support resources were included in the learning environment. To help learners orient themselves to the technology a series of activities using the *WebCT* CMC tools was created that learners completed in the first week. One of these activities was to create a learner page where learners introduced themselves to the class.

The learners in the course were grouped into triads and expected to provide support and constructive feedback on assignments to their triad members. Learners self-selected triad members during the initial F2F session. As part of the course requirements, each triad was required to e-moderate one discussion forum. The professors determined the general area for discussion each week and provided relevant readings and online documents. The e-moderators (learners) then developed the discussion questions and took the topic in any direction they chose as they facilitated a one-week dialogue between their peers. Learners were provided with guidelines for facilitating online discussions.

Participants

One of the final course requirements necessitated the learners to reflect on the course and share their experiences by posting a final reflection in the discussion forum. The final postings suggested that, overall, the learners enjoyed the course and had a positive experience. However of the 23 learners in the course (n = 3 males; 20 females), 11 reported that they missed and/ or would have liked more F2F contact. In an attempt to understand what it is about F2F contact the learners missed, these individuals were invited to participate in an interview. Ten of the eleven learners (n = 1 male; 9 females) accepted the invitation and agreed to participate in this inquiry. The majority of the participants were working adults who were teachers, school administrators, or counsellors, the remainder were full-time students. The cultural diversity of the class was reflected in the participants in this inquiry. All the participants signed a consent form.

Procedure

The inquiry was qualitative in nature and conducted from a constructivist perspective. Constructivist proponents "share the goal of understanding the complex world of the lived experience from the point of view of those who live it" (Schwandt, 1994, p. 118). Each participant engaged in an in-depth semi-structured interview; the purpose of which was to

discover what the learners perceived was missing from online learning and what they felt would make the online learning experience richer. The interviews were audio-taped with the participants' permission and then transcribed verbatim. The transcripts were returned to the participants who were asked to read, amend, and expand them if they felt it would clarify or better represent their answers.

Data Analysis

Data were analysed using the constant comparative method (Bogdan & Biklen, 1998; Merriam, 1998). The first interview transcript was read and re-read and notes, comments, and observations were written in the margin with regard to interesting data that were relevant to developing an understanding of what was missing from online learning for that participant. A preliminary list of emergent categories into which the notes and comments were grouped was developed. The second interview was then analysed in the same way as the first, and the two lists of categories were compared and merged to create a master list. This process was repeated until all the data had been analysed. Once the authors were satisfied with the categories, the data were fractured into meaning units that were assigned to the categories. Direct quotations were used throughout the report in order to preserve the voice of the participants. Pseudonyms were assigned to maintain the participants' anonymity. The findings were then interpreted using the community of inquiry framework.

Findings

Five themes regarding what learners perceived was missing from their online learning experience emerged: robustness of online dialogue, spontaneity and improvisation, perceiving and being perceived by the other, getting to know others, and learning to be an online learner.

Robustness of Online Dialogue

Participants focused on issues relating to the online dialogue, in particular, the comparison to F2F conversations and controlling the flow of the online discussions.

Comparison to F2F

The learners varied in their perceptions of the quality of online discussions. Katie recognised that after people had figured out the technology and "got more comfortable with it then the quality of the discussion got better and better all the time." Others, however, felt that the quality of the discussions was poor and that occasionally the forums were used as a means of "reporting in" rather than as a medium for discussion. Molly noted, "I'd respond to something and then . . . somebody would respond to the same thing but didn't respond to my [comment] . . . I don't think people were always . . . paying attention to other participants . . . that was a little frustrating [and] . . . inhibited the conversation." On a similar note, Katie felt discussions were drawn out and there was a lot of "rehashing":

> "In the classroom, I think you would tend to cut that short . . . you'd say, 'Is there anything more to say about this topic? No, let's move on.' I think because it is online and you're thinking and typing it tends to get drawn out more."

Conversely, Fran felt that communicating through text constricted the conversation: "You can say a lot through speaking. You change your ideas fast, and the body language and the expressions. You can convey faster and in a bigger way; your ideas can be more."

Some learners felt that a robust online dialogue was missing because the "dynamic" that is often present in F2F settings was missing. Ann explained, "Someone else's comment will inspire you to make another comment and then the conversation has a certain dynamitism to it . . . In the online discussions . . . people would comment but [there was] the time [lag] or people wouldn't answer." Whether this desired real-time communication had to be F2F or not was a question contended by the participants.

A number of learners missed the energy of F2F classes. Learners talked about being able to feed off other people's energy in F2F settings and feeling more energised after F2F classes. One missed the humour that can be used to break tension in F2F classes:

> "Someone comes up with a quick one-liner and everyone laughs and relaxes and the tension is broken. At home you're the only one that can break the tension . . . so if you're not in the right mindset you're going to get more tense reading it . . . There is no opportunity to take a breath with everyone as a group, for everybody to take a step back and take a deep breath and say, "OK, we can't be this serious about it" (Molly).

Some learners indicated that they missed the emotion that is usually present in F2F interactions, although many agreed that there was emotion present in the online course. Katie reported that she made an effort to include emotion in her postings. Nevertheless she cautioned: "When you are writing you can get a certain amount of emotional impact in your writing, but what you put into it someone else may or may not detect." It is likely, however, that not all learners will be able to inject such emotion in their postings. Katie noted, "To me, the written word is such a powerful thing and that's probably where I've had some negative aspects of this . . . I mean email messages are just so grammatically incorrect and flat."

Controlling the Flow

In this course, the primary form of online communication was asynchronous (discussion forums and email) but there were also opportunities for synchronous communication (chatrooms). Many learners commented that the communication through the discussion forums was more reflective and they benefited from this. Learners noted they put more thought into their postings and were able to express themselves more clearly. They liked to be able to slow the pace of communication and clarify points when necessary and/ or go back and review postings. Moreover, Maire stated, "I never felt bored with [the conversation] because I knew I could depart from it whenever I wanted."

All but one of the participants commented on the absence of non-verbal cues. Kelly was nervous that she would post something that someone would misinterpret because it could be taken out of context without such cues. Learners in this inquiry struggled to understand the silences. Although there was a perception of feeling connected to others, some learners still had a sense of isolation on occasion. One factor seemed to be "a lack of responsiveness on the part of the class to one's comments." Without the non-verbal communication there is no (or minimal) feedback in terms of how well you are communicating. As Katie commented:

> "You know when you've put your foot in your mouth when you're talking to someone [F2F] . . . but when it is online, it's not quite the same . . . There are some times when things are said and, yes you get those sharp responses back, but . . . it's easy to just ignore."

Spontaneity and Improvisation

Learners reported there was a decreased tendency for the discussion to go off on a tangent and a lack of spontaneity in the course. Learners' feelings regarding this were mixed. Although Lisa liked to self-scrutinize herself before she spoke, she also valued spontaneity: "[What] I like about the classroom and the teacher is the tangent factor; those teaching moments where it's not on the syllabus but it's kind of important or a nice touch." The lack of spontaneity was also a negative aspect of the course for Maire:

> "I find in a F2F class . . . a lot of the learning happens just through discussion; like when you're sitting around and somebody brings up a point and that leads to another point and you have this discussion that comes out of nowhere . . . I found with this I could read something and I might have an initial reaction but at the time I don't have time to type it out and when I come back to it I've kind of lost my groove and just don't post."

Indeed, having to take the time to compose a message rather than being able to just speak your thoughts prevented more than one learner from participating as much as they might have in a F2F class.

There were some learners who felt they would benefit from more synchronous communication, perceiving that it was more "real". Rick liked synchronous communication because "the conversation can move along more quickly." He elaborated, "I like to interact, not be passive. And I think most people also feel they . . . want to give some feedback back. It is a shared experience that they are looking for." A number of learners talked about the frustrations associated with having to wait for a response to a question from other learners, especially if the information that was returned was not what the learners wanted. One learner explained:

> "If it is in real-time and they misunderstood you, you can correct them at once . . . It's kind of a helpless feeling; you're yelling at your computer, 'It's not what I'm saying, it's not what I wanted you to respond to.' But I have waited for three days or a week [for an answer] . . . I want to learn more efficiently" (Lynn).

Despite the desire for more synchronous communication, however, The Chatroom – the one tool that supported synchronous interaction in this course – was not very popular. Many commented on how hard it was to have a conversation through this medium. One learner noted that she could not type fast enough and would have appreciated having sound attached to the chatroom, noting: "For me, listening and talking is much faster than writing and reading" (Zoe).

Perceiving and Being Perceived by the Other

Learners in this inquiry were conscious of how they perceived others and how others perceived them online. Furthermore, the "accuracy" of the images they constructed was questioned. Concerns regarding honesty also emerged. Katie stated, "I like to look at a person right in the eye

and see if they are honest and you can't do that with a computer." Rick felt that not all the learners portrayed themselves accurately online. He indicated, "People would often put things in the best of light in their online communications and then not necessarily follow through." Furthermore, Rick felt that it was important that learners include a picture of themselves on their learner pages. He explained:

> "I do think in learning communities there is an expectation of honesty and part of the honesty for me is being able to know who I'm dealing with, just to be able to see what they look like. I felt there was a reason why people didn't put their pictures up there."

Also, participants felt they were in a position where they had to make assumptions and believed that it was human nature that other learners would try and read between the lines. Kelly noted:

> "When you're online you can make it what you want it to be, because there is a part of it where you're being creative. You're imagining who these people are and you're imagining what they're like and what their personalities are like. You don't really know until you meet them."

A number of learners commented that they thought they came across differently online compared to F2F.

The learner pages helped facilitate the development of relationships, making the online experience rich. One learner commented, "Those were really helpful because you did get a sense of who the people were . . . And you could go back [and see] 'What does that person look like?'" A number of learners, however, commented that some of their fellow learners remained "faceless." In some instances this was because they did not include a picture of themselves on their learner page. One learner relayed why he felt this was a problem:

> "[If] you've seen their face, you know who they are so if you see them again in a conference or in another course you can immediately build on that relationship. But . . . with someone who hasn't posted a picture, I could . . . sit right next to them and not realise that's who they are" (Rick).

Learners were conscious of not posting something that might offend others. One learner felt that this might change as people get more experienced using the technology. This led to some banal conversation, however. As Molly put it:

> "I do think that [the interactions] were . . . bordering on the ridiculous sometimes in terms of praise. I mean you don't praise people that much in a face-to-face situation, so why would you merely because you're online? The constant 'Good work', 'Good thought'. What really detracted from the so-called reality of the interactions was this virtual sense of touchy-feely camaraderie. Few people participated in head shaking, in disagreement, which is what makes a discussion flow."

Learners also commented on the formality of the communication, which resulted, at least in part, because the learners felt they needed to put a lot of thought into the postings because of their permanence. Learners wanted to sound academic so would take care to include references, check spelling, and carefully select the right words to use.

Getting to Know Others

The degree to which the learners felt they were part of a community seemed to be influenced by the social relationships they developed with each other and the professors. The learners varied in their success at developing friendships with other learners in the course. Ann reported, "Generally I come up with really good friends at the end of courses and that is also an enriching process for me. It didn't happen this time." Although she wanted more F2F contact with her triad and the other two triad members met frequently, Ann only met with her triad a couple of times because she found it inconvenient. She felt the lack of time they met F2F hindered them from developing a social relationship. Ann found when they did meet they were very task oriented and there was little time for socialising. Lisa also felt that she did not "really get to know people" in this course yet commented that in previous online courses she had got to know people better. She attributed this to different course content and that there was not a centralised topic of interest, but instead many different research areas the learners were interested in, as well as the fact that in the other course the learners were "excited to get into a hot discussion about [the topic]." She also felt that the discussions never got "to a critical thinking level" for the same reason. Nonetheless, topics that had a lot of potential for discussion and where the e-moderators attempted to post thought provoking questions and controversial statements still did not generate the discussion many of the learners hoped for.

In contrast to these learners' experiences, Lynn developed a very close friendship with one of her triad members. Similarly, Rick noted, "One of my surprises was that you could actually bond with people online that you haven't met face-to-face." The depth of the relationships developed also varied. Maire explained, "I didn't feel that I developed relationships with people [even though] I certainly found out more about my classmates than I ever have [through the learner pages]." Conversely, Molly felt "There is more room in face-to-face situations for [informal] information to come out."

Learners felt there was a sense of community between and among the learners and professors. Learners felt supported and encouraged in their learning. There was a sense of caring and learners indicated that people were usually quick to help, share resources and information, and respond to questions. Fran explained, "The beauty of it is that we have all these people that you could easily connect to . . . I think for adult learners like myself that have a minimum time to spend, this is very good." The community served a purpose outside academics; there was also a sense of personal caring. For example, one learner posted in the forum warning about the perils of tobogganing after her friend broke her back. Maire relayed, "I thought, 'That was really nice, it goes to show that we are here for more than just this class.' And it sort of showed that people still do need that interaction aside from just the academic." Katie attested that the biggest factor that contributed to the development of the community was the sense of camaraderie between the professors.

Learners had mixed feelings with regards to the type and depth of relationship they felt they had developed with the professors and the type of relationship they wanted and/ or expected. Some of the learners felt they did not benefit from the professors' expertise in the online course. Ann noted that she would have liked to have met the professor F2F to "get her insights into the material informally . . . I mean just her insights as a person, as someone who has done research for so many years, we just never had that." Indeed, many of the learners missed the informal conversations they might have had with the professors if the course had been F2F. These conversations appeared to be as important for relationship building as for learning.

Learning to be an Online Learner

Many of the learners did not feel confident about engaging in online learning. For most, this was their first experience learning online and they were concerned that they were not "doing it right." Some were worried they were "missing something" or "were behind and didn't know it." A number of the learners wished there was F2F contact as they felt that would have allowed them to see if they were on the right track. Learning online they felt they had no one to ask, "Am I doing this right?" Learners felt they missed "[picking] up on the small points you get through informal conversations" with classmates or dropping into the professor's office after class. Fran noted, "[Human contact gives you] reassurance." Other learners felt that meeting F2F would allow the sharing of experiences of learning online and perhaps "boost their confidence." Indeed, at least one learner sought out opportunities to discuss her experiences F2F with other learners and used the F2F classes she had with other learners to reassure herself she was on the right track with this course.

A number of the learners were worried about making postings in the course. Fran described, "I had a panic attack! Although people couldn't see me, the idea of just sending something in writing was like . . . all these people could read what I put down! [It] was a very fearful situation." Learners were concerned that what they wrote would be judged and they would not sound academic enough. Maire noted, "I think that was more of our personal insecurity; we're not going to put our dumb old comment on there because there's some really smart sounding ones on there." Similarly, Fran relayed, "A lot of time I was very skeptical to jump in at first because I felt maybe I'm wrong . . . just the idea of putting my writing in the middle of all these people and them seeing it." A number of learners wished there was the facility to edit the discussion postings. One learner noted, "It was just so final; you put it out there and you couldn’t change it. I think that probably influenced how I wrote things and what I said."

Discussion

We used Garrison et al.'s (2000) community of inquiry framework to interpret the findings and help us understand what these learners missed in their online learning experience. The findings will be discussed within the three areas of presence identified within the framework: social, cognitive, and teaching. It should be noted that due to the interaction of these three elements, as indicated in the framework, many points of discussion span more than one element.

Cognitive Presence

According to Garrison et al. (2001), cognitive presence reflects higher-level knowledge acquisition. Examining our findings through the lens of cognitive presence fostered a deeper understanding of the learners' experiences and actions online and provided insights on how critical thinking and cognitive presence can be enhanced.

Internet practices create a reality of nowness and immediacy; other people, information, and events are just a click away. However, in this course it was the lack of immediacy -- the spontaneity and quickness of a F2F learning experience -- that the learners missed. Although learners enjoyed being able to reflect on their postings, they spoke of the inability to pursue tangents like they would in a F2F conversation; the spontaneous teaching moments that are not prescribed by the syllabus. Furthermore, the asynchronous nature of the conversation meant that by the time they composed a response to a posting they had "lost the groove". Our findings

illustrate the non-linear cognitive process that appealed to these learners and their desire for the freedom to explore and tackle interesting and learner-generated problems and issues; a process that they believed was more easily enabled in a F2F setting.

When designing online learning events, Cavallo (2000) argued that delivering a pre-set curriculum does not take "advantage of the very benefits that . . . technology affords" (p. 774). Thompson and MacDonald (2005) explored the tension between structure and flexibility in design. They found that a well mapped out course seems to increase learners' competence and confidence, yet recognised that course design needs to have the flexibility to respond to emerging learning needs. They concluded that a course that lends itself to rapid redesign as learners' needs become better articulated leads to a quality learning experience. The voices of the learners in this inquiry further emphasise the importance of emergent design and facilitation—the ability of the online learning experience to respond to and even drive evolving and budding tangents as they surface. Further research is needed to better understand how technology can be used more effectively (and innovatively) to open up tangents that may lead to more cognitive presence and movement through the critical thinking process as outlined in the community of inquiry framework.

The data in this inquiry reflect a jumble of perceptions and expectations about what learners do in online discussions. Some commented that the discussion forums were used merely to report in and not as a medium of discussion. To some the discussions were too loose and drawn out. To others the discussions did not progress. At the same time, these learners seemed to value the reflective nature of the postings. Other researchers have encountered similar findings regarding learners' experiences with discussion forums. Thomas (2002) found an overall incoherence in online discussion in terms of "branching structure, the large proportion of messages that terminated branches, and the abstracted nature of student interaction" suggesting that "the online discussion forum does not promote the interactive dialogue of conversation, but rather leads students towards poorly interrelated monologues" (p. 361). Others, such as Pawan et al. (2003), have found parallel results. Levy (2003) noted that contributing to online discussions is often one of the most challenging aspects of online courses. It entails "learning a different form of communication" and sometimes can feel like "anything but a conversation" (Levy, p. 102). Although CMC tools are still evolving, current practices suggest that online communication can be disjointed as learners jump in and out of online discussions. Our data reveal the paradox of online communication in that it is more informal and more formal than F2F conversations; more frenetic and more reflective. Garrison et al. (2000) stated that the "extent to which cognitive presence is created and sustained is partly dependent upon how communication is restricted or encouraged by the medium" (p. 93). Our findings add to the research literature that highlights the contradictory and ambiguous nature of online discussions in an academic setting.

Anagnostopoulos, Basmadjian, and McCrory (2005) asserted that within a F2F classroom teachers and students do not "expect to define social space and interactions . . . they expect to find their place within it" (p. 1699). This is in contrast to online classes in which teachers and students may share few expectations and conventions. It seems learners in this inquiry had varying expectations of how the discussions fit into their learning path and therefore the usefulness of these forums to their learning. The findings suggest that for some learners their perceptions of the purpose of the discussions was merely a way of reporting in – a façade of participation. In contrast are lively online discussions that enhance, are an integral part of, and reflect learning. The findings encourage us to question whether these learners wanted to engage critically in online discussions and whether they regarded the discussion forums as the best venue for this type of dialogue. As Thomas (2002) noted:

While the online discussion forum has become a ubiquitous element of Internet-supported flexible delivery of education, it is apparent that it might not be the best technology to support the interactive and collaborative processes essential to a conversational model of learning (p. 364).

Critical thinking in an asynchronous text-based online learning environment is not necessarily reflected entirely in the postings. Certainly, findings in this inquiry suggest that learners engaged in critical thinking with other members of their triad offline. In addition, learners likely engaged in critical thinking in their own reflections, in dialogue with colleagues outside the course, and in their assignments. Garrison and Cleveland-Innes (2005) observed that students may be "cognitively present while not interacting or engaging overtly" (p. 144); for example, when vicariously following and reflecting on the discussion and constructing meaning individually. Moreover, the learners in this inquiry shared the careful nature in which many of their postings were constructed. They did not want to post something that might offend, they wanted to sound academic, they were excruciatingly aware of the permanence of whatever text they posted, and they did not feel fluent in the language of online dialogue. Given these concerns it is perhaps not surprising that the learners did not engage in a higher degree of critical thinking in the forums; its very nature demands an unpacking of assumptions and a willingness to expose personal beliefs, tease apart differences, and challenge assumptions. It is therefore problematic to equate the presence of critical thinking solely to what transpired in the discussion forums.

Using the community of inquiry framework to interpret the findings in this inquiry elicited questions regarding the intentions of this particular online learning experience. Was it to create a collective community of inquiry; for the learners to engage in all four stages of the critical inquiry process? It seems the forums were used to build a sense of community in order to help learners achieve a level of critical thinking made evident in their individual papers. We also need to question who the "collective" is in an online experience: the whole class? the triads? Perhaps for some there is no collective.

Social Presence

There is no doubt that learners felt a degree of social presence within the course. Social presence appeared to be greater within the triads than for the class as a whole. Perhaps the more frequent interactions that occurred in these small groups led to a greater sense of presence (Russo & Campbell, 2004). There was some evidence for social presence in each of Garrison et al.'s (2000) categories of social presence: emotional expression, open communication, and group cohesion. In the category of emotional expression, there were indications of self-disclosure on the learner pages. Learners shared wedding pictures and photographs of their children, travel stories, hobbies and professional interests, and likes and dislikes. Learners felt they knew more about more of their classmates than they would have if the class was taught F2F. However, we feel it is important to distinguish between getting to know about someone and getting to know someone and propose that it is the latter that contributes to social presence. There was scant evidence of other indicators of emotional expression; the learners in this inquiry generally felt that humour was lacking in the course and they rarely used emoticons in their postings.

According to Garrison et al.'s (2000) definition, there was evidence of open communication occurring between learners in the course. Learners responded to each others' messages; quoting from previous messages and continuing on a thread. Learners signalled agreement with each other and asked questions. However, some learners got frustrated with the constant agreements and comments such as "Good point" and "I agree"; feeling it made the conversation overly positive and fake. Although these types of responses and rejoinders are an important component of

conversation as they build relationships and provide encouragement (Eggins & Slade, 1997), they were not valued as such by the learners in this inquiry. There appears to be a fine line between the need for these types of comments to build and sustain community and avoiding their overuse to the point of being annoying. There is a need to post comments that challenge and provoke learners to reflect and construct new knowledge thereby stimulating in-depth discussion. This type of discourse was only apparent a few times in this course. Perhaps this led learners to disengage as they did not feel challenged or inspired by their peers. Indeed, Anderson (2004) noted that an "absence of social presence leads to an inability to express disagreements, share viewpoints, explore differences, and accept support and confirmation from peers and teacher" (p. 274). The link between cognitive and social presence is apparent here and invites us to ask whether educators' efforts should first be focused on developing social presence or on encouraging learners to engage in meaningful discourse, or whether these two elements need to be developed in concert. Fostering social presence might be a necessary precursor to meaningful discourse, but if the "conversation" comprises only social dialogue and low level information exchange then perhaps learners will disengage as they perceive they are "wasting time" getting to know each other and are not learning.

Group cohesion was evident in that the learners helped each other out by answering questions that related to technical problems and course requirements and shared resources they thought others would find helpful. They looked out for each other; warning of the perils of tobogganing after one learner's friend broke her back. Yet learners commented that the bond with other learners was not as strong as it would have been in a F2F class, where learners are likely to meet after class to go for coffee or walk together to their cars or the bus stop and talk about life. It seems that the social contact time between learners is higher in a F2F situation than online. However, there is the potential for contact time to be much greater online given the characteristics of the environment. Perhaps learners do not take advantage of this because they see online learning as a convenient and efficient way to learn and therefore when they log onto the course they view the goal as learning, not idle conversation and developing social relationships. Maybe the individuals most attracted to online learning are those who are "surface learners" and focused on "getting it done" (see Garrison & Cleveland-Innes, 2005 for a discussion on deep and surface learners). Future research analysing what learners do with their time online is warranted.

Although there were indicators of social presence within this course, it appears that this is still what the learners missed most when learning online. Lynn noted, "I just want to have the feeling that the communication is real and that I [am] talking with a real person in real time." Learners reported that when they read postings they sometimes questioned who wrote them, a problem also experienced by learners in Tu and McIsaac's (2002) study. With the use of *WebCT* discussion boards comes the standardisation of messages. That is, the variation in the appearance of messages is minimal and so messages become generic and less personal (Shamp, 1991). Although emoticons and different font styles can be used, learners are limited in how they can represent their thoughts beyond words. These constraints are less evident in technologies that use voiceover-IP capabilities thereby enabling the learners to inject more of who they are into their communication. Other technologies, such as *Moodle*, allow the inclusion of a personalised image next to postings, which would help develop a connection between the posting and the person who wrote it.

A common perception among the participants was that learners remained faceless. A few learners noted that they could easily get annoyed at postings and attributed it to not being able to associate the posting with a face. Two learners described yelling at their computers out of frustration because of something that was posted, rather than at the person who wrote it. The concept of

anthropomorphism within the context of online learning has been discussed in the literature (Rourke et al., 1999). Increasing social presence is likely to reduce the application of anthropomorphism to computers and strengthen the identity of the learners.

Perhaps the learner who was most successful in establishing her identity in the course was one whose postings were written as poems, demonstrating a stylistic communication style. Her postings always evoked numerous responses. Such a distinguishing style gave this learner an identity within the group and arguably increased her social presence within the course. The relationship between identity and social presence has received scant attention in the literature. Rogers and Lea (2005) examined whether establishing a personal identity is necessary for social presence or whether it can be realised through the creation of a shared social identity. They suggested that social presence can exist within a group when the group has common goals and a social identity exists, regardless of whether there are interpersonal cues and learners are able to portray their personal identity. Consequently, they proposed that in a distributed group (such as the one in this course) the focus should be on making the shared social identity salient, rather than the personal identity, so group goals, priorities, and norms are adhered to, rather than individual ones. As a result, the lack of interpersonal cues resulting from an absence of F2F contact will not be a barrier to developing social presence (Rogers & Lea).

Enormous efforts were made to foster social presence during the design and delivery of this course using multiple strategies, including learner pages, welcoming postings, learning triads, chat sessions, discussion forums, a F2F orientation class, small class size, collaborative activities, promptly responding to emails and postings, sharing personal stories and experiences, and being funny, many of which have been suggested by other educators and researchers (Aragon, 2003; Gunawardena, 2005; Lobry de Bruyn, 2004; Russo & Campbell, 2004). Yet despite these efforts, we feel that perhaps more can be done to enhance social presence in online learning. One way to do this is to explore the role of emerging technologies in this regard. Text-based communication is time consuming. Responses need to be constructed and then typed. Visual cues get lost so learners take extra care regarding how they structure their postings to ensure they are not misconstrued. The time factor sometimes means that learners do not say everything they want to. Interactive Voice Response (IVR) systems that will type the spoken word may reduce the time required to construct postings.

In addition, the integration of audio and video technologies will allow the creation of a richer communication medium that contains more interpersonal cues to enhance social presence. Web-based video conferencing is becoming more and more prevalent requiring only an inexpensive Web-based video camera and the download of free software, such as *MSN Instant Messenger* or *Skype*. Even the use of audio without video, requiring less bandwidth, may contribute to social presence. The use of short, multimedia rich "digital movies" that include pictures or video of the professor or a learner, along with his/her voice, to present ideas may also serve to enhance social presence. Application sharing software is also becoming more popular and is available at no cost (e.g., *Windows Messenger*). Application sharing allows two or more users to work on the same application at the same time from one computer, regardless of their location. Again, this approach would likely enhance social presence. Research that investigates the use of these types of software to foster social presence and enhance online learning is required.

The use of synchronous communication options to enhance social presence is a point of debate. Haythornthwaite, Kazmer, Robins, and Shoemaker (2004) argued that synchronous communication contributes to community building and "provides simultaneous many-to-many contact that helps stave off feelings of isolation" (p. 48). Wang and Hewlin (2001) found that

chatrooms enhance social presence in a way that cannot be achieved by asynchronous communication by affording the possibilities of immediate feedback and answers to questions; providing encouragement; and fostering learner perceptions that the educators are genuinely invested, engaged, and personally connected with the learners. Moreover, the learners in this inquiry reported they missed the dynamic nature of synchronous communication and being able to steer the conversation. However, the inclusion of synchronous components in an online learning experience takes away the features that attract many learners to this medium: the convenience and flexibility afforded by not having to meet at a specific time and place. Indeed, Anderson (2004) reported, "I have noticed a deep division between those who yearn for the immediacy of real-time communication, and those who are adamant that they have chosen online learning alternatives to avoid the time constraints imposed by synchronous . . . activities" (p. 279). Learners need to carefully assess why they have chosen to learn online, rather than F2F, and determine whether they are ready and willing to adjust to learn in this new type of environment that is fundamentally different from a F2F setting.

The style of communication can impact social presence (Russo & Campbell, 2004). It is an art to be able to express yourself through text. As educators, we need to spend more time teaching learners how to communicate, collaborate, and build community effectively online if we want to enhance social presence. Learners felt that the communication was more formal online than it would have been F2F, which appeared to diminish the sense of presence. Tu and McIsaac (2002) found that when postings are more formal, immediacy is sacrificed and perceptions of social presence decreased. Similarly, others have found that learners are able to increase presence when they are less formal, write in more conversational tones, and make jokes (Russo & Campbell). A balance must be achieved between the need for the professionalism required in a university setting and the need for informality required to enhance social presence. Furthermore, in addition to the instructional and conversational voices typically seen in online transcripts, Stroupe (2003) discussed the need for a compositional or third voice within which "students play an active role in creating, or composing, not just their own texts, but the experience of the class, its sources of authority and presence, and its online community" (p. 258).

Teaching Presence

The community of inquiry framework proposes three indicators of teaching presence: design and organisation, facilitating discourse, and direct instruction (Anderson et al., 2001). Throughout the course and during the interviews, learners repeatedly commented on how organised the course was. Our experience designing, developing, delivering, and evaluating online courses has made us cognizant of the importance of design to the quality of an online event (MacDonald & Thompson, 2005; Rovai, 2003; Salmon, 2000; Song, Singleton, Hill, & Koh, 2004; Thompson & MacDonald, 2005). Designing and developing quality online courses takes an enormous amount of time as well as painstaking attention to detail (Anderson et al., 2001; MacDonald & Thompson, 2005). This course was no exception. We were also aware that using learning models helps "address realistic applications of new knowledge in context" (Garrison & Anderson, 2000, p. 28). By using the Demand-Driven Learning Model (DDLM) (MacDonald, Stodel, Farres, Breithaupt, & Gabriel, 2001) to guide the design and delivery of this course it would appear that many of the design issues that may otherwise arise in an online course were addressed prior to delivery. The present research inquiry reinforces the importance of design and organisation in successful online learning.

In terms of facilitating discourse, Rourke and Anderson (2002) and Anderson (2004) extolled the benefits of having the learners take on the role of discussion leader. In this course, a different

triad was responsible for facilitating each weekly discussion. The role of the e-moderators was to stimulate discussion, keep the discussion on topic, encourage everyone to participate, and summarise the weekly discussion. Despite building this aspect of teaching presence into the course, learners did not feel that the discussions reached critical thinking. Our findings support Garrison et al.'s (2001) claims that cognitive presence requires guidance, support, and nurturing; it does not just happen. An educational environment "must be more than undirected, unreflective, random exchanges and dumps of opinions" (Garrison et al., 2001, p.21). Garrison (2006) later clarified that "direction and facilitation is [*sic*] required to establish cohesion and ensure messages are developmental" (p. 4). Furthermore, learners should understand "the stages of inquiry and how this relates to the task at hand" (Garrison, p. 5). Examining the data in light of the community of inquiry framework suggests that several of the weaknesses regarding the discussion might have been addressed with more active facilitation of the online discussions. On reflection, we question whether the learners were equipped to take on this role and had the necessary skills and understanding to cultivate higher level thinking in these forums. In their study of collaborative interactions in three online courses, Pawan et al. (2003) concluded that "students require training and modelling by instructors before they can assume the roles [of facilitation and leadership] in an effective manner" (p. 136). Once again, as online educators, it becomes apparent that we need to ensure the learners have the requisite skills and/ or support and guidance to lead online discussion if we are going to ask them to take on that role (Rourke & Anderson, 2002). Moreover, there is a need for the instructor to take on a "meta-facilitation" role. Delegating moderating responsibilities to the learners requires ongoing support and coaching by the instructor. As this inquiry illustrates, the instructor must still retain responsibility for the overall facilitation of the online experience. If not, the success of the learning experience is jeopardised.

Although the professors logged on multiple times each day, read every posting, and responded immediately when there was a question, concern, or problem, they did not post every day. When they did, the posting usually referred to what had gone on in the course in the preceding few days and was often long. It became apparent in this course that the learners wanted the professors to be more visible by way of more frequent postings. However, this can quickly become time consuming and unfeasible. Garrison and Cleveland-Innes (2005) noted, "It is not educationally desirable or reasonable from a time-management perspective to have the teacher respond to each comment. But it is crucial that the teacher moderate and shape the direction of the discourse" (p. 145). Similarly, Pawan et al. (2003) recommended that instructors model the type of postings they expect from learners. They suggested that long postings (300 words or more), and those posted all at one time, imply a presentation mode rather than a discussion mode.

Time is a definite issue for instructors in online courses (MacDonald, Stodel, Coulson, Mace, & Thompson, *in press*; Muilenburg & Berge, 2001). As a professor with 25 years of teaching experience, the third author has never spent the time and energy in any F2F class that she has in designing and delivering online courses. Hiltz (1988) compared teaching online to parenthood: "You are on duty all the time, and there seems to be no end to the demands on your time and energy" (p. 441). Is this degree of investment necessary to make online learning effective or are we going beyond the call of duty to ensure we are successful and setting unrealistic expectations for ourselves?

In terms of direct instruction, the two professors provided intellectual and scholarly leadership and shared their subject matter knowledge with learners by providing synthesised text-based content in weekly e-Docs, providing detailed feedback on assignments using the "track changes" feature in Word, answering questions through email and the discussion forums, and participating

in online discussions. Nonetheless, despite the fact the learners reported they had never received so much feedback on assignments, the content was relevant and meaningful, and the professors' responses to questions were quick and helpful, some learners felt they were not receiving full advantage of the professors' expertise. Learners did not seem to link these contributions with teacher expertise. This raises questions regarding learner expectations and the need for a paradigm shift to separate the underlying learning assumptions of online learning from classroom learning. Are learners' expectations for online learning higher than they are for F2F learning?

Overall, the learners appreciated the availability and support of the professors. Our findings also point to the importance of providing learners with confirmation they are on track in the course. New issues related to online learning came into view and prompted us to question whether learners' (and instructors') expectations with regards to teaching presence in terms of design and organisation, facilitating discourse, and direct instruction are realistic. If they are not, it may be problematic given the abundance of research that suggests "teaching presence is a significant determinate of student satisfaction, perceived learning, and sense of community" (Garrison, 2006, Teaching Presence section, ¶2). The way we define our roles as teachers and learners and our attitudes, practices, and expectations need to be fundamentally different in an online context compared to F2F. We need to understand these elements if we are to transform education and liberate the way we design and deliver online learning.

Limitations

There are several limitations to this research. First, the perspectives reported in this paper are those of the learners who indicated they missed and/ or would have liked more F2F contact in the course. It is not known whether efforts made to address these learners' concerns would contribute or detract from other learners' experiences. A comparative case study using a multi-method approach that examines the perspectives of both learners who did and did not miss F2F contact is warranted. Understanding why some learners missed F2F contact whereas others did not, and the characteristics that distinguish these groups, would be valuable. A more in-depth examination of how those learners who missed F2F contact felt it impacted their learning would also be of interest.

Second, differences in preferred communication and learning styles as a result of gender-related or cultural issues were not examined in this inquiry. Future research examining the role of gender, ethnicity, and culture on online learning preferences is required. Lastly, the learners were interviewed by the co-professor, which may have prevented full disclosure by the participants. We tried to mitigate this concern by conducting the interviews after the learners' grades had been submitted. In addition, the interviewer was not responsible for grading the learners' work. The transcripts reveal that the learners were forthcoming in their responses and did not appear reticent to comment on negative aspects of the course or the professors.

Implications for Practice

Using the community of inquiry framework to interpret our findings provided us with new understandings regarding online learning. We were able to view this course from an alternative perspective and see the online experience in a new light. As the import of presence in an online environment was revealed, it became apparent that aspects of what online learners miss about F2F learning relate to deficiencies in presence. As a result, a number of recommendations for improving practice emerged:

1. Create opportunities to enhance spontaneity and emergent design

Allow flexibility in the course design and facilitation to ensure responsiveness to learners' needs as they emerge. Collaborative authoring tools, such as wikis and blikis, enable learners to build the course content in ways that are interesting and meaningful to them. Learners bring their ideas into a learning space that they are constructing. The fluid and spontaneous linking structure of wikis enables a non-linear and more playful representation of key learnings and allows the pursuit of interesting tangents. In essence, the learners assume a more active role in co-constructing the learning elements. However, enabling this "freedom" presumes a comfort level in the instructor, as well as the required skills, to work with emergent developments. From a technology perspective, the use of synchronous communication tools will help promote spontaneity. However, spontaneity can also be fostered in an asynchronous environment. The incorporation of IVR systems will allow learners to dictate postings, thereby reinstating the possibility for spontaneity in communication. Features that indicate when other learners are online will also serve to promote opportunities for spontaneous conversations.

2. Coach learners how to learn online

Online learning is a fundamentally new learning experience. Just as educators need to learn how to teach online, learners need to learn how to learn online. It is important to create spaces within an online learning event that invite learners to reflect on how they are bound by discourses and practices from a traditional F2F classroom that extend back to kindergarten days—boundaries that include expectations about what learning is, what teaching is, how a learning experience should unfold, and the roles assumed by teacher and learner. It is to be expected that F2F practices will be adopted and transposed into an online learning environment to some degree. At issue is a largely unexamined or unconscious transfer of F2F classroom practices to the online environment. Thomas (2002) warned that major difficulties arise from the conflict between form and function when we expect the "text-based medium of the online discussion forum" to serve the function of F2F interaction rather than presenting a "technology-mediated alternative to F2F dialogue" (p. 363).

What became apparent from this inquiry is that developing and maintaining community, which entails being able to communicate effectively online as well as facilitate online dialogue, is a critical skill for online learners. Learners need to shift their focus from an individual perspective to one of community. Facilitators need to be prepared for the role they must take in actively guiding the online discussions in order to achieve the desired quality of interaction. Educators should articulate best practices, be role models in their online interactions, provide examples of strong community building behaviours, remind learners of the important role they have in the discussions, offer constructive feedback, and be present to coach and support learners in their interactions. We cannot assume that effective communication and facilitation will just happen, even with a thoughtful course design. As this inquiry illustrates, teaching presence (as outlined in the community of inquiry framework) is the responsibility of every participant in an online environment.

3. Explore the use of diverse technologies for enhancing communication and social presence

Over a decade ago, Berge and Collins (1995) pointed to the fact that educators often do not take advantage of the latest technologies available to enhance learning. They argued, "there is no

shortage of technology, only a shortage of the educational vision necessary to use the technology to create new educational environments" (p. 5). Indeed, communication in online courses has commonly been limited to text-based discussion forums. However, as Thomas (2002) cautioned, "the attainment of a discourse that is both interactive and academic in nature is difficult within the online environment of the traditional threaded discussion" (p. 359). The present inquiry further revealed that threaded discussions can make it hard to inject emotion into communication, make others salient in the learning environment, and foster enjoyable and rewarding interactions. The ever-present tension is juggling the demand for academic discourse while at the same time desiring personal expression and connection on an individual level. Boyd (2006) proposed learners, "write themselves into being online" (p. 9). However, there are other effective means of communicating online that are not so dependent on "writing" ourselves into being. Technologies, such as Web-based audio- and video-conferencing and application sharing, that do not rely on text might be more effective at establishing social presence and supporting richer communication. Finally, learners should be encouraged to communicate with each other outside the formal venue of the online course whenever possible so they can benefit from F2F interactions and/ or synchronous interactions as needed or desired.

4. Articulate and manage the expectations of the online community

Expectations of both the learners and instructors in online environments need to be discussed and made explicit. Much of this discussion should focus on the process of learning and the best way to achieve the learning objectives both as a group as well as individually. Is a community going to be developed and, if so, what is its purpose: To create a social infrastructure to support the learners, to foster critical thinking, or a combination of both? As the concept of community is complex and usually not clearly articulated it should be unpacked and examined with particular attention to why a course designer, instructor, or learner believes it is (or is not) important in the learning process.

5. Understand all learners in online learning environments

Not everyone embraces learning in an online environment. Many learners have a choice about whether or not to take their course or program online. Others do not. The present inquiry revealed that learners can be successful in online courses in terms of learning outcomes, yet still long for a richer experience. Also illustrated is the need to understand learners in order to help them develop coping and adaptation strategies so that the online learning experience is effective and enjoyable. As educators, we must continue to focus on how we can help each learner feel comfortable and confident in the online environment, especially when it is not his or her preferred learning medium, even when the obvious indicators of success are present.

Conclusion

Using the community of inquiry framework (Garrison et al., 2000) to interpret the findings in this inquiry brought the significance of presence, in its many different guises, to the fore and also served to emphasise the importance of questioning the commitment of the participants to the creation of a community of critical inquiry, a community expressed and brought to life in the space created by online text-based discussions. Furthermore, as this inquiry revealed, the three "presences" outlined in Garrison et al.'s (2000) framework are not distinct dimensions. While it is valuable to scrutinise each singly, a deeper understanding of how they interrelate is needed.

Through this inquiry we discovered something about what it is that learners miss about F2F contact when they are learning online and the dangers inherent in transposing our comfortable and familiar F2F practices and expectations into the new medium. Expecting an online learning experience to be a 'copy' of other learning experiences (i.e., F2F) is potentially problematic. If it is not the same does that necessarily make it a lesser experience? Burbules and Callister (2000) suggested that rich online activities are "unique and irreplaceable learning opportunities themselves; and often they can exist only online" (p. 277). Our online learning experiences in cyberspace are filled with paradoxes. Idhe (1990) pointed out the contradiction that the "user both wants and does not want the technology. The user wants what the technology gives but does not want the limits" (p. 76). This discussion is a reminder that as technology magnifies and reduces it draws attention to what is present as well as what is missing.

References

Anagnostopoulos, D., Basmadjian, K. G., & McCrory, R. S. (2005). The decentered teacher and the construction of social space in the virtual classroom. *Teachers College Record, 107*(8), 1699-1729.

Anderson, T. (2004). Teaching in an online learning context. In T. Anderson & F. Elloumi (Eds.) *Theory and practice of online learning* (pp. 273-294). Athabasca, AB.: Athabasca University. Retrieved November 8, 2006 from: http://cde.athabascau.ca/online_book/

Anderson, T., & Elloumi, F. (2004). *Theory and practice of online learning.* Athabasca, AB.: Athabasca University. Retrieved November 8, 2006 from: http://cde.athabascau.ca/online_book/

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks, 5*(2), 1-17.

Aragon, S. R. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education, 100*, 57-68.

Argyle, M., & Dean, J. (1965). Eye contact, distance, and affiliation. *Sociometry, 28*(3), 289-304.

Berge, Z. L., & Collins, M. P. (Eds.) (1995). Computer Mediated Communication and the Online Classroom Vol. III. Distance learning. Cresskill, NJ.: Hampton Press.

Bibeau, S. (2001). Social Presence, Isolation, and Connectedness in Online Teaching and Learning. From the literature to real life. *Journal of Instruction Delivery Systems, 15*(3), 35-39.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research for education* (3rd Ed.) Toronto: Allyn & Bacon.

Boyd, D. (2006, March 9-6). G/localization: When global information and local interaction collide. Paper presented at the *O'Reilly Emerging Technology Conference.* Retrieved August 1, 2006 from: http://www.danah.org/papers/Etech2006.html

Burbules, N. C., & Callister, T. A. (2000). Universities in Transition: The promise and the challenge of new technologies. *Teachers College Record, 102*(2), 271-293.

Burge, E. J., & Haughey, M (2001). *Using Learning Technologies: International perspectives on practice.* London: Routledge Falmer.

Cavallo, D. (2000). Emergent Design and Learning Environments: Building on indigenous knowledge. I*BM Systems Journal, 39*(3&4). Retrieved August 11, 2004 from: http://www.research.ibm.com/journal/sj/393/part2/cavallo.html

DeBard, R., & Guidera, S. (2000). Adapting asynchronous communication to meet the seven principles of effective teaching. *Journal of Educational Technology Systems, 28*(3), 219-230.

Dewey, J. (1933). *How we think.* Boston: DC Heath.

Eggins, S., & Slade, D. (1997). *Analyzing casual conversation.* Washington, DC.: Cassell.

Garrison, D. R. (2006). *Online community of inquiry update: Social, cognitive, and teaching presence issues.* Unpublished paper. Retrieved May 17, 2006 from: http://communitiesofinquiry.com/sub/papers.html

Garrison, D. R., & Anderson, T. (2000). Transforming and Enhancing University Teaching: Stronger and weaker technological influences. In T. Evans & D. Nation (Eds.) *Changing University Teaching: Reflections on creating educational technologies* (pp. 24-33). London: Kogan Page.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical Inquiry in a Text-based Environment: Computer conferencing in higher education. *Internet and Higher Education 2*(2-3), 87-105.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education 15*(1), 7-23.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating Cognitive Presence in Online Learning: Interaction is not enough. *American Journal of Distance Education, 19*(3), 133-148.

Garrison, D. R., Cleveland-Innes, M., Koole, M., & Kappelman, J. (2006). Revisiting Methodological Issues in the Analysis of Transcripts: Negotiated coding and reliability. *Internet and Higher Education, 9*(1), 1-8.

Gunawardena, C. N. (2005, July-August). Social presence and implications for designing online learning communities. Paper presented at the *Fourth International Conference on Educational Technology*, Nanchang, China.

Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education, 11*(3), 8-26.

Haythornthwaite, C., Kazmer, M. M., Robins, J., & Shoemaker, S. (2004). Community development among distance learners: Temporal and technological dimensions. In C. Haythornthwaite & M. M. Kazmer (Eds.) *Learning, culture and community in online education: Research and practice* (pp. 35-57). New York: Peter Lang.

Hiltz, R. S. (1988). *Learning in a Virtual Classroom: Final evaluation report 25.* Newark, NJ.: Computerized Conferencing and Communications Center.

Idhe, D. (2004). A phenomenology of technics. In D. M. Kaplan (Ed.) *Readings in the philosophy of technology* (pp. 137-159). Lanham, MD.: Rowman & Littlefield.

Kanuka, H., Collett, D., & Caswell, C. (2002). University instructor perceptions of the use of asynchronous text-based discussion in distance education courses. *American Journal of Distance Education, 16*(3), 151-167.

Levy, P. (2003). A methodological framework for practice-based research in networked learning. *Instructional Science, 31*(1-2), 87-109.

Lobry de Bruyn, L. (2004). Monitoring Online Communication: Can the development of convergence and social presence indicate an interactive learning environment? *Distance Education, 25*(1), 67-81.

MacDonald, C. J., Stodel, E. J., Coulson, I., Mace, H., & Thompson, T-L. (*in press*). *Pioneers in eLearning: Exploring different technologies.*

MacDonald, C. J., Stodel, E. J., Farres, L.G., Breithaupt, K., & Gabriel, M. A. (2001). The Demand-Driven Learning Model: A framework for web-based learning. *Internet and Higher Education, 1*(4), 9-30.

MacDonald, C. J. & Thompson, T-L. (2005). Structure, Content, Delivery, Service, and Outcomes: Quality e-Learning in higher education. *International Review of Research in Open and Distance Learning, 6*(2). Retrieved May 17, 2005 from: http://www.irrodl.org/index.php/irrodl/article/view/237/321

McConnell, D. (2002). The experience of collaborative assessment in e-learning. *Studies in Continuing Education, 23*(1), 73-92.

Merriam, S. B. (1998). Qualitative research and case study applications in education. San Francisco, CA.: Jossey-Bass.

Muilenburg, L. Y., & Berge, Z. L. (2001). Barriers to Distance Education: A factor-analytic study. *American Journal of Distance Education, 15*(2), 7-22.

Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C-F. (2003). Online Learning: Patterns of engagement and interaction among in-service teachers. *Language Learning and Technology, 7*(3), 119-140.

Rogers, P., & Lea, M. (2005). Social Presence in Distributed Group Environments: The role of social identity. *Behaviour and Information Technology, 24*(2), 151-158.

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education, 14*(2). Retrieved February 10, 2006 from: http://cade.athabascau.ca/vol14.2/rourke_et_al.html

Rourke, L., & Anderson, T. (2002). Using peer teams to lead online discussions. *Journal of Interactive Media in Education, 1*, 1-21.

Rovai, A. P. (2002). Building sense of community at a distance. *International Review of Research in Open and Distance Learning, 3*(1). Retrieved May 17, 2006 from: http://www.irrodl.org/index.php/irrodl/article/view/79/153

Rovai, A. P. (2003). A practical framework for evaluating online distance education programs. *Internet and Higher Education, 6*(2), 109-124.

Russo, T. C., & Campbell, S. W. (2004). Perceptions of Mediated Presence in an Asynchronous Online Course: Interplay of communication behaviours and medium. *Distance Education, 25*(2), 215-232.

Salmon, G. (2000). *E-moderating: The key to teaching and learning online.* London: Kogan Page.

Schwandt, T. A. (1994). Constructivist, interpretivist approach to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.) *Handbook of qualitative research* (pp. 118-137). Thousand Oaks, CA.: Sage.

Shamp, S. (1991). Mechanomorphism in perception of computer communication partners. *Computers in Human Behavior, 7*(3), 147-161.

Shin, N. (2002). Beyond Interaction: The relational construct of 'Transactional Presence.' *Open Learning, 17*(2), 121-137.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications.* Toronto, ON.: Wiley.

Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. *Internet and Higher Education, 7*(1), 59-70.

Stroupe, C. (2003). Making Distance Presence: The compositional voice in online learning. *Computers and Composition, 20*, 255-275.

Thomas, M. J. W. (2002). Learning within incoherent structures: The space of online discussion forums. *Journal of Computer Assisted Learning, 18*(3), 351-366.

Thompson, T-L., & MacDonald, C. J. (2005). Community Building, Emergent Design, and Expecting the Unexpected: Creating a quality eLearning experience. *Internet and Higher Education, 8*, 233-249.

Tu, C-H., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *American Journal of Distance Education, 16*(3), 131-150.

Wang, A.Y., & Hewlin, M.H. (2001, August). Online Lectures: Benefits for the virtual classroom. *T.H.E. Journal*. Retrieved April 14, 2006 from: http://www.thejournal.com/articles/15513

Wiener, M., & Mehrabian, A. (1968). *Language within Language: Immediacy, a channel in verbal communication.* New York: Appleton-Century-Crofts.

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Designing Websites for Learning and Enjoyment: A study of museum experiences

Aleck C. H. Lin and **Shirley Gregor**
The Australian National University

Abstract

This study reports on an exploratory research study that examined the design of websites that encourage both learning and enjoyment. This study examines museum websites that offer educational materials. As part of their mission, most museums provide the general public with educational materials for study and enjoyment. Many museums use the Internet in support of their mission. Museum websites offer excellent opportunity to study learning environments designed for enjoyment. Computer-supported learning of various types has been studied over the years, including computer-aided learning, computer-aided instruction, computer-managed learning, and more recently, learning via the Internet. Some relevant work appears in the literature on pleasure; however, the concept of online learning for enjoyment – specifically when learning is not part of a formal instructional undertaking – has not been well studied and thus is not well understood. This study seeks to redress this gap in the literature, specifically 'learning for enjoyment', by reporting on a number of semi-structured in-depth interviews with museum and educational experts in Taiwan. Our study identified a number of characteristics required of online learning websites, and we conclude some suggested guidelines for developing an online learning website for enjoyment.

Keywords: e-learning; learning; enjoyment; museum; website design

Learning for Enjoyment

A museum, as defined by the International Council of Museums (ICOM, 2006), is "a permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment." Museums have a natural role as educational institutions. Ambrose and Paine (1994) state that a museum's educational mission is "to enhance the education of children and adults through the imaginative use of the museum and its collections" and "to assist the museum to maximise the educational potential of its collections, buildings and other resources" (p. 45). Thus, museums have the mission of providing study, education, and enjoyment for the general public (ICOM, 2006). With this mission in mind, museum websites offer an opportunity to study a particular kind of online learning (e-Learning), which is herein called 'learning for enjoyment.'

The aim of the study is to investigate how 'learning for enjoyment' can be encouraged through website design. This topic is important because museums are increasing their use of the Internet

in support of their mission. In response to this institutional push for the global dissemination of human culture, ancient civilisation, and the arts online via the Internet, a new top level domain name, .museum (dot museum), has recently become operational (Museum Domain Management Association, 2006).

Computer-supported learning of various types and under various guises has been studied over the years. Current conceptualizations of e-Learning have progressively evolved from the traditional concepts of Computer-Aided Learning, Computer-Assisted Instruction, and Computer Managed Learning (Chang, 2001; Joint, 2003; Mazoue, 1999; Silberman, 1972; Tucker, 1997). e-Learning now attracts attention from those marketing of global enterprises' e-Learning investment and business perspectives (IBM, 2003; Fisher, 2002).

The concept of e-learning for enjoyment – specifically when learning is not part of a formal instructional undertaking – has been little studied and thus not well understood (Goldman & Wadman, 2002; Schaller, Allison-Bunnell, & Borun, 2005). Some relevant work appears in the literature on pleasure (Telfer, 1980), happiness (Perry, 1967; Veenhoven, 1984), playfulness (Lieberman, 1977; Webster & Martocchio, 1992), and flow (Csikszentmihalyi, 1990; Pace, 2004). While all these concepts are related, they nonetheless differ from 'enjoyment' in subtle ways. This study seeks to redress this gap in the literature by exploring the concept of learning and its link to 'enjoyment.' We conclude with a conceptual guideline for building e-Learning websites for enjoyment.

As an exploratory study, a number of semi-structured in-depth interviews with museum and educational experts were conducted. These interviews allowed the researchers to gain insight into a number of perspectives and experiences regarding the development of e-Learning 'websites for enjoyment.'

The paper proceeds first by exploring the concept of enjoyment and related literature. Descriptions of the interviews are given, followed by the methods used and data analysis employed. The characteristics of a website that encourages learning are subsequently identified, and guidelines for developing 'websites for enjoyment' proposed.

Conceptual Background

Knowledge from a number of different areas was found to be relevant to our study, including e-Learning in general and in museums in particular, the understanding of the concepts of enjoyment and learning for enjoyment, and website design. This section discusses the relevance of each of these topic areas.

e-Learning

The concept of e-Learning is relatively new and is defined as "a broad concept, encompassing a wide set of applications and processes which use all available electronic media to deliver vocational education and training more flexibly. The term 'e-Learning' is now used to capture the general intent to support a broad range of electronic media (Internet, intranets, extranets, satellite broadcast, audio/ video tape, interactive TV and CD-ROM) to make vocational learning more flexible for clients" (Australian National Training Authority, 2003, p. 3). The scope of e-Learning builds on prior work that has occurred in areas with diverse labels, including Computer-Aided Learning, Computer Assisted Instruction, and Computer Managed Learning. Previous studies in

these fields have shown that computer-based education can maintain learners' attention, increase their motivation, and improve learning effectiveness (Beech, 1983; Gilliver, Randall, & Pok, 1998; Thomas & Kobayashi, 1987; Thompson, Higgins, & Howell, 1991). Computer-Aided Learning represents an instructive environment in which a computer program is employed to assist users in learning. Computer-Aided Learning is not a solitary computer learning system, but part of an instructive approach devised to educate a specific subject (Joint, 2003; Tucker, 1997). Computer-Assisted Instruction provides a vehicle for providing extended practice to increase learner's ability (Chang, 2001). Cepni, Tas, and Kose (2006) found Computer-Assisted Instruction materials can improve student achievement, change misconceptions in some degree, and progress cognitive levels in science education domain. Wofford, Smith, and Miller (2005) used multimedia computer techniques, the use of graphics (animation, video) and/ or audio with or without using text support, to study Computer-Assisted Instruction in the healthcare sector. They believed that "Evolving computer technology and strategies will allow better targeting of the educational tasks amenable to computer-assisted education strategies" (Wofford, et al., 2005, p.156). Computer Managed Learning is the use of a computer to manage a learner's progress through study. In Computer Managed Learning, the computer is used to plan, organise, control, evaluate, and assess what the learner learns (Silberman, 1972).

It is significant that teaching and learning features of computer programs have changed with the influence of the Internet and developments in multimedia and interactive functions. The Australian National Training Authority (2003) gives two major characteristics of e-Learning: one is that e-Learning is assisted by information and communication technologies, and the second is that diverse media are needed for effective instruction and study purposes. Iverson (2004) proposed that successful e-Learning must not only be enjoyable and engaging, it must also be positive, supportive, active, collaborative, and contextual.

In contemporary museum research, several researchers recommend the use of multimedia and interactive functions to capture learners' attention and increase their learning experience (Horniblow, 2004; Marable & Incognita, 2004; Neal, Magazine, & Wormer, 2004; Schaller, et al., 2005). A few projects adopted 3D virtual reality to design museum e-Learning websites (Kaye & Poletto, 2004; Di Blas & Poggi, 2006). The existing literature, however, does not provide general guidance as to the key factors in creating an enjoyable learning experience with a museum's website (Neal, et al., 2004) or, in fact, for e-Learning for enjoyment in general. This current study was performed against this background, with the aim of helping address the gaps in theoretical knowledge concerning learning for enjoyment and the design of websites that lead to enjoyable learning.

Enjoyment

Philosophers and psychologists have created a large body of literature relating to enjoyment, but definitions of 'enjoyment' vary. In philosophy, Perry (1967) argued that 'enjoyment' is a:

> *non-evaluative, non-conative pro-attitude toward some actual object for what it is in itself, which object is a present doing, undergoing, or experiencing on the part of the subject or is something which is intimately connected with a present doing, undergoing, or experience on his part. To be enjoying a thing or to be deriving enjoyment from it, is to have such a pro-attitude toward it. To enjoy or to derive enjoyment from a thing in a dispositional sense is to have a tendency to have this attitude toward it* (p. 214).

White (1964) believed that "to enjoy something . . . is to be having one's desires satisfied" (p. 326).

In psychology, Davis (1982) expressed the view that "A is enjoying E, if E is causing A to have a number of occurrent beliefs concerning E, which collectively add significantly to the pleasure (happiness) A is experiencing" (p. 249).

Csikszentmihalyi (1990), known for the concept of 'flow,' sees the flow experience as a subset of enjoyment and also as a certain type of enjoyment. Csikszentmihalyi's view was that when people ponder about what makes their lives rewarding, they tend to move beyond pleasant memories and begin to remember other events and experiences that overlap with pleasurable ones, but fall into a category that deserves a separate name: enjoyment. Enjoyable events occur when a person has not only met some prior expectation or satisfied a need or a desire, but also gone beyond what they have been programmed to do and achieved something unexpected, perhaps something even unimagined before.

Warner (1980) defined enjoyment in a thorough way as: "To formulate the definition, let ***t'*** be a moment of time slightly prior to ***t***; then we can say that: ***x*** (a person) enjoys an experience or activity ***Z*** at t if and only if there is an array of concepts ***C*** such that

1. ***x Z***s at ***t'***;
2. ***x***'s ***Z***ing causes ***x*** at ***t***:
   (i) to believe, of his ***Z***ing, that the concepts in ***C*** apply to it;
   (ii) to desire, of his ***Z***ing, under the concepts in ***C*** that it occur;
3. ***x*** desires for its own sake what (2, ii) describes him as desiring" (p.518).

The central idea behind this definition is that enjoyment consists of a certain harmony between three elements: the activity or experience itself; the concepts which this activity or experience causes you to believe to apply to it; and a certain desire in which these same concepts figure (Warner, 1980). When dissecting this definition, three vital concepts can be extracted. First is the factor of engagement in an activity. The fundamental assumption in Warner's definition is that enjoyment is related to 'an experience or activity,' that the person was doing something that engaged his/ her cognition and feeling. Furthermore, the thing a person was doing attracted their attention. The definition of enjoyment from Cobuild (2003) also supports this construct: "Enjoyment is the feeling of pleasure and satisfaction that you have when you do or experience something that you like" (p. 470).

Second is the factor of 'positive affect.' The words 'to believe, of his **Z**ing, that the concepts in **C** apply to it,' and 'to desire' the concepts in **C**, imply that that the activity done by a person leads to some desirable positive affects, for instance a feeling of pleasure or happiness. The definition of 'enjoyment' according to Davis (1982), and as articulated by Perry, (1967): "To enjoy or to derive enjoyment from a thing in a dispositional sense is to have a tendency to have this attitude toward it" (p.214) support this view, as does Seligman and Csikszentmihalyi's (2000) who wrote: "Enjoyment refers to the good feelings people experience when they break through the limits of homeostasis" (p. 12).

The third factor is 'fulfillment:' "***x*** desires for its own sake" what happens from his "**Z**ing"; that is, it fulfills some need. Csikszentmihalyi (1990), states that "Enjoyable events occur when a

person has not only met some prior expectation or satisfied a need or a desire but also gone beyond what he or she has been programmed to do and achieved something unexpected, perhaps something even unimagined before" (p. 46). In addition, White (1964) mentioned that "To enjoy something . . . is to be having one's desires satisfied" (p. 326). All these definitions provide a basis for the idea that 'enjoyment' means the meeting and fulfillment of a person's needs .

Learning for Enjoyment

Schaller et al. (2005) note that "Research into computer-based informal learning is rare, particularly for studies focusing on Web-based informal learning." One significant case from Di Blas and Poggi (2006) report on two 3D game-based online learning programs designed for cultural heritage and education: Learning@Europe and Stori@Lombardia. Dia Blas and Poggi's study found students felt fulfilled in going through these programs. Moreover, the programs motivated students to learn, noting: "Games and activities are fundamental parts of the experience: they keep students busy, they are exciting and engaging. ('When we won, students roared as if they were at a soccer match,' reported one Italian teacher)" (Di Blas & Poggi, 2006). Gee (2003), Prensky (2000), and Steinkuehler (2004) proposed that online games and video games can engage users' activities and retain their concentration on tasks to learn some complex information. Participants in Learning@Europe obtained motivation and goals to push them to learn hard (Di Blas & Poggi, 2006).

There is still the question of how exactly 'enjoyment' is associated with learning. To consider this question, we must refer back to the prior definitions of 'enjoyment,' which include the idea that an enjoyable activity meets a person's need or fulfills some desire. The idea of meeting needs leads us to theories of human motivation.

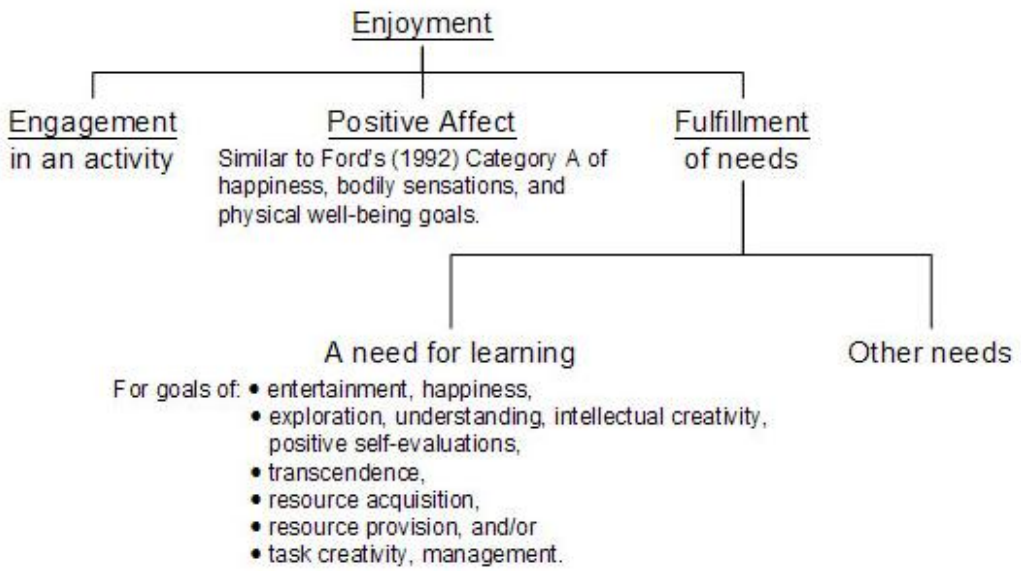
There are many theories of human motivation, with one of the best-known being illustrated in Maslow's hierarchy of human needs (Maslow, 1987). Here we make use of a later work by Ford (1992), which provides an integrating view of a number of other theories. Ford (1992) in Motivating Humans categorised human goals as follows:

> **A.)** ***Affective Goals***, including entertainment, tranquility, happiness, bodily sensations, and physical well-being goals
>
> **B.)** ***Cognitive Goals***, including exploration, understanding, intellectual creativity, and positive self-evaluations goals
>
> **C.)** ***Subjective Organization Goals***, including unity and transcendence goals
>
> **D.)** ***Self-Assertive Social Relationship Goals***, including individuality, self-determination, superiority, and resource acquisition goals
>
> **E.)** ***Integrative Social Relationship Goals***, including belongingness, social responsibility, equity, and resource provision goals
>
> **F.)** ***Task Goals***, including mastery, task creativity, management, material gain, and safety goals.

According to Ford's arguments, there are two fundamental characteristics of these human goals, the first is that they represent the consequences to be achieved, and the second is they direct the attention of the person to the achievement of those consequences. The first three goal categories represent within-person goals, and the last three categories represent goals with respect to the relationships between people and their environments (Lawton & Gregor, 2002).

Figure 1. illustrates how the concepts of learning and enjoyment can be related analytically. The 'Positive Affect' aspect (the second characteristic of enjoyment) includes the notions of pleasure, happiness, and good feelings which can break through the limits of homeostasis. This corresponds to the first category (A) of happiness, bodily sensations, and physical well-being goals found in Ford's taxonomy, 'the affective goals.' The 'Fulfillment' aspect of enjoyment arises when some needs are fulfilled, including several categories of Ford's taxonomy: Category A of entertainment and happiness goals; also Category B goals of exploration, understanding, intellectual creativity, and positive self-evaluations ; Category C goal of transcendence; Category D goal of resource acquisition; Category E goal of resource provision; and/ or Category F goals of task creativity and management. The conclusion is that enjoyment can be derived from learning, as learning satisfies a number of human needs, but it needs to be learning that is accompanied by positive affect.

Figure 1. Enjoyment Arising from Learning



Several types of learning do not fit with 'learning for enjoyment.' They arise when extrinsic motivation occurs, such as when force is applied or learning for material gain. Hence, visitors to museum websites are likely to have intrinsic rather than extrinsic motives for learning. In this context, making a learning experience enjoyable is additionally important. However, even though website design has been contemplated for many years, the guidelines for developing an online learning website for enjoyment, especially within the museum sphere, are still relatively unexplored, which leads us to the next section.

Website Design

Goldman and Wadman (2002) expressed "Although the field of distance education is rich in studies, little of it was transferable to museum websites". When we came to the questions of what are the characteristics of a museum website that encourages learning, and what are guidelines for developing an online learning website for enjoyment, we found remarkably little to guide us.

There is an extensive literature on website design and human-computer interaction in general. For example, Powell (2002) thought that there are five areas that cover the major facets of website design, and asserts that designers should keep these in mind at all times. These areas are content, visualization, technology, delivery, and purpose. Jakob (2000) considers that poor information architecture will always lead to poor usability. In looking at knowledge transfer in particular, Stopsky (2000) argues that interactive characteristics and immediate access to any type of information make the Web a particularly useful medium for the creation of knowledge.

The phenomenon of enjoyment, however, is believed to have unique characteristics that discriminate it from traditional usefulness, ease of use, and user acceptance of websites in important ways (Blythe & Wright, 2003). There are few studies that treat with this specific aspect of website design.

Some studies have been carried out on the 'flow' phenomenon, which in our terms is a particular type of enjoyment. The notion of 'flow' was initially applied to the experiences of website users by Hoffman and Novak (1996) in an assessment of Internet marketing activities. Pace (2004) presented a grounded theory of the flow experiences of Web users engaged in information-seeking activities. Pace (2004) mentioned that curiosity and interest play a vital role in the flow experiences of website users. Moreover, Pace showed that appealing content and links also sustain and attract a website user's concentration. Congruence with personal interests and novelty were also two major factors. The characteristics of a website such as credibility, correctness, currency, ease of understanding, rarity, emotional impact, and aesthetic appeal are also influential in maintaining a user's concentration under some conditions.

From the studies of flow, especially Pace (2004), we expect that good website design will be a pre-condition for enjoyable learning to occur. Learners experience the usability of an e-Learning website from the first moment they encounter the website. If they encounter poor usability, the chance of further use of the website decreases, with a subsequent effect on both learning and enjoyment.

Method

The design of this study uses a descriptive qualitative approach based on semi-structured in-depth interviews and expert interviews as the primary method. Qualitative research is relevant to the study of social relations (Berg, 1989; Flick, 2003). In-depth interviews are "between the researcher and informants directed toward understanding informants' perspectives on their lives, experiences or situations as expressed in their own words" (Taylor & Bogdan, 1984, p. 77). Minichiello, Aroni, Timewell, and Alexander (1990) considered: "It is more usual to see this method being employed as part of an exploratory study where the researcher is attempting to gain understanding of the field of study, and to develop theories rather than test them" (p. 101). Furthermore, they noted that to adopt this research method as one's research approach or data-

collection method is connected to theoretical and practical deliberation, which means that the researcher realises what social reality is and how it ought to be studied.

The expert interview is a special form of semi-structured in-depth interview, as it is linked to the expectation that the interviewed subjects' viewpoints are to be expressed in a relatively openly designed interview situation (Flick, 2003). Dorussen, Lenz, and Blavoukos (2005) believed that expert interviews can provide a distinctive supply for 'inside' information about the policy-making process. Awad and Ghaziri (2004) in Knowledge Management defined an expert as "someone who knows what he or she does not know and is the first one to tell you so. Firms hire experts to benefit from their experience and proven knowledge in solving complex problems"(p. 34). They believed that when interviewing an expert, a knowledge developer should obtain an opportunity to confirm information and receive the expert's thinking process dynamically. To collect and analyse the affairs and processes experienced by experts is a conduit to knowledge acquisition (Moody, Blanton, & Will 1998/ 99). To interview experts includes not only knowledge elicitation, but also autonomous learning processes. Awad and Ghaziri (2004) proposed several advantages for interviewing experts, including the flexibility of investigating regions about which little is known, a better opportunity for assess the validity of information attained, and a valuable method for educing information on complex subjects.

Goldman and Wadman (2002) noted that most studies of museum websites were based on quantitative research methods. Qualitative studies were few, however. When investigating how to design websites for learning and enjoyment, the information we felt we needed was not commonly available in books, journals, computer databases, or on the Internet. We also realised that we encountered a very complex topic which needed initial broad understanding. Therefore, this study adopted a qualitative research method of expert interview as the primary research approach.

The sampling selection strategy employed was purposeful sampling, where information-rich cases are selected (Patton, 2002). Information-rich cases are those from which the researcher can learn about the issues of central importance of the research. Five experts in Taiwan were selected as subjects with the following criteria in mind. All were currently working in a museum or related educational institution, in which one or several e-Learning projects were launched, executed, or managed by them. All had been employed in their current position for more than three years. All had educational, e-Learning, or informatics and communications technology backgrounds or experiences. Table 1 shows the profile of the experts participating in this study.

Table 1. Profiles of experts participating in the study

Expert	Institution	Gender	Functional Area	Educational Level	In Position
E1	Museum	M	Systems Management and E-Learning	PhD	3 Years
E2	Museum	F	Web Design and E-Learning	Masters	5 Years
E3	Museum	M	Information Technology and Museum Education	Masters	17 Years
E4	Educational Institution	M	Information Systems and Research	PhD	3 Years
E5	Educational Institution	F	Education and E-Learning	Bachelors	18 Years

Each interview took approximately 1.5 hours. The primary approach to data analysis was content analysis, which is a research method that uses a set of procedures to make valid inferences from text (Weber, 1990). The procedures for the study were based on the general procedures illustrated

by Rossman and Rallis (2003) and using the concepts of Eisenhardt (1989) for generating theory from case studies.

The interview protocol explored the following major questions:

- What have been your experiences with e-Learning websites in your organisation?
- Do you think that an e-Learning website can encourage learning by the general public? If Yes, how? If No, why not?
- What are the conditions for creating an enjoyable learning experience with an e-Learning website?
- How can a website for the enjoyment of e-Learning be developed?

Findings and Results

The interviews were transcribed and analysed for the key concepts in the interviewees' responses. This data gave rise to a description of the features that were believed to characterise a website that encouraged learning and the conceptual guidelines for designing an e-Learning website for enjoyment.

Features of an e-Learning Website that Encourage Learning

The experts all proposed significant features that they believed encouraged learning from a museum's e-Learning website, including aesthetic appearance, interactivity, ease of use, asynchronous and free accessibility and, simplicity (relaxing and short tasks), and partnerships (provision of useful hyperlinks). Table 2 summarizes the features identified from the narratives of all the experts. In the description of the experts' views that follow, their personal experiences and beliefs are related to confirming research literature.

Feature 1. Appearance

Expert 1 felt that good website design was one of the major factors influencing the enjoyment of learning. Similarly, Expert 4 deemed that visual design is the most important thing for encouraging the enjoyment of learning and that a good visual design would encourage people to look deeper into a website (taking account of colour, text format and size, and image size). Expert 2 also believed that the colours in a website would make visitors decide how long they would stay at a website. These findings are congruent with much Human-Computer Interaction literature, including Blythe Overbeeke, Monk, and Wright (2003), Carroll (1991), Preece, Rogers, Sharp, Benyon, Holland, et al. (1994), and Tarasewich, Harold, and Hampton (2001). Tarasewich et al. (2001) report that aesthetics play a valuable component in one's overall experience, and Pace (2004) mentioned that aesthetic appeal is one of the characteristics that influences and maintains a user's concentration under some circumstances.

Feature 2. Interactivity

One of the experts suggested increasing interaction with learners on the website as a first step in motivating e-Learning. Interactivity could involve games, e-cards, emailing greeting functions, voting for favorite objects or exhibitions, and providing some form of reward. These functions can motivate and increase learners' participations and attentions. Cohen and Payiatakis (2002) suggested similar concepts in that e-Learning has to be compelling and appealing to maintain the learner involved and interested. Further, learning experiences have to become memorable and motivational if they are to make a lasting impact on learners.

Feature 3. Ease of Use

Two experts in website design considered that museums should rethink and restructure their e-Learning websites when new content and new functions are added to the original e-Learning website, because these new contents and functions would affect the original presentation of the website and make the interface more complex. Expert 2 believed that the frame of the website should make it easy and quick for people to navigate and find what they want. Expert 4 believed that the structure of the website should not be complicated, citing "ease of use" and "trouble-free navigation" as two foremost factors.

Feature 4. Accessibility

Expert 3 noted that the museum's e-Learning courses would usually be accessed worldwide. Learners in this virtual environment would learn asynchronously. Every individual learner should be able to learn in a flexible way – at their own time, pace, and place because when they are distributed globally, it is difficult for them to stay together at the same time for one particular synchronous course. Horton (2000) defines 'asynchronous' in Web-based training as meaning that learners can undertake learning whenever they want – learners can read courses or learning materials at any time. Moreover, Expert 3 expressed that the e-Learning courses developed by museums should be free for the general public.

Feature 5. Simplicity (Relaxing and Short Tasks)

Three experts observed that the contents of courses designed for a museum e-Learning website should not be abstruse or long-winded, because most learners visit museum websites other than for the formal purposes of studying. Expert 2 expressed that " . . . most of the purposes to visit a museum's website are for interests and relaxation," and moreover, if an e-Learning course is designed only from the viewpoints of experts, it would become too abstruse and the general public would not understand it or learn from it easily. Jakob (2000) states: "Ultimately, users visit your website for its content. Everything else is just the backdrop . . . " (p. 99). This statement suggests that the design should be user-centred and not just from the designer's view. Although Web-based technologies can provide an effective yet inexpensive way to test knowledge, skills, and attitudes (Horton, 2000), some of the experts suggest that too many tests at the end of a museum e-Learning course were counter-productive. Most visitors are aiming to learn for relaxation and to obtain more extensive knowledge. They do not join the e-Leaning programs offered as a public service by museums for the purposes of tests or getting a high score.

Feature 6. Partnerships

Expert 3 believed that museums should collaborate with schools to adopt museum e-Learning courses for teaching, as this practice would encourage potential users to access those courses. Moreover, museums would then have the opportunity to obtain feedback to evaluate and improve their courses and the design of their e-Learning website. Expert 2 considered that museums could also exchange links to their website with some commercial portals, to increase traffic and thus, their popularity. This type of promotion would theoretically raise awareness of the website among the general public, and thus learning behaviours could indirectly be encouraged. Connecting to different types of learning resources is also another vital aspect in museum e-Learning websites. It is understood that such tactics will extend learners' breadth of the knowledge because they can visit other relevant and helpful websites. Powell's (2002) opinion is that each link presents a door and the link label is thought to specify what is beyond each door. Therefore, the provision of useful hyperlinks and external resources, would be a factor for designing museum e-Learning websites.

Table 2. Illustrative narrative extracts for features of an e-Learning website

Feature	Expert	Narrative extracts
Feature 1. *Appearance*	E1	• It is understood that the good design of the website interface, the course contents, and the attractive functions would all be the factors to influence the enjoyment of learning. • The visual design of the National Palace Museum's website is very beautiful and charming, which could be very attractive.
	E2	• Chose the website colour set cautiously because the colours of a website will make visitors decide how long they will stay at your website.
	E4	• The most important thing would be the visual design. A good visual design would encourage people to look deeper in a website, which includes colour, text format and size, image size.
Feature 2. *Interactivity*	E2	• …to increase interactions with learners on the website, such as games, e-cards, e-mail greeting functions, the votes of favourite objects or exhibitions, and provide some little gifts to attract participations. This will keep people visiting the website frequently to see what's new.
Feature 3. *Ease of Use*	E1	• …it is important to evaluate and analyse this kind of information systems before constructing it.
	E2	• To rethink and redesign the structure of the website is also an important thing, especially when new content and/or new functions are added to the original e-Learning website. The frame of the website should make people easier and quicker to navigate and find what they want.
	E4	• The structure of the website should not be complicated. "Easy to use" and "trouble-free to navigate" are important factors.

		• "Design", included designing concepts and designing techniques, is very important fro developing an e-Learning website. • System analysis is also an important aspect.
Feature 4. *Accessibility*	E3	• …to provide asynchronous learning functions is very important. This means that every individual learner can learn in a more flexible way – in their own time, pace, and place. • Asynchronous learners become independent learners. Independent learning – having people think for themselves and figure things out for themselves – certainly is a museum's educational objective. • "Free" will be another key factor. Learners will be frustrated if they find the information or courses provided from the website are needed to charge.
Feature 5. *Simplicity (Relaxing and Short Tasks)*	E1	• The current Bronze e-Learning course has twelve chapters. It is too long. Learners do not have patience to finish the whole course. • …an unforced final exam is designed at the end of the bronze course, but only 1/ 10 registered learners took the test. Most of the learners do not like to be tested.
	E2	• The learning contents with twelve chapters are designed from the viewpoints of experts and are become too abstruse, general public can't realize or learn from them easily. • …do not construct too many tests at the end of the course. People would like to learn something from your museum's Website, of course. But most of the purposes to visit a museum's Website are for interests and relaxation.
	E4	• The contents of the course should not be very enormous and complex, which means that learners can read through and find some useful information quickly.
Feature 6. *Partnerships*	E2	• …to consider the museum marketing. Try to access the famous portals' banners, to join international competitions, and to exchange the hyperlink with other museums and relevant organisations.
	E3	• …to connect with schools, local communities, and businesses. With their participations, the website will be promoted and evaluated in an adequate way.
	E4	• From the e-Learning website, you should provide as many as hyperlinks to connect different kinds of resources from other e-Learning websites or sources.
	E5	• …to provide some useful hyperlinks.

Development Guidelines for an e-Learning Website for Enjoyment

Five development guidelines for designing websites for enjoyment and learning were extracted from the interviews and covered several dimensions, including adopting multimedia and

interactive technologies, self-directed learning, sharable considerations, and museum's internal and external resources. Table 3 provides illustrative narrative from the experts.

1. Adoption of Multimedia and Interactive Technologies

All of the experts provided an opinion related to multimedia and interactive functions. A number indicated that multimedia and interactive learning functions could easily catch and hold users' attention. Forrester and Jantzie (2004) proposed that multimedia allows instructors and designer to bring the real world to the learners through the use of audio and visual functions. Lawton and Gregor (2002) analysed the uses of Internet interactivity for marketing and suggested that in the Internet environment, non-passive, user-pull, and interactive tools have the greatest potential to add value.

2. Considering the Characteristics of Self-Directed Learning

The majority of the experts regarded the function of self-directed learning as a vital element. One expert considered that self-directed learning is a museum's educational objective. Another expert identified self-directed learning as a future trend in education. Knowles (1975) outlines the advantages of self-directed learning: firstly, people learn more things and learn better than those who wait passively to be taught; secondly, people enter into learning more purposefully and with greater motivation; and thirdly, people tend to retain and make use of what they learn better and for longer. This guideline matches well with the idea of the intrinsic motivation needed to underpin 'learning for enjoyment.'

3. Have Qualified Staff and Adequate Financial Support

Expert 1 commented on the need for professional design techniques and use of creative staff for the development of enjoyable multimedia and interactive learning functions. This need is noted by other scholars. Sommerville (2001), for example, sees systems engineering as an interdisciplinary activity involving teams drawn from different backgrounds, thus good system engineering requiring teams with wide knowledge to consider all implications. Therefore, the availability of qualified staff affects the success of the e-Learning website. Moreover, without good financial support, it is not easy to design such e-Learning websites, which are expensive to develop.

4. Consider the Targeted Audience

One expert commented on the need to consider what type of people visit a museum's website, and what are the major targets of a particular e-Learning course. Focusing on user-centred design aspects, Powell (2002) reported that users can be classified into three levels: novices, intermediates, or expert/ power users. Marable and Incognita (2004) also found that users of a museum website might range from broad interest visitors with slight knowledge of the topic, to instructors looking for supporting resources, to recreational scholars using the website as an auxiliary research tool. When designing such a website, it is therefore essential to consider different levels of targets. Powell (2002) suggests that even though designers do not need to 'perfectly accommodate' every user's preference and necessity, they should still develop an adaptive interface which can be suitable for these three broad categories of users: novices, intermediates, or expert/ power users. Moreover, he advises that "be particularly careful not to

lock users out, particularly those who may be disabled or slightly different from your average user" (Powell, 2002, p. 63).

5. Make the Information More Sharable

One expert recommended that the platform of e-Learning websites should try to follow the Sharable Course Object Reference Model (SCORM) international standards to make all the information more sharable. SCORM aims to establish a mechanism for repeated use and sharing of courseware that is acceptable in different learning management systems (Yang & Ho, 2005). Although it is still a debatable perspective, this expert envisions learners interacting with learning contents on museum websites that are both globally delivered and globally accessible.

Table 3: Illustrative narrative extracts for the design of an e-Learning website for enjoyment

Guidelines	Expert	Narrative
Guideline 1. *Adopt Multimedia and Interactive Technologies*	E1	• Most of the multimedia and interactive development techniques are not mature and popular enough and the developed costs are still expensive.
	E2	• We designed the sections of Kid's Corner, Digital Museum, and E-Learning for our museum's education objectives. There are many multimedia and interactive functions applied in these categories, including Flash objects and audio and visual functions.
	E3	• …Some multimedia and interactive systems will be employed in the near future, such as the video-on-demand online learning system, wireless and mobile tour guide, and wireless electronic schoolbook.
	E4	• Multimedia and interactive functions could also promote the enjoyable learning experience.
	E5	• …to design some interactive functions to catch learner's attention and to make them feel that learning from the Website could be so interesting and exciting.
Guideline 2. *Consider the Characteristics of Self-Directed Learning*	E1	• It (the NPM's E-Learning Website) also becomes a medium for self-directed learning. The self-directed learning will be a tendency for the future educational function.
	E2	• How to attract people to visit the museum's website and how to serve people to learn by themselves are important questions for us when designing the e-Learning website.
	E3	• Asynchronous learners become independent learners. Independent learning – have people think for themselves and figure things out for themselves – certainly is a museum's educational objective.
	E5	• Students also can study at home by themselves at anytime and anywhere. • Some extra readings on the websites are listed in the handouts, so student can choose some websites to learn by themselves.

Guideline 3. *Have Qualified Staff and Adequate Financial Support*	E1	• We have high quality human resources (a professional website design and development team) and adequate financial support from government.
Guideline 4. *Consider the Targeted Audience*	E3	• When designing e-Learning in the museum, it is necessary to consider the following questions, such as what kind of people will visit the museum's website, what are the major targets of a particular e-Learning course.
Guideline 5. *Make the Information More Shareable*	E4	• The platform should follow the Sharable Course Object Reference Model (SCORM) international standards to make all of the information become more shareable and transformable.

Limitations to the Study

Before concluding, the limitations of the study should be acknowledged. Flick (2003) proposed that the collection of interview data could be stopped when reaching the criterion of 'theoretical saturation' and 'saturation means that no additional data are being found.' As an exploratory study, only five experts were interviewed and therefore interviewing a larger sample may have yielded additional guidelines. Moreover, this study examined the designer's point of view; the user's view was not considered. These limitations will be addressed in further research.

Conclusion

A successful e-Learning website is thought to be enjoyable and engaging, positive and supportive, active, collaborative and contextual (Iverson, 2004). This study further explored the nature of e-Learning for enjoyment through a grounded study with five experts drawn from the field of museum website design in Taiwan. Interviews with these experts allowed insights into key factors affecting website design from those with considerable experience in the field.

Six features for encouraging online learning for enjoyment, including 1.) attractive appearance, 2.) increasing interaction with learners, 3.) ease of use, 4.) asynchronous accessibility, 5.) relaxing and short tasks, and 6.) provision of useful hyperlinks were integrated from the experts' viewpoints. Furthermore, five development guidelines for designing learning for enjoyment in museum websites were investigated: 1.) adopting multimedia and interactive technologies, 2.) considering the characteristics of self-directed learning, 3.) having qualified staff and adequate financial support, 4.) considering the targeted audience, and 5.) making the information more sharable.

While the findings of this study support findings from other related literature, the expert interviews reported in this paper highlight the key features of designing for 'e-Learning for enjoyment,' research which has not been done before in a formal study. Not unexpectedly, this study's finding that ease-of-use, appearance, user-centred design, and employment of well-resourced qualified staff, are important and is congruent with general principles of human-centred design (e.g., Preece et al., 1994). The findings in this study also align with Pace's (2004) study of 'flow,' which found that features such as ease of understanding and aesthetic appeal contributed

to users' flow experience. Pace (2004) also showed that appealing content and links were important, a finding that was again supported in this study.

Other findings of this study (not so obvious in previous literature) explore the museum website experts' depth of experience with website development for enjoyable learning. These features include: interactivity, lower complexity (i.e., short and few tasks), and the consideration of self-directed learning. The value of the study lies in its identification of these specific features that the experts see as central to their mission of providing enjoyable online learning in museum contexts. Additionally, this study, through its in-depth consideration of enjoyment as a construct, shows conceptually the linkage between enjoyment and learning.

Expert 2 opined: "Without digitisation and Internet technologies, we can't provide the whole of ancient knowledge in such deep going and detailed form." In the new era, e-Learning in museums can be a vehicle that helps to spread and promote the knowledge of civilisation. Learners will be able to enhance their own learning needs, interests, and optimal experiences. From this study, successful e-Learning in museum initiatives today requires:

- A strategy that tightly links e-Learning with institutions and learners' needs
- Encouragement, experiences, and intriguing content that make learning enjoyable, compelling, and engaging to target the museum audiences' needs
- A visual-driven and self-directed design that bring the real world to the learners through the use of audio and visual functions, where learners can gain from self-paced instruction based upon multimedia and interactive learning technologies
- Supported internal and external resources for museums, including qualified staff and adequate financial supply, and connections with schools and businesses.

References

Ambrose, T., & Paine, C. (1994). *Museum Basic.* London/ New York: ICOM/ Routledge.

Australian National Training Authority (2003). Definition of Key Terms Used in e-Learning. *Australian Flexible Learning Framework Quick Guides Series.* Retrieved August 1, 2006 from: http://www.flexiblelearning.net.au/guides/keyterms.pdf

Awad, E. M., & Ghaziri, H. M. (2004). *Knowledge Management.* Upper Saddle River, NJ.: Pearson Education.

Beech, G. (1983). *Computer Based Learning: Practical methods for microcomputers.* Wilmslow, UK.: Sigma.

Berg, L. B. (1989). *Qualitative Research Methods for the Social Sciences.* Boston: Allyn & Bacon.

Blythe, M. A., Overbeeke, K., Monk, A. F., & Wright P.C. (2003) (Eds.) *Funology: From usability to enjoyment.* Netherlands: Kluwer Academic.

Blythe, M. A., & Wright, P. C. (2003). Introduction – From Usability to Enjoyment. In M. A. Blythe, K. Overbeeke, A. F. Monk, & P.C. Wright (Eds.) *Funology: From usability to enjoyment.* Netherlands: Kluwer Academic.

Carroll, J. M. (1991). *Designing Interaction: Psychology at the Human-Computer Interface.* Cambridge MA.: Cambridge University Press.F

Cepni, S., Tas, E., & Kose, S. (2006). The effects of computer-assisted material on students' cognitive levels, misconceptions and attitudes towards science. *Computers and Education, 46*(2), 192-205.

Chang, C. Y. (2001). A Problem-Solving Based Computer-Assisted Tutorial for the Earth Sciences. *Journal of Computer Assisted Learning, 17*(3), 263-274.

Cobuild, C. (2003). *Advanced Learner's English Dictionary*. London: Harper Collins.

Cohen, S. L., & Payiatakis, D. (2002). e-Learning: Harnessing the Hype. *Performance Improvement, 41*(2), 7-15.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience.* New York: Harper Collins.

Davis, W. A. (1982). A Causal Theory of Enjoyment. *Mind, New Series, 91*(362), 240-256.

Di Blas, N., & Poggi, C. (2006). 3D for Cultural Heritage and Education: Evaluating the Impact. *Museums and the Web 2006 Conference*, March 22 - 25, Albuquerque, NM., Retrieved October 24, 2006 from: http://www.archimuse.com/mw2006/papers/diblas/diblas.html

Dorussen, H., Lenz, H., & Blavoukos, S. (2005). Assessing the Reliability and Validity of Expert Interviews. *European Union Politics, 6*(3), 315-337.

Eisenhardt, M. K. (1989). Building Theories from Case Study Research. *Academy of Management Review, 14*(4), 522-550.

Fisher, A. (2002, April). A Better Way to Learn: Understanding e-Learning. *FT.com website.* Retrieved August 1, 2006 from: http://specials.ft.com/elearning/FT3W67AL2ZC.html

Flick, U. (2003). *An Introduction to Qualitative Research*, 2nd Ed. London: Sage.

Ford, M. E. (1992). *Motivating Humans: Goals, emotions, and personal agency beliefs.* Newbury Park, CA.: Sage.

Forrester, D., & Jantzie, N. (2004). Learning Theory. *University of Calgary website.* Retrieved September 13, 2004 from: http://www.acs.ucalgary.ca/~gnjantzi/learning_theories.htm

Gee, J. P. (2003). What Video Games Have to Teach Us about Learning and Literacy. *ACM Computers in Entertainment, 1*(1), 1-4.

Gilliver, R. S., Randall, B., & Pok, Y. M. (1998). Learning in Cyberspace: Shaping the future. *Journal of Computer Assisted Learning, 14*(3), 212–222.

Goldman K. H., & Wadman, M. (2002). There's Something Happening Here, What It Is Ain't Exactly Clear. *Museums and the Web 2002 Conference* April 17 – 20, 2002, Boston, MA. Retrieved October 24, 2006 from: http://www.archimuse.com/mw2002/papers/haleyGoldman/haleygoldman.html

Hoffman, D. L., & Novak, T. P. (1996). Marketing in Hypermedia Computer-Mediated Environments: Conceptual foundations. *Journal of Marketing, 60*(3), 50–68.

Horniblow, J. (2004). Developing the Strategy for Change and Redevelopment of your Web Site. *Museums and the Web 2004 Conference*, March 31 – April 3, Washington, DC. Retrieved August 4, 2006 from: http://www.archimuse.com/mw2004/papers/horniblow/horniblow.html

Horton, W. (2000). *Designing Web-Based Training: How to teach anyone anything anywhere anytime.* New York: John Wiley & Sons.

IBM Corporation and Economist Intelligence Unit (2003). *The 2003 e-Learning Readiness Rankings.* A White Paper from the Economist Intelligence Unit and Written with IBM.

ICOM (2006). *ICOM Definition of a Museum.* Retrieved October 27, 2006 from: http://icom.museum/definition.html

Iverson, K. M. (2004). *e-Learning Games: Interactive learning strategies for digital delivery.* Upper Saddle River, NJ.: Pearson Education.

Jakob, N. (2000). *Designing Web Usability: The practice of simplicity.* Indianapolis, IN.: New Riders.

Joint, N. (2003). Information Literacy Evaluation: Moving towards virtual learning environments. *The Electronic Library, 21*(4), 322-334.

Kaye, A., & Poletto, P. (2004). Virtual vs. Physical: Creating on-line educational experiences through design. *Museums and the Web 2004 Conference*, March 31 – April 3, Washington, D.C. Retrieved August 4, 2006 from: http://www.archimuse.com/mw2004/papers/kaye/kaye.html

Knowles, M. S. (1975). *Self-Directed Learning: A guide for learners and teachers.* Englewood Cliffs, NJ.: Prentice Hall/ Cambridge.

Lawton, B., & Gregor, D. S. (2002). Internet Marketing Communications: Interactivity and Integration. *Seeking Success in e-Business: A multidisciplinary approach. IFIP8.4 Conference*, June 9 – 12, Copenhagen.

Lieberman, J. N. (1977). *Playfulness: Its relationship to imagination and creativity*, 2nd Ed., New York: Academic Press.

Maslow, A. H. (1987). *Motivation and Personality*, 3rd Ed., New York: Harper & Row.

Marable, B., & Incognita, T. (2004). Experience, Learning, and Research: Coordinating the multiple roles of on-line exhibitions. *Museums and the Web 2004 Conference*, March 31 – April 3, Washington, D.C. Retrieved August 4, 2006 from: http://www.archimuse.com/mw2004/papers/marable/marable.html

Mazoue, J. G. (1999). The Essentials of Effective Online Instruction. *Campus-Wide Information Systems, 16*(3), 104-110.

Minichiello, V., Aroni, R., Timewell, E., & Alexander, L. (1990). *Indepth Interview: Researching people.* Cheshire, UK.: Longman.

Moody, J. W., Blanton E. J., & Will, R. P. (1998/99). Capturing Expertise from Experts: The need to match knowledge elicitation techniques with expert system types. *The Journal of Computer Information Systems, 39*(2), 89-95.

Museum Domain Management Association (2006). *Internationalized Domain Names (IDN) in .museum: Introduction*, Retrieved August 1, 2006 from: http://about.museum/idn/

Neal, L., Magazine, L., & Wormer, K. V. (2004). Making Learning Fun: Plimoth plantation's online learning centre. *Museums and the Web 2004 Conference*, March 31 – April 3, Washington, D.C. Retrieved August 4, 2006 from: http://www.archimuse.com/mw2004/papers/neal/neal.html

Pace, S. (2004). A Grounded Theory of the Flow Experiences of Web Users. *International Journal of Human-Computer Studies, 60*(3), 327-363.

Patton, M. Q. (2002). *Qualitative Evaluation and Research Methods,* 3rd. Ed., Thousand Oaks, CA.: Sage.

Perry, D. L. (1967). *The Concept of Pleasure.* The Hague: Mouton & Co.

Powell, A. T. (2002). *Web Design: The complete reference,* 2nd. Ed. New York: McGraw-Hill/Osborne.

Preece, J., Rogers, Y., Sharp, H., Benyon, D., Holland, S., & Carey, T. (1994). *Human Computer Interaction.* Wokingham, UK.: Addison-Wesley.

Prensky, M. (2000). *Digital Game-Based Learning.* New York: McGraw-Hill.

Rossman, G. B., & Rallis S. F. (2003). *Learning in the Field: An introduction to qualitative research,* 2nd. Ed., Thousand Oaks, CA.: Sage.

Schaller, D. T., Allison-Bunnell, S., & Borun, M. (2005). Learning Styles and Online Interactives. *Museums and the Web 2005 Conference.* Vancouver, Canada, April 13 – 17. Retrieved October 24, 2006 from: http://www.archimuse.com/mw2005/papers/schaller/schaller.html

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive Psychology: An introduction. *American Psychologist, 55*(1), 5-14.

Silberman, H. F. (1972). Applications of Computers in Education. In R. C. Atkinson & H. A. Wilson (Eds.) *Computer-Assisted Instruction: A book of reading*. (pp. 49-61). Stanford, CA.: Stanford University Press.

Sommerville, I. (2001). *Software Engineering*, 6th. Ed., Harlow, UK.: Addison-Wesley.

Steinkuehler, C. A. (2004). Learning in Massively Multiplayer Online Games. *ICLS 2004: International Conference on Learning Sciences*, June 22 - 26, Los Angeles. Proceedings of the 6th International Conference on Learning Sciences, 521 – 528.

Stopsky, F. (2000). The Internet and the quest for knowledge. *College Teaching, 48*, 37-38.

Tarasewich, P., Harold, D. Z., & Hampton, G. E. (2001). Aesthetics and Web Site Design. *Quarterly Journal of Electronic Commerce, 2*(1), 67-81.

Taylor, S. J., & Bogdan, R. (1984). *Introduction to Qualitative Research Methods: The search for meanings*, 2nd. Ed., New York: John Wiley & Sons.

Telfer, E. (1980). *Happiness.* London: Macmillan.

Thomas, R. M., & Kobayashi, V. N. (1987). *Educational Technology: Its creation, development, and cross-cultural transfer.* Oxford: Pergamon.

Thompson, R. L., Higgins, C. A., & Howell, J. M. (1991). Personal Computing: Toward a conceptual model of utilization. *MIS Quarterly, 15*(1), 125-143.

Tucker, E. (1997). The Impact of CAL in a University Engineering School. *Education and Training, 39*(6/7), 271-274.

Veenhoven, R. (1984). *Conditions of Happiness.* Dordrechy, The Netherlands: D. Reidel.

Warner, R. (1980). Enjoyment. *The Philosophical Review, 89*(4), 507-526.

Weber, R. P. (1990). *Basic Content Analysis,* 2nd. Ed., Newbury Park, CA.: Sage.

Webster, J., & Martocchio J. J. (1992). Microcomputer Playfulness: Development of a Measure with Workplace Implications. *MIS Quarterly, 16*(2), 201-226.

White, A. R. (1964). The Notion of Interest. *The Philosophical Quarterly, 14*(57), 319-327.

Wofford, J. L., Smith, E. D., & Miller, D. P. (2005). The Multimedia Computer for Office-based Patient Education: A systematic review. *Patient Education and Counseling, 59*(2), 148-157.

Yang, C. T., & Ho, H.C. (2005). A shareable e-Learning Platform Using Data Grid Technology. Proceedings of the *2005 IEEE International Conference on e-Technology, e-Commerce and e-Service* (pp. 592-595), March 28 – 31, Hong Kong, PRC.

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Feedback Model to Support Designers of Blended-Learning Courses

Hans G. K. Hummel
Open University of the Netherlands

Abstract

Although extensive research has been carried out, describing the role of feedback in education, and many theoretical models are yet available, procedures and guidelines for actually designing and implementing feedback in practice have remained scarce so far. This explorative study presents a preliminary six-phase design model for feedback (6P/ FB-model) in blended learning courses. Each phase includes leading questions and criteria that guide the designer. After describing the model, we report research into the usability and quality of draft versions of this model. Participants in both a small usability pilot and an expert appraisal survey rated and commented on the model. We conclude that the overall quality of the model was perceived as sufficient, although experts recommended major revisions before the model could actually be used in daily practice.

Keywords: feedback; blended learning; instructional design model

Feedback in Blended Learning

Distance education and lifelong learning call for individualised support to large and heterogeneous groups of learners. In such large, up-scaled learning environments, direct teacher-student interaction is often not considered an economically feasible option. Furthermore, lifelong learners at various stages of their lives, coming from various contexts and having different backgrounds, will show more variation in learning history and learning profile (needs and preferences), and therefore will need more customized support than more traditional cohorts of students. Feedback can be considered as an important, if not the most important, support mechanism in a variety of educational contexts. It consists stimulating or corrective information about tasks students are performing (Mory, 2003). In more traditional education, feedback is often handled by teachers that provide students with tailor-made information in direct face-to-face interaction. When relatively large numbers of students need to be serviced by relatively few teachers, individualised support comes under pressure because of 'bandwidth' problems (i.e., constraints to the intensity of tutoring or available tutoring time per student; see Wiley & Edwards, 2003), its labour-intensive character and related costs. But also when the amounts of students remain low, we have to carefully consider which alternatives for providing individualised feedback would be most suitable given the specific educational context (Nelson, 1999).

Although extensive research has been carried out into feedback's role in education, yielding many theoretical models (Butler & Winne, 1995), procedures and guidelines for actually designing and implementing feedback in educational practice have remained scarce so far. This study intends to decrease the current lack by providing teachers of distance or blended learning courses with an instructional design model for feedback (6P/ FB-model) describing procedures and guidelines on how to best provide feedback to their students in a variety of educational contexts.

Feedback

The concept of feedback in learning actually is an 'umbrella concept' that entails several meanings beyond the narrow meaning of feeding back information after task completion. Pellone (1991) argues that students should not only be told whether they have given the right answer (feedback), but also be stimulated for providing a correct answer (positive reinforcement), or prompted when they need more information when thinking about correct answers (cueing). Nowadays, both concrete, more product-oriented information after task execution (feedback) and abstract, process-oriented information before or during task execution (feedforward, feedthrough) are considered necessary for schema-based learning at every step of solving (complex) problems (Van Merriënboer, 1997). Note that this article (and the model it describes) broadly defines the concept of feedback to denominate both feedforward, feedthrough and feedback (as in its original, more narrow meaning).

For many centuries feedback has been considered to control and influence learning (Mory, 2003). Feedback always had the intention to steer the learning process based on a diagnosis of actual progress, and was considered to be a specific type of support on the level of concrete assignments or tasks. Feedback about progress on tasks can be expressed simply as either 'right or wrong,' but will more often also contain an evaluation on multiple facets, that might even be contradictory. Complex tasks may have not just one but several valid solutions, which will depend on the weights assigned to various (contradictory or competing) factors under considerations (i.e., economic criteria may outweigh environmental criteria when trying to find a good solution for the hole in the ozone layer).

Instructional guidelines on more process-oriented types of feedback appear to be scarce. Effects of feedback have primarily been studied in contrived experimental learning situations in the form of outcome feedback provided after a learner responds to relatively simple and self-contained tasks with simple solutions (Mory, 2003). Results from these studies cannot be used in constructivist learning based on complex, problem solving tasks containing many possible solutions. Feedback should then take the form of cueing or task-valid cognitive feedback that facilitate schema-based learning (Balzer, Doherty, & O'Connor, 1989; Narciss, 1999; Whitehall & MacDonald, 1993). Such process-oriented formats (feedforward, feedthrough) pay attention to the problem-solving process by providing general strategies and heuristics, enabling learners to construct or adapt schemata (Chi et al., 2001) and deduce a specific solution. For instance, Process Worksheets may contain a layout with keywords or driving questions (Land, 2000) reflecting a strategic approach. An exemplary type of a Process Worksheet could be a quality control checklist to be used during assignment preparation, containing various evaluation criteria (e.g., criteria for teaching law students to prepare and hold an effective plea in court). Some studies (Ley & Young, 2001; Mevarech & Kramarski, 2003; Hummel, Paas & Koper, 2004) have demonstrated positive effects of combining evaluation criteria in a Process Worksheet during assignment preparation, with later providing assignment evaluations in a Worked Example based on the same criteria (Renkl, 2002; Atkinson et al., 2000).

Blended learning

Embedding prefabricated feedback, based on prior learner experience and problems most often encountered, in learning materials is one way to offload teacher efforts. Such 'common denominators' will not suffice however, when learners encounter more specific problems – e.g., when solving complex problems. Combining face-to-face with support through online (virtual) learning environments offers new possibilities for 'blended learning' (Hannafin, Land, & Oliver, 1999; Jonassen, 1999; Van Eijl et al., 2004). Concrete implementations of feedback need to be tailored to specific requirements for each 'blend' (such requirements will be treated when we describe our feedback model).

Roles, procedures and guidelines for designing feedback in more traditional education (e.g., a combination of written learning material with teacher-based instruction) or in interactive computer programs meant for self-study, now need to be reconsidered for new technologies, as well as for new approaches to learning and for the shifts in feedback's roles that we have introduced above (from product- to process-oriented information, and from supporting single to multiple solutions). This study aims to describe such roles, procedures and guidelines in a comprehensive design model for feedback in various educational context or 'blend of learning' (combining face-to-face and online learning in various proportions), and to examine the feasibility and usability of such an approach in practice.

Using new technologies offers new possibilities to cater for individual learner needs. For instance, learners now can receive personalised and timed feedback whenever they demand (Sales & Williams, 1988). Besides new technologies, new theories about learning demand a reconsideration of feedback's role. For instance, within competence-based education the emphasis on corrective feedback on learning products will shift towards an emphasis on cognitive feedback on learning processes (Balzer, Doherty, & O'Connor, 1989). Feedback research over the last decades (for a review see Mory, 2003) has delivered many models, some of which (Butler & Winne, 1995; Harasim et al., 1995) stress feedback's role in fostering self-regulation. How we should implement such models in concrete (blended learning) courses largely remains unresolved, however.

Feedback Model: Introduction

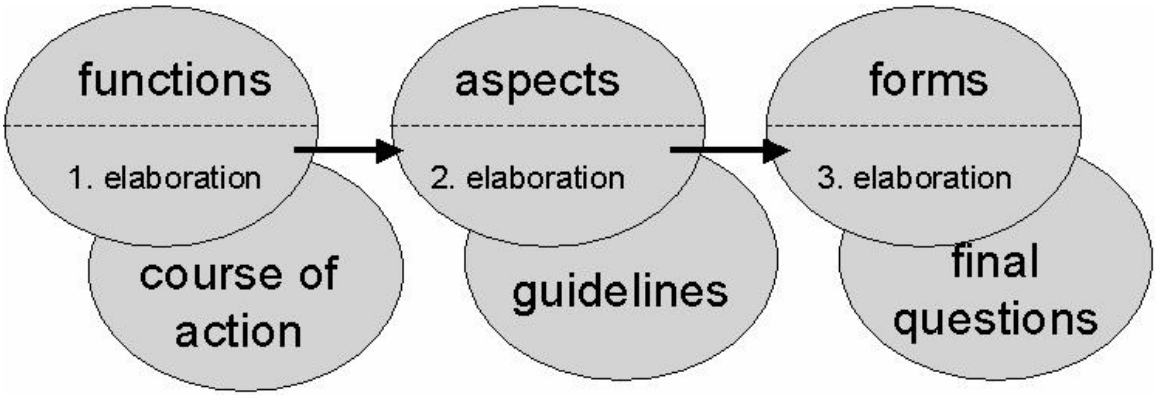
We aim for a feedback model that provides a usable, stepwise procedure containing concrete questions and guidelines to support the design of concrete feedback in blended learning courses. The next, third section of this article will describe the six steps of the model. The fourth section (methods) will describe two rounds of validation and testing we carried out with draft versions of the model: a pilot test where teachers were asked to apply and comment on the usability of the model, and an expert appraisal where experts were asked to comment on the usability and quality of the model. After presenting the results from both validations, we conclude this article with some recommendations for improvement and future research.

6P/ FB-model

Our six-phase model for designing feedback in blended learning (6P/ FB-model) provides a procedure or 'design scheme' for selecting adequate content and forms of feedback in blended learning courses. It is structured around six phases (or steps), that aim to support:

1. Definition of concrete functions of feedback
2. Determination of a desirable course of action when providing feedback
3. Consideration of various situational aspects that need to be considered
4. Application of important principles and practical guidelines
5. Selection of possible forms and organisation of feedback
6. Answering of some of the leading questions involved.

Figure 1. Six-phased feedback model (6P/ FB) for designing feedback in blended learning



Designing feedback also is a very complex, problem solving task containing many possible solutions. Therefore, information on procedures and guidelines when designing feedback should take the form of process-oriented cueing (or task-valid cognitive feedback) to facilitate such design schema-based tasks. Each phase of the 6P/ FB-model provides general strategies and heuristics, mainly in the form of leading questions (Table 1 contains the main leading questions for each phase), to be answered, and criteria, to be addressed for specific situations. Such questions and criteria will enable users to deduce a specific solution for their situation. Each step of the model contains various examples to illustrate possible answers to questions, and the model also contains an integrated Worked Example of feedback designed according to the procedure of the model. A phased approach implies that we feel certain elements of the design can only be made once others have been decided upon. In practice this will neither mean a strict sequence nor will it suffice to follow the steps just once. The design process may need many iterations, where phases will build on each other but might also be taken in parallel.

Underlying Theories

Based on our institute's experiences in designing feedback for learning materials in both distance and regular education, a theoretically rather eclectic model emerged. Some of the phases (Phase 1, 2 and 4) stress feedback's role as a controlling mechanism, considering the learner as a system to be steered externally. Such ideas strongly lean on system theory (Newell & Simon, 1972; Kramer & Smit, 1987; Roossink, 1990), applied to an educational context. Mechanisms like measurement, diagnosis and intervention are conceived to take place to control the (learning) system.

While this – rather objectivist – approach stresses the importance of monitoring and error correction in direct interaction between learners and teachers, we also included other situational elements to broaden this scope. Such elements can be found in Phases 3, 5 and 6 of the model. For instance, Phase 3 stresses the importance of considering – more constructivist – process-oriented and adaptable forms of feedback (Land, 2001; Sales & Williams, 1988), and other media for the mediation of feedback, like CSCL (Dillenbourg, 1996), peer-feedback (Prins, Sluijsmans, & Kirschner, *in press*; Sluijsmans, 2002; Topping, 1998) or by internal steering or self-regulation (Harasim et al., 1995; Butler & Winne, 1995). New approaches to learning stress that learners can to a large extent make the measurement and diagnosis, monitor and steer their learning progress themselves (i.e., internally), with the proviso that adequate process-oriented feedback is available.

Table 1. Main questions of the six-phase feedbackmodel (6P/ FB-model)

Phase	Main questions
1. define functions	- What's available, quality, efficiency... of current feedback? - What are the functions feedback has to fulfil? Which are the conditions / constraints within your organisation? - What type of learning processes are in order?
2. determine course of action	- What type of content and actions are in order? - What type of performances are in order? - Which assessment criteria apply? - What type of diagnosis could be made? - Which interventions can be taken? - Which type of feedback will be possible?
3. consider various aspects	- Which situational aspects play a role? -Specific versus uniform feedback -Allocation of feedback -Number of students -Timing of feedback -Orientation of feedback -Information density of feedback -Use and availability of technology - Which aspects are of most importance?
4. apply principles and guidelines	- How do I apply general principles to elaborate feedback? - How do I apply practical guidelines to elaborate feedback?
5. decide on form and organisation	- Which forms of feedback will be most suitable (including an elaboration of the organisation)?
6. final questions	- Can feedback be designed in advance? - Is personal contact really needed? - Does contact have to be synchronous? - Does contact have to be face-to-face? - Does students need contact with teachers?

Feedback Model: Short description of phases

The actual documentation describing the 6P/ FB-model covers over 50 pages, and includes various figures, tables and examples to illustrate the procedure and leading questions on a

practical level. Within this article we will have to limit ourselves to a short description of each of the phases, and can barely scratch the surface of the questions involved.

Phase 1: Define functions of feedback

This first phase stresses the distinction between functions and means. Important functions of feedback are: orientation (on task); controlling / stimulating the problem solving process (measuring); determining (most important) errors made during problem solving; determining the causes of errors; providing criteria; and providing adequate interventions (e.g., prompts or hints, corrective feedback / error messages, cognitive feedback). To establish the function 'determining the cause of an error,' various means can be used, like consultation over telephone (students can discuss their tasks with teachers), an interactive learning programme containing embedded feedback, or an electronic learning environment (students can share and discuss their tasks with peers, with teachers only responding when needed).

Phase 2: Determine course of action when providing feedback

For effective steering to occur, a specific course of action needs to be followed when providing feedback: measurement (get information from the system); diagnosis (comparing this information to certain criteria or norms); selecting and providing adequate interventions (e.g., cognitive feedback to improve the process). This phase relates feedback functions (from Phase 1) to the required course of action for providing feedback. It also stresses that possible approaches of learners, type of content and actions need to be determined first in order to draw up a scheme of possible errors and adequate feedback to address them. It would go beyond the scope of this article to treat the various controlling mechanisms entailed in system theory (Newell & Simon, 1972; Kramer & Smit, 1987; Roossink, 1990).

Phase 3: Consider various situational aspects

Besides the type of learning processes (e.g., memorising simple facts and figures versus acquiring complex problem solving skills), various situational aspects will further determine most adequate feedback:

- ***Uniformity –*** An important group of aspects relate to the extent to which feedback can be provided in a uniform fashion to all students. Can feedback be designed in advance, embedded in the learning materials, providing more or less automated support? Should each student receive more or less tailored feedback, and be able to exercise influence on the appearance of the feedback? When tasks are relatively simple, feedback can mostly be designed in advance in a uniform fashion.

- ***Allocation –*** Feedback should be provided either by persons (in various roles, like teacher or peer) or by computers, depending on the availability and efficiency of such resources. Feedback could be provided on demand of the learner (e.g., through a newsgroup in the LMS), or when the course provider sees fit (e.g., by adding information to a FAQ in the LMS). When a group of students are facing similar problems, (uniform) feedback can be provided through an LMS with peer-feedback. Where individual differences exist, personalised feedback will be required.

- ***Numbers –*** Evidently, the amount of students enrolled in a specific course may limit the available time for personally provided feedback; alternatives for providing feedback more efficiently will then have to be conceived. When possible, students should work together, supported by peers or LMS (Prins, Sluijsmans, & Kirschner, *in press*; Sluijsmans, 2002; Topping, 1998).

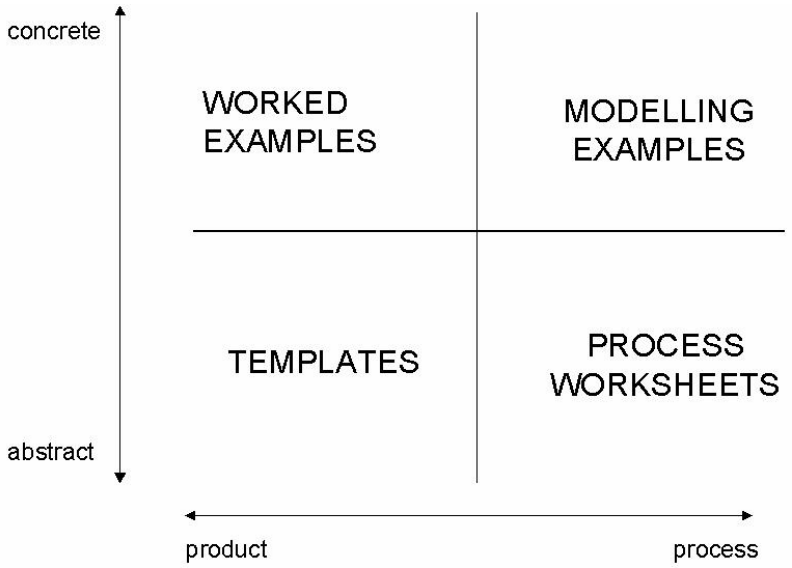
- ***Timing –*** Sometimes learners might not just want to control the appearance of feedback, but also the moment of its delivery. Will feedback be provided at fixed moments or when the learners demand it (just-in-time)? For instance, procedural information about general problem solving strategies should best be offered just-in-time, while more specific information can best be offered in advance (Kay, 2001; Kester, 2003).

- ***Orientation –*** We already mentioned that the role of feedback has shifted from product-oriented corrective feedback towards process-oriented cognitive feedback. When feedback also contains information about the problem solving processes (and the various factors involved to reach an adequate solution), then automatically the information density will increase. Higher order learning mostly requires process-oriented feedback.

- ***Information Density –*** Related to the previous aspect, feedback can be rich or poor in information, going from simply 'true or false' to elaborate information. When solving complex problems, learners will require both abstract and concrete, and both product-oriented and process-oriented types of feedback. Table 2 presents some basic formats of cognitive feedback mapped on these dimensions (Hummel & Nadolski, 2002). Worked Examples can be offered when students need to apply this feedback on similar problems; Process Worksheets can be offered when students need to apply feedback to different problems.

- ***Technology –*** We have to consider the availability and added value of various new learning technologies to realise the required functions of feedback.

Figure 2. Four basic formats for cognitive feedback



Phase 4: Apply important principles and practical guidelines

A number of feedback principles was derived from system theory: diagnosis should be process-based; feedback should contain information about both procedures and content; diagnosis should include both actual and prior performance; diagnosis should be of sufficient quality (reliable, valid, representative); criteria should be measurable; feedback should be aimed at both correction and stimulation of learning processes; feedback should foster a maximum amount of independence and self-guidance of students. Besides such general principles, a list of practical guidelines for concrete elaboration of feedback content was provided. Feedback should be based on concrete performance (and not on judgments of behavior); not be too abstract or concrete; be formulated in a positive and stimulating fashion; be both positive and negative; be explicit (and not ambiguous); etc. (e.g., Dirkx & Koopmans, 2000).

Phase 5: Decide on possible forms and organisation of feedback

After determining the functions, course of action and various situational aspects that need to be addressed, this step focuses on the actual form and organisation of adequate feedback. How can we achieve that the delivery of feedback will suit the needs of students? Where will they have access to this feedback? Which persons or facilities will be responsible for providing and maintaining such feedback? In a 'function-means matrix' the most important functions (based on the analysis in Steps 1 and 2) will now be matched to concrete forms (based on the analysis in Steps 3 and 4). For each function there may still be more forms of realisation. Our model contains a preliminary list of such forms.

Phase 6: Answer some final, leading questions

As a final check on the feedback forms that have now been selected and designed, a number of final questions has to be considered (preliminary decisions already made in Phase 3):

- ***Can feedback be designed in advance?*** (also related to the aspects of 'uniformity' and 'information density')
- ***Is personal contact needed?*** (related to the aspects of 'allocation' and 'technology')
- ***Does contact have to be synchronous?*** (related to the aspect of 'timing')
- ***Does contact have to be face-to-face?*** (also related to the aspects of 'allocation' and 'technology')
- ***Do students need contact with teachers?***

Feedback can be made less labour-intensive by using a LMS to monitor progress on assignments, and by using peer-feedback to offload teachers and tutors, or by using automated support to handle most familiar problems. Still, teachers are expected to remain important providers of feedback, especially when diagnosis of highly specialised or complex problem solving behaviour can not be catered for by computers.

Methods

Preliminary test results about the usability and quality of the first two versions of the 6P/ FB-model were collected on two occasions. A Beta-release was tested during a small pilot test, during which a small group of teachers applied the model. A pre-release version was surveyed by means of a questionnaire that experts used to rate the usability and quality of the model. We will present some simple descriptive statistics to indicate the appreciation of the model. Additionally for the survey, we carried out an analysis of variance to check for possible differences in appreciation across various types of higher education institutions. Some qualitative analysis was carried out on the comments made by participants.

Participants in pilot test

Two teachers from each of the two Dutch universities (Open University and University of Twente) that developed the model (n = 4) participated in a first pilot. They were asked to apply the model on their courses in Active Learning and Applied Communications respectively, representing various "blends" of both distance (self-guided study in combination with a LMS) and regular education courses (a combination of classes, practicals, and working groups).

Materials for pilot test

Teachers used the Beta-release of the model. A questionnaire with 20 items was used to rate the quality and usability of each of the phases and the overall model (see the results section for an overview of the items). The questionnaire contained 15 closed questions, that had to be scored on five-point Likert-type scales, and five open questions for providing some background information and general comments.

Procedure for pilot test

Teachers were sent the document containing the Beta-release of the model via email about two weeks before the date of the pilot. They were asked to study the model and record all questions and comments they had about the model, and to select a representative portion of theory still requiring adequate feedback. The pilot sessions with each teacher were led by one of the model developers and lasted about two hours each. At the start of the session participants filled in the questionnaire. Then the session leader tried to clarify questions. Participants were asked to apply the model on the selected portion of their own course, allowing them to work for about a quarter of an hour on each phase. Results for each step had to be recorded on paper. Actions were observed, questions and utterances about unclarities were recorded by the session leaders. At the end of the session, participants were asked to again fill in the questionnaire, in order to collect changes in appreciation of the model by actually using it.

Participants in expert appraisal

We tried to make a representative sample of experts from the field of higher education by including staff members from both universities (18 members, divided over four universities), polytechnics (16 members, divided over six institutions), and educational research bureaus (six members, divided over five institutions); 14 experts were female and 26 were male. Complete questionnaires were received back from 22 experts (a response rate of 55%), of which eight were

female and 14 were male, equally divided over the (types of) institutions (*n* = 9, 10, and 3 respectively).

Materials for expert appraisal

Experts used a pre-release of the model, in which comments from the pilot had been addressed where possible. The same questionnaire with 20 items was used to rate the quality and usability of each of the phases and the overall model (see the results section for the titles of the items).

Procedure for expert appraisal

Derived from authors' personal contact lists we approached 40 national experts in the educational field, that had lead projects dealing with issues around feedback (in blended learning), by email, informing them of the aims and intended planning of the survey as well as the expected amount of time they would have to award it (about two hours). About two weeks later they received the material and were allowed two more weeks to study it and return the filled-in questionnaire. After sending one reminder by email, eventually 22 complete questionnaires could be processed.

Results

Pilot test

Table 2 contains an overview of the average scores before and after the pilot sessions. Because we are dealing with a very small sample of participants, these results can only be taken as a first impression. All closed questions (3-17) had to be scored on a Likert-type scale ranging from 1 [*very unclear*] to 5 [*very clear*], with the exception of questions 15 and 16 that had to be scored from 1 [*very low*] to 5 [*very high*], and question 17 that had to be scored from 1 [*strongly disagree*] to 5 [*strongly agree*] (see Table 2 below).

Qualitative analysis showed that the Beta-release still contained many conceptual unclarities (e.g., about subsuming feedforward and feedthrough under the overall concept of feedback) and some inconsistencies in the procedure (e.g., about relations between phases). In general, more theoretical parts of the model (e.g., about system theory, 4C/ ID-model, in Phases 1 and 2) were considered to be too abstract and in need of more practical illustrations. Participants expressed mixed opinions about the usability and quality of the model in the current version, with an average overall appreciation before and after the pilot ranging from M = 3.0 to M = 3.5 (before), and from M = 2.2 to M = 3.8 (after), respectively. OUNL-teachers (distance education) on average were less positive after the pilot, while UT-teachers (regular education) had become more positive after applying the model.

Table 2. Scores on closed items questionnaire (before and after pilot test sessions) (n = 4)

	Questionnaire items	Scores before and after pilot sessions (n = 4)			
		Before		After	
		M	*SD*	*M*	*SD*
	Phase 1 Functions of feedback				
3	The aim of this section was clear to me (quality)	3.5	1.0	3.0	1.2
4	The description of this section was clear to me (usability)	2.8	0.5	3.3	1.0
	Phase 2 Desirable course of action				
5	The aim of this section was clear to me (quality)	3.0	0.8	3.0	1.2
6	The description of this section was clear to me (usability)	2.3	0.5	2.5	0.6
	Phase 3 Circumstantial aspects feedback				
7	The aim of this section was clear to me (quality)	3.0	0.8	3.0	1.2
8	The description of this section was clear to me (usability)	3.5	1.0	2.8	1.5
	Phase 4 Principles and guidelines				
9	The aim of this section was clear to me (quality)	2.8	0.5	3.5	1.0
10	The description of this section was clear to me (usability)	3.0	0.8	3.3	1.0
	Phase 5 Feedback forms and organisation				
11	The aim of this section was clear to me (quality)	3.5	1.0	3.0	1.0
12	The description of this section was clear to me (usability)	3.5	1.0	3.3	1.2
	Phase 6 Final questions				
13	The aim of this section was clear to me (quality)	3.8	1.3	2.8	1.5
14	The description of this section was clear to me (usability)	3.8	1.3	3.0	1.2
	In general				
15	In general, I think that the usability of this model is …	3.5	1.0	3.0	1.2
16	In general, I think that the quality of this model is ….	3.5	0.5	3.3	1.2
17	I will advise my colleagues to use this model.	3.0	1.4	2.8	1.5

Expert appraisal

Table 3 contains an overview of the average scores that experts awarded to the items of the questionnaire.

Table 3. Scores on closed items questionnaire by expert appraisal (n = 22)

	Questionnaire items	Expert rating (n = 22)	
		M	*SD*
	Phase 1 Functions of feedback		
3	The aim of this section was clear to me (quality)	3.7	0.6
4	The description of this section was clear to me (usability)	3.1	0.8
	Phase 2 Desirable course of action		
5	The aim of this section was clear to me (quality)	3.2	0.7
6	The description of this section was clear to me (usability)	2.7	0.9
	Phase 3 Circumstantial aspects feedback		
7	The aim of this section was clear to me (quality)	3.7	0.7
8	The description of this section was clear to me (usability)	3.5	0.7
	Phase 4 Principles and guidelines		
9	The aim of this section was clear to me (quality)	3.6	1.0
10	The description of this section was clear to me (usability)	3.4	0.9
	Phase 5 Feedback forms and organisation		
11	The aim of this section was clear to me (quality)	3.3	0.9
12	The description of this section was clear to me (usability)	3.3	0.8
	Phase 6 Final questions		
13	The aim of this section was clear to me (quality)	3.8	1.0
14	The description of this section was clear to me (usability)	3.3	0.8
	In general		
15	In general, I think that the usability of this model is ...	3.2	0.8
16	In general, I think that the quality of this model is	3.5	0.5
17	I will advise my colleagues to use this model.	2.6	0.7

Again, because we are dealing with a relatively small portion of participants here, these preliminary results can only be taken as a second impression. This pre-release version of the model was awarded an average overall appreciation of M = 3.26; SD = .49, which is (only) slightly higher than the appreciation of the Beta-release. The overall appreciation on these fifteen items by the 22 participants showed an individual range of averages between M = 1.9 and M = 4.4. Only three participants, however, were awarded an overall score less than 3.0 points (which could be interpreted as 'insufficient'), with averages of 1.9, 2.1, and 2.9, respectively. Especially items 6 (description of Phase 2) and item 17 (recommending the model to colleagues) remain problematic.

When controlling for a possible effect of type of institution (polytechnic, university, or educational research bureau) on the appreciation of the model, we found no differences on the average scores on (general) items 15, 16, and 17. We did find a difference approaching significance for average scores (3.9, 3.1, and 3.1, respectively) on the (perceived) quality of the model ($F(2, 19) = 2.91$, $MSE = 8.11$, $p = .088$).

Qualitative analysis of the comments provided by clustering leads to following list of improvements: clarifying how the model addresses all levels of learning goals; elaborating the description of concrete forms of feedback; making the description more compact, by using more summations and schemes; further limit theoretical contributions in the text; further clarify what should be the 'products' for each of the Phases; give more attention to the contribution of peer-feedback; some final restructuring and proof reading.

Conclusions and Recommendations

We found mixed appreciations of the Beta-release of the model during a small pilot test. Such differences will largely be explained by error due too the very small numbers and selection of specific participants. A difference in appreciation of the usability between teachers from a distance and a regular institution, however, could also be partly explained from differences in educational model. Differences in appreciation before and after the pilot test might also be partly explained from the role the session leaders played in explaining the model, which might have (further) increased or decreased the appreciation of the model. It can therefore be considered necessary to further examine the extent to which the 6P/ FB-model can be used independently, or whether users will need additional training or support by more experienced designers of feedback.

A more extensive survey by means of an expert appraisal revealed that the overall quality and usability of the model were scored as sufficient. The model was valued to offer a comprehensive and valuable approach to the problem. Experts also found, however, that they could not yet recommend the model in its present form. Experts especially criticised the current presentation and advised us to make a more compact and practical version to be used by teachers in the future.

We feel that the main challenge in improving future versions of the model will be to make the procedures more accessible and applicable. Layering the information, providing easy-to-use templates, more elaborate matrices of functions and forms of feedback, using the model in combination with trainers that provide personal support might all contribute to solving this issue, and therefore need to be further explored.

Projects that will build on this explorative study should at least include more extensive pilot testing, including other domains and institutions, allowing users to further comment on the usability of the model. Further training of teachers in designing feedback is considered a

necessity by our group of experts. Some of them have proposed to organise workshops or training programs around the topic of designing adequate feedback for blended learning, using the model as part of the training.

Acknowledgement

This study was carried out in the context of an explorative project funded by the Digital University consortium, a group of universities and polytechnics working on the innovation of Higher Education in the Netherlands and Flanders (5087 Feedback as an instrument to support blended learning: development of a model). Authors would like to thank participants in the usability pilot and the expert appraisal.

References

Atkinson, R. K., Derry, S. J., Renkl, A., & Wortham, D. (2000). Learning from Examples: Instructional principles from the worked examples research. *Review of Educational Research, 70*(2), 181-214.

Balzer, W. K., Doherty, M. E., & O'Connor, R. (1989). Effects of cognitive feedback on performance. *Psychological Bulletin, 106*, 410-433.

Butler, D. L., & Winne, P. H. (1995). Feedback as Self-Regulated Learning: A theoretical synthesis. *Review of Educational Research, 65*, 245-281.

Chi, M. T. H., Siler, S. A., Jeong, H., Yamauchi, T., & Hausman, R. G. (2001). Learning from human tutoring. *Cognitive Science, 25*, 471-533.

Dillenbourg, P. (1996). The evolution of research on collaborative learning. In E. Spadea & P. Reimann (Eds.) *Learning in Humans and Machines: Towards an interdisciplinary learning science* (pp. 189-211). Oxford: Pergamon.

Dirkx, C., & Koopmans, M. (2000). *Feedback: Commentaar geven en ontvangen* [Feedback: giving and taking comments]. Thema: Zaltbommel, The Netherlands.

Hannafin, M., Land, S., & Oliver, K. (1999). Open Learning Environments: Foundations, Methods, and Models. In C. M. Reigeluth (Ed.) *Instructional-Design Theories and Models: A new Paradigm of Instructional Theory,* Volume II (pp. 115-140). Mahwah, NJ.: Lawrence Erlbaum.

Harasim, L., Hiltz, S., Teles, L., & Turoff, M. (1995). *Learning Networks: A field guide to teaching and learning online.* Cambridge: MIT Press.

Hummel, H. G. K., & Nadolski, R. J. (2002). Cueing for Schema Construction: Designing problem-solving multimedia practicals. *Contemporary Educational Psychology, 27*(2), 229-249.

Hummel, H. G. K., Paas, F., & Koper, E. J. R. (2004). Cueing for Transfer in Multimedia Programmes: Process-worksheets versus Worked-out examples. *Journal of Computer Assisted Learning, 20*(5), 387-397.

Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.) *Instructional-Design Theories and Models: A new paradigm of instructional theory,* Volume II (pp. 215-239). Mahwah, NJ.: Lawrence Erlbaum.

Kay, J. (2001). Learner control. *User Modeling and User-Adapted Instruction, 11*, 111-127.

Kester, L. (2003). *Timing of information presentation and the acquisition of complex skills.* Unpublished doctoral thesis. Heerlen, The Netherlands: Open University of the Netherlands.

Kramer, N. J. T. A., & de Smit, J. (1987). *System thinking.* Stenfert Kroese: Leiden, The Netherlands.

Land, S. M. (2000). Cognitive requirements for learning with open-ended learning environments. *Educational Technology Research and Development, 48*, 61-78.

Ley, K., & Young, D. B. (2001). Instructional principles for self-regulation. *Educational Technology Research and Development, 49*(2), 93-103.

Mevarech, Z. R., & Kramarski, B. (2003). The effects of metacognitive training versus worked-out examples on students' mathematical reasoning. *British Journal of Educational Psychology, 73*, 449-471.

Mory, E. H. (2003). Feedback research. In D. H. Jonassen (Ed.) *Handbook of research for educational communications and technology* (pp. 745-783). New York: MacMillan Library Reference.

Narciss, S. (1999). *Individual differences in learning and motivation with informative feedback.* Paper presented at the EARLI conference, August 1999, Göteborg.

Nelson, L. M. (1999). Collaborative problem solving. In C. M. Reigeluth (Ed.) *Instructional Design Theories and Models: A new paradigm of instructional theory* (pp. 241-267). Hillsdale, NJ.: Lawrence Erlbaum.

Newell, A., & Simon, H. A. (1972). *Human problem solving.* Englewood Cliffs, NJ.: Prentiss Hall.

Pellone, G. (1991). Learning theories and computers in TAFE education. *Australian Journal of Educational Technology, 7*(1), 39-47.

Prins, F. J., Sluijsmans, D. M. A., & Kirschner, P. A. (*in press*). Feedback for General Practitioners in Training: Quality, styles and preferences. *Advances in Health Sciences Education.*

Renkl, A. (2002). Worked-Out Examples: Instructional explanations support learning by self-explanations. *Learning and Instruction, 12*, 529-556.

Roossink, H. J. (1990). *Terugkoppelen in het natuurwetenschappelijk onderwijs: een model voor de docent* [Feedback in Science Education: A model for teachers]. Unpublished doctoral thesis. University of Twente, The Netherlands.

Sales, G. C., & Williams, M. D. (1988). The effects of adaptive control of feedback in computer-based instruction. *Journal of Research on Computing in Education*, 97-111.

Sluijsmans, D. (2002). *Student Involvement in Assessment: The training of peer assessment skills.* Unpublished doctoral thesis. Open University: The Netherlands.

Topping, K. (1998). Peer-assessment between students in colleges and universities. *Review of Educational Research, 68,* 249-276.

Van Eijl, P. J., Wils, S. A. M., Supheert, R., Kager, R., Bruins, W., & Admiraal, W. A. (2004). *Peer Feedback en 'blended learning' voor schrijfonderwijs bij Engels: effectief maar ook voldoende?* [Peer Feedback and 'Blended Learning' of English Writing: Effective, but also sufficient?] Paper presented at the Onderwijs Research Dagen 2004: Utrecht, The Netherlands.

Van Merriënboer, J. J. G. (1997). *Training complex cognitive skills.* Englewood Cliffs, NJ.: Educational Technology Publications.

Wiley, D. A., & Edwards, E. K. (2003). *Online Self-Organizing Social Systems: The decentralized future of online learning.* Retrieved March 12, 2004, from: http://wiley.ed.usu.edu/docs/ososs.pdf

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Partner Power: A study of two distance education consortia

Anne Banks Pidduck and **Tom Carey**
University of Waterloo, Canada

Abstract

This research reports findings from a study which explored the process and criteria of partner selection – how and why partners are chosen – for two distance education consortia. The researchers reviewed recent literature on partnerships and partner selection. Two Canada-wide distance education consortia were identified as large-scale case studies for investigation of the research theory. A total of 34 informants were contacted. Written business plans, contracts, documents, partner network diagrams, and 231 archival emails from 36 correspondents were collected and analyzed for the two consortia. The research identified four criteria that influence why specific partners are chosen: requirements, resource availability, social network, and reputation. These findings suggest that the formation of partnerships and the process of partner selection are both very complex.

Keywords: distance education; higher education; e-learning; online learning

Partner Selection Issues in Distance Education Consortia

Alliances, collaborations, and consortia are becoming ubiquitous in today's competitive environment (Doz & Hamel, 1998; Barringer & Harrison, 2000; Das & Teng, 2000). Partner selection is of significant importance in the success of these collaborative interorganizational relationships (Beamish, 1987). The current problem is not whether to partner, but to decide among a variety of collaborators (Beamish, 1987; Angeles & Nath, 2000; Dussauge, Garrette, & Mitchell, 2000). How do organizations find and choose among a number of potential partners? How do organizations choose the best partner for a particular situation? "You don't want to be left standing alone, but you also want to secure the best partners you can and avoid being pulled down by someone else's poor partnering" (Kanter, 2001, p. 138).

Our domain of interest is the field of education, in particular distance education in Canadian universities. This research investigated alliances and consortia among distance education providers. There is an abundance of educational literature on collaborations and partnerships, but the majority is personal learning and mentoring relationships. Some of this literature has been explored for factors that may be extended to the organizational relationships of interest in this study.

The overall objective of this research was to understand the partner selection process in two Canadian distance education consortia. This work explored partner selection through interviews,

written artifacts, contracts, email, and other data. Through this exploration, discovered was the cyclic processes of deal-making, organizational approval, and partner negotiation. This research also identified critical influences that may have contributed to partner selection such as reputation and social network.

The first two sections of this paper provide background on the issues around which the case studies were focused and the methods which were employed. The overview of issues in the next section examines recent work in interorganizational relationships and partner selection from the broader management science literature, with subsequent examination of issues specific to consortia in distance education. The section on research design and methodology includes a discussion of qualitative design and case study research, as well as the specific process followed with the distance education consortia of this study. The two case study sections provide a high-level view of data from Consortium 1 and 2. Analysis of Results discusses the results from both consortia and suggestions for future research. The Conclusions section provides a summary of the insights from this research study and some of their implications for distance education.

Issues in Interorganizational Relationships and Partner Selection

Interorganizational relationships help organizations create value by combining resources, sharing knowledge, increasing speed to market, and gaining access to foreign markets (Yan & Gray, 1994; Doz & Hamel, 1998; Dussauge, Garrette, & Mitchell, 2000) Since 1987, the number of strategic alliances worldwide has grown by 25 percent annually (Bleeke & Ernst, 1995; Harbison & Pekar, 1998). Business alliances for cooperative or competitive advantage have become ubiquitous over the past 10 years (Davidow & Malone, 1992; Landay, 1996; Barringer & Harrison, 2000). Firms are purchasing in bulk from each other, manufacturing cooperatively (Chen & Ross, 2000), servicing each other's customers, and so on in reciprocal agreements that are meant to increase revenue and profit for both partners.

Alliances have limited lifespans (Ajami & Khambata, 1991). The median lifespan of alliances is about seven years, failure rate is high, and seven out of 10 joint ventures fall short of expectations and thus disband (Kanter, 1994; Bleeke & Ernst, 1995). In spite of the disadvantages ". . . factors such as dependence on external resources or pressure for legitimacy can lead organizations into difficult alliances . . ." (Barringer & Harrison, 2000, p. 369). Alliances between competitors require a fair balance of skills, market access, and capital between the companies (Bleeke & Ernst, 1994).

A number of authors have identified positive reasons for becoming involved with other organizations. The initial advantages are economic – gain access to a particular resource, economies of scale, and risk and cost sharing, particularly in a large venture. Alliances can provide access to foreign markets, can enable corporate learning, and can pool resources for the development of new, better, bigger products and services. Speed to market, structural and regulatory flexibility, lobbying power, and market power for competitive advantage all add to the potential advantages of partnerships. Alliances can be social entities, useful for personal and political motivations. Some alliances form as a result of personal ties between key decision makers. Conversely, some alliances may be avoided because of mistrust or personal differences among firms or decision-makers (Barringer & Harrison, 2000).

Research on Partner Selection

Partner selection literature is limited and focused on the criteria for choosing partners rather than on the process of partner selection. Most articles assume a rational decision-making process based on specific selection criteria. In fact, computers, search engines, and pattern matching are now being used for partner selection. For example, potential collaborators can be found through a software program that compares individual patterns of Web browsing. Access logs are graphed and compared, so that similarities and differences can be discovered. Mechanisms to overcome privacy concerns are noted. Visual designs are used to enable users to explore possible matching interests with other users (Payton, 1999).

Existing partner selection literature assumes a straight-line start-to-finish selection process (Duysters, Kok, & Vaandrager, 1999; Angeles & Nath, 2000; Barringer & Harrison, 2000; Hitt, Dacin, Lavitas, Arregle, & Borza, 2000; Saffu & Mamman, 2000). Depending on the motivation of the alliance as a whole, particular partner characteristics will be more or less valuable. A logical selection criteria is developed, often prioritizing the partner characteristics of interest. Finally, a partner is rationally selected meeting all of the criteria.

Based on the preceding theories, Table 1 identifies a variety of partner selection criteria.

PARTNER SELECTION CRITERIA	SOURCE
Personal contact and previous knowledge of partner	Barringer & Harrison, 2000
Strategic commitment and support	Angeles & Nath, 2000
Flexibility and willingness to adjust to change	Angeles & Nath, 2000
Communications including willingness to talk and make the alliance work	Angeles & Nath 2000
Personal interest in the alliance	Duysters, Kok & Vaandrager, 1999
Financial assets available to put into the partnership	Hitt, Dacin, et al. 2000; Saffu & Mamman 2000
Technical capabilities, people or machines needed for the alliance	Hitt, Dacin, et al., 2000; Saffu & Mamman 2000
Intangible assets; other items of interest	Hitt, Dacin, et al., 2000
Willingness to share expertise and teaching resources	Hitt, Dacin, et al., 2000; Saffu & Mamman 2000
Unique competencies	Hitt, Dacin, et al., 2000
Local market knowledge, access	Hitt, Dacin, et al., 2000; Saffu & Mamman 2000

Table 1. Partner Selection Criteria

Partner Selection Issues in Distance Education

Distance education provides a number of opportunities for partner selection – educational institutions, students, countries, industrial partners, and so on. An e-learning evolution paper in 2001 (Johnston, 2001) promoted a pan-Canadian coordination of e-learning. Our research identified 20 large-scale educational partnerships worldwide, many of which included distance education. Numerous additional alliances are regional within provinces, states or countries and an increasing number of worldwide partnerships are forming. There have been a number of online learning initiatives including the Canlearn database (www.canlearn.ca) and Schoolnet in the United States (www.schoolnet.com). As the business world moves to a global model, the push for global education increases.

While our focus in the case studies is limited to a single country, a number of university consortia were in formation in the same timeframe. For example, Universitas 21, a global alliance, is an international network of 20 leading research-intensive universities in eleven countries, including McGill and University of British Columbia in Canada (www.universitas21.com). Its purpose is to facilitate collaboration and cooperation between the member universities and create entrepreneurial opportunities for them on a scale that none would be able to achieve operating independently or through traditional bilateral alliances. Membership is determined by a Nominations and Membership Committee. This alliance prompted early concerns over the commitment of large sums of money and the licensing of names and logos to an outside organization (Maslen, 2001).

Some research questions of interest were found in (Saltiel, Sgroi, & Brockett, 1998), adapted from (Baldwin & Austin, 1995):

- How do partners find each other and initiate their work?
- What qualities does each partner look for or find in the other? Why is this important? How does it contribute to the dynamic?
- What factors from the particular setting or context affect the success of the partnership?
- How do partnerships change over time?
- What stages do they pass through?

The above questions were related to research on faculty collaboration, using individual researchers as the unit of analysis. The researcher adapted some of these questions to interorganizational relationships, using the organization as the unit of relevance. This research is interested in particular in 'Why do partners choose each other?' and 'What qualities does each partner look for or find in the other?'

The researcher has chosen to not focus on the notions of power, politics, time, and trust in decision-making and in partner selection, other than as they were raised by interviewees and affected the specific decision instances of the research. A detailed discussion of these issues is outside the scope of this work. Power is difficult to identify, measure, and put into practice (Pfeffer, 1992). 'Politics' may be defined as competition between competing interest groups or individuals for power and leadership (Merriam-Webster, 2004). In the context of a consortium, however, politics may mean pressure to join the group if a favour is owed, thereby causing

confusion. Time to make a decision and length of time that the alliance will last are both beyond the scope of this work. Trust is a large enough issue that it has been explored in many other articles, and again is outside the scope of this work. Each of these items could be studied in their own right as potential selection criteria.

Case Study Research Design and Methodology

A qualitative design approach was chosen for this research beginning with a focused literature review to identify key issues. Qualitative research is interdisciplinary, crosscutting the humanities and the social and physical sciences and is well suited to studies in education (Lancy, 1993; Creswell, 1994). Qualitative work allows reality to be subjective with multiple viewpoints, evolving decisions, and emerging design categories identified during the research process (Firestone, 1987; Marshall & Rossman, 1989). Early in the work, three people who had been involved in software development or distance education partnerships or both were informally interviewed. These initial interviewees were known to the researchers and provided valuable insight into how their partner selection had worked. This limited empirical view was compared to the theoretical ideas of the literature and both were used to develop a Partner Negotiation Model (Pidduck, 2006). The work was continued with a multiple case study approach, using two Canadian education consortia as the cases.

The specific partnerships studied were two Canada-wide distance education consortia. Consortium 1 included 13 Canadian universities during the study period and focuses on open and distance teaching and learning. Consortium 2 is comprised of eight Canadian universities with a broader academic research mandate around distance education. Due to different motivations of the partners, Canada ended up with two consortia rather than one.

Case study information was gathered from a number of sources. The most significant resources for Consortium 1 were formal interviews with three Consortium 1 partners, discussions with four university contacts, email interviews, Consortium 1 organizational documents, Consortium 1 webpages, and government request for proposal (RFP) and funding documents. The email interviewees were aware that their information would be used in this research study and were offered final study results. For Consortium 2, the majority of the information came from formal interviews with three Consortium 2 partners, informal discussions with two university contacts, historical emails, Consortium 2 documents, press releases, and webpages. The historical emails provided generic background information and timelines only for this research. The combination of various types of data collected from multiple sources reduced bias and added depth to the final study results (Bogdan & Biklen, 1992; Merriam, 1988).

Informants were purposefully selected for their knowledge of alliances or consortia in the distance education domain. All interviewees were at a director level or higher, generally in a group related to education, teaching, learning, and technology. Some subjects were previously known to the researcher, which added a dimension of informality and potentially additional depth of understanding for the study. The researcher contacted at least one key informant from each partner in Consortia 1 and 2. The purpose was discussed with them so that they had a good idea of the interview focus, which was partner selection within their consortium. For those partners willing to be interviewed, an interview schedule was established to verify the day and time for an interview. Some contacts asked for questions ahead of time and these were provided only if requested. Interviews occurred in a variety of settings: university offices, hotel lobby, hotel bar, park bench on a busy street, and hotel meeting room. Researcher observation notes on the settings

and other descriptive data were also recorded. Some partners who were not available in person provided information by telephone or email and authorized its use for this work.

Consortium 1

Consortium 1 is a partnership of universities across Canada, committed to delivering university-level programs that can be completed from anywhere in the country or beyond. As of June 2006, Consortium 1 had 12 institutional partners from across Canada. The consortium identifies accredited courses, provides access to courses developed by partner universities, provides a clearing house for students wanting to mix and match courses from various universities, facilitates transfer credit, and generally creates sharing efficiencies.

There was a three-stage process of partner selection in Consortium 1. The 'early birds' who were organizing the consortium got in first, set the partnership criteria, and selected the educational areas of interest for themselves. Then the alliance was opened up to other universities who would take the educational areas that had not yet been covered. Finally, when the partnership needed to grow, it was opened to anyone who wanted to join.

Consortium 1 started with discussions of the need for a Canadian Open University. The general feeling was that a distance education consortium was needed to prevent Canadian universities from joining American, European, or Asian consortia. Interest from non-Canadians, as well as other world-wide collaborative efforts, inspired the Canadians to start their own online distance education collaboration. Funding for a potential Canada-wide consortium was pre-arranged in the form of a 'commitment in principle' from provincial and federal governments before Consortium 1 began.

The original discussants were three of Canada's leading distance education specialists. Program offerings from these three organizations made up the core of Consortium 1 at its outset. The organizing committee approached 12 other Canadian universities to become a 'founding member' of Consortium 1. Potential Consortium 1 partners needed strong distance education programs that could be offered nationally and something unique that everyone else did not offer. The focus of Consortium 1 was to be 'program-based' rather than 'distance education course listings' as was already being done with regional consortia.

Consortium 1 Fundamental Principles emphasized the view of what Consortium 1 could be – only complementary programs with openness and flexibility. The open enrolment philosophy meant that many universities with very high and tight enrolment standards might end up with sub-standard students in individual courses if not in entire distance education programs. Two large research-intensive universities told the Consortium 1 organizers that they could not sell Consortium 1 principles in their institutions, because research universities had different pedagogies than open universities. They thought that the idea of a Canada-wide distance education consortium was a good idea, but needed more focus on research. After the organizational meeting, Consortium 1 incorporated with five distance education institutions as founding members and a seat on the board of directors.

Shortly after the formation of Consortium 1, Industry Canada put out a RFP for Campus Canada funding, looking for universities and colleges to work together to provide flexible, seamless, portable learning opportunities for federal employee groups. The government got three responses to the RFP – one from Consortium 1, one from a group of community colleges called the Canadian Virtual College (CVC), and the third one from a group of three Atlantic universities.

The Atlantic universities then joined Consortium 1, so that it would be easier for them to obtain federal funding. Consortium 1 worked with CVC so that all three groups ended up sharing the federal funding.

In year two, Consortium 1 grew to nine partners with the board of directors made up of the president or an appointee from each of the member institutions. There was also one additional provider university, which advertised its distance education offerings with Consortium 1, but did not pay member dues. By year four, there were 13 Consortium 1 partners. Of those, 10 were full members and three were associates. As of year five, there were 250 programs and 2,000 courses being offered through Consortium 1.

There are different degrees of commitment and participation from the various partner institutions, depending on the time, energy and money that they will provide for Consortium 1. Universities who have fewer programs to offer and those who have joined recently are less active. Institutions with only one course or a small number of courses to offer within Consortium 1, are not required to pay full fees. Such institutions are not shareholders in Consortium 1 and do not attend board meetings. The degree of participation within Consortium 1 goes to some institutions by virtue of the people involved who sit on the advisory committee. This supports the idea of the real partner as the 'person,' not the 'institution.'

Consortium 2

Immediately after the Consortium 1 inaugural meeting, three Ontario universities began discussing a different type of distance education consortium with a significantly broader and deeper academic mandate than Consortium 1. The new proposal focused on technology, quality, depth, breadth, research, and active collaboration. Members of Consortium 2 were recognized as research intensive universities with a strong presence in the delivery of Internet-enhanced learning. The three founding members invited additional universities with similar profiles as innovative research institutions to join. A Memorandum of Understanding (MOU) established the intention of member institutions to work collaboratively to enhance high-quality Internet-based programs and to integrate scholarly values and culture into our learning and teaching. Membership was open to other Canadian research universities who can add value and who share our traditions of quality, innovation, accessibility, and outreach. Funding was explicitly mentioned in the MOU. An annual membership fee of CDN $5000 was proposed.

Contacts from two western universities agreed that an academic focus of research into teaching and learning through technology was important as was an interactive approach. Concern was expressed, however, about a clear definition for a 'research university' and the issue of new partner selection – 'how and at what stage' would you invite others if they wished to join? One of the western universities joined and the consortium identified a target to add three more universities by the end of year one, providing a truly national, coast-to-coast collaboration. At this time, two operational thrusts were recognized – Consortium 2 web presence focused on collaborative development of high-quality Internet-enabled programs, and the Consortium 2 Institute focused on integrating scholarly values and culture with longer-term impacts. Two partner selection issues at this time were that federal funding required Canada-wide coverage and that the west coast partners were worried that Ontario may be overly controlling the partnership.

Quebec and Atlantic partners were proactively sought to provide the broad geographical coverage necessary for a truly Canadian consortium. An appropriate Quebec partner was not found, but an

Atlantic partner with strong distance education research experience was added. Four partners were added later from the western provinces, broadening the consortium's geographical reach.

In year three, Consortium 2 was officially announced as a national collaboration of eight major Canadian universities. The universities included four western universities, three Ontario universities, and one Atlantic university. The Consortium 2 also promised its first research project with an online learning environment, as well as co-development of courses among universities. The website also promised a culture of research and scholarship tied to technology-enhanced learning, development of students' capabilities and ongoing development of faculty, culminating in a network of expert faculty members. This indicated a very different focus and agenda from Consortium 1.

Analysis of Results

Partner selection results are provided in varied formats and organized into a number of areas, following mixed research methods. Findings were validated, as suggested by (Creswell, 2003), with multiple cases, rich narrative descriptions, patterns, different sources of data, and external auditing. As the data was collected, it was read through at a high level to obtain a general sense of the work. At this point, data from other sources were read, organized chronologically, and written into the two case study narratives. As expected, there was a definite sense of community and social network contact in order to find appropriate partners. Reputation was mentioned several times as an issue in partner selection. The term 'reputation' is used here as expressed by interviewees. Brewer, Gates, and Goldman (2002) use the term 'prestige' in their discussion of U.S. higher education. Unrelated to the specific issue of partner selection, many of the interviewees expressed concern that there were two distance education consortia in Canada and they would prefer to see only one. Since the two consortia are separated in the minds of some participants by level of education and research (or quality of both), the issue actually is relevant to the partners chosen or not chosen for each partnership. Also tied to this issue was the notion of government funding. Both sides seemed to feel that funding would be easier to obtain for one united consortium.

Consortium 1 membership has changed dramatically over the years. Consortium 1 began with five members and grew to a high of 13 members in year four, and is currently at 12 members. Conversely, Consortium 2 began with eight members and currently remains at that steady state. The interests and motivation of the partners are very different as well. Consortium 1 partners are interested in online course development and offerings and in generating revenue from the partnership. Consortium 2 partners are more interested in research and scholarship related to online teaching and learning, co-development of courses, and faculty development.

A strong social network is evident, in that many of the partners knew each other and worked together before either consortium was established. As well, many new contacts were made through the partnerships. This research documented 86 people known to be involved in either the Consortium 1 or the Consortium 2 partnership or both. Many of those in Ontario already knew the Alberta and British Columbia people before Consortium 1 and vice versa. At least three western presidents and vice presidents had previous academic appointments in the Maritimes and in Ontario.

The Consortium 1 partners seemed close to very each other and very specific in terms of the good that the Consortium 1 partnership was doing for their organizations. All of the interviewees could

name specific things that had been accomplished through Consortium 1. They could all identify collaborative distance education course offerings that had been developed with Consortium 1.

Consortium 2 partners were less sure of the need for and benefit of the partnership for their organizations. Since this partnership operates at a higher level, related to collaborative research rather than specific distance education offerings, this should not be surprising. Several collaborative research projects were mentioned that were ongoing or that were at the proposal stage. Because collaborative research had been going on before Consortium 2, however, the interviewees were unsure of the positive impact of Consortium 2 on this work.

A change proposed by many partners, but which is seemingly difficult to implement, is to have the two consortia join or work together. One suggestion was to have various 'tiers' within one partnership. That is, have a high-quality research group in the universities that are interested, but also have a distance education program and course development group at the same universities. That would allow both a Consortium 1 and 2 flavour within the one consortium.

A number of Canadian universities were approached to join either Consortium 1 or 2 or both, but declined. One university already had a large number of established international and provincial partnerships, so at that point perceived no advantage for them. At least seven large universities declined because they do not have strong distance education programs.

In contrast to previous work, these results show the complex and multi-faceted nature of partner selection with multiple negotiation cycles and irrational selection criteria. These findings showed two patterns: one related to process and the second related to selection criteria. The process showed multiple cycles of deal-making, partner negotiation, and organizational approval rather than the simple straight-line decision-making process shown in much partner selection literature. The selection criteria findings showed a number of decisive factors that influenced the final choice of partner. As well as the need to meet the condition of documented requirements, partner selection was also influenced by resource availability, social network, and reputation.

The deal-making cycles in these results showed multiple sponsors and drivers. External funding was needed for both consortia as well as high-level organizational approval for the partnership itself. Cycles of organizational approval appeared both in this early partnership formation and later as new partners were added and the partnership changed. Key partners were needed to fulfill specific partnership roles or to attract new partners. Partners were identified first based on their match to explicit requirements. As part of the selection process, however, additional criteria influenced the specific partners that were chosen. Some partners were selected only after the potential first-choice partners had declined their offers. Many partners were chosen because they were already known by others in the partnership, while others were distinguished and proposed because of their reputation.

Overall, results identified the following issues:

1. Partner selection is more complex than past research has described

2. There are gaps in the research on partner selection

3. Existing partner selection models do not adequately describe what was happening

4. Partner selection criteria are not based solely on rational analysis of goals and requirements

5. One challenge of partner selection is the large number of people involved in partner selection and partnerships in general. This social network and communication are important in identifying and selecting partners

6. Reputation can be very important in partner selection

For future research, resource availability could be studied on its own since several partners were observed that had been chosen only because other partners were already busy or not interested in the partnership at hand. This indicates the potential of a first choice or second choice partner. The second choice only seems to be included when the first choice is not available for whatever reason.

A number of levels of partner and partnership emerged from this work, but were too complex to include at this time. For example, partnerships can be based on verbal agreements among high-level executives. The actual partnership formation and operation are then delegated to lesser executives, middle managers, and finally frontline personnel. Each of these levels of responsibility has a different focus on the partnership. Each level has work to do to make sure that the partnership develops appropriately and evolves to the advantage of each organization and to the advantage of the partnership itself.

All work to be done, with or without partnerships, is constrained at different institutions, depending on resources of time, money, and expertise. Government constraints are tied to funding priorities such as distance education, mobile technologies, Canada-wide networks, and coast-to-coast coverage. There was some evidence in this research of institutions trying to fit their needs to government constraints and vice versa. A study of a number of funding opportunities, including constraints and funding fit on both sides, might provide some interesting results which could help both sides better negotiate their future requirements.

Conclusions

The research questions that were answered in this work focused on 'how and why' partners are chosen. These questions turned out to be non-trivial as the researcher found that the formation of partnerships and the process of partner selection are both very complex. The literature review provides a synopsis of previous work on interorganizational relationships, decision-making, and partner selection.

The Canadian distance education partnerships described in the case study narratives provide both positive and negative lessons learned. Partnership formation and initial partner selection information can help other institutions with similar issues. Information on later partners who were added or who dropped out can provide insight as to what worked and did not work in these cases. External funding, governing structure, and social network emerged as extremely important issues for these partnerships, so could again provide a solid background for new partnerships just starting out.

The most important contribution of this research to distance education theory is an increased understanding of partner negotiation and selection from an organizational perspective. The research is unique with the focus on partner selection and processes. Key people and institutions

are major factors in partnership formation. Social networks and reputation are key elements in partner choice.

The Canadian distance education field cases used as the domain also provide a distinctive perspective for this research. These cases provide deep and narrow research that may later be extended and generalized into a partner selection theory in combination with the existing literature and models noted previously. This work will also be of interest to researchers who want to know how certain partnerships form. The study will be of interest to governments and other organizations involved in establishing standards and limitations for collaborations, so that they can better delineate partner selection processes and choice criteria.

One contribution of this study to the distance education practice will be to provide managers with an aid in partner selection decisions. The list of partnership issues and organizational and alliance characteristics resulting from this study can assist managers in implementing, or considering, interorganizational relationships. The study can provide both a rich description of partner selection issues and an analysis of the relationship between these issues and real-world consortia. At an individual organization level, the results of this work can save time and aid the decision-making process in terms of partner selection. By providing information about the process and factors to consider as important for partnerships, this work may allow organizations to choose among potential collaborators more easily, more fairly, and in a more structured manner than a typically ad hoc approach.

This work makes a number of contributions to an understanding of partnerships and partner selection. Although we used two specific Canadian distance education consortia for our domain subjects, we expect that some of the results may be used in a broader international context. The literature review provides a summary and overview of current alliance and partner selection literature and shows deficiencies and gaps in that literature. Case study narratives offer deep, interesting insight into two specific cases of Canadian consortia. The results of the case study data applied to theory give further understanding of partnerships. Finally, the number of issues identified for future work verify the complexity of this research and give other researchers a better understanding of what still needs to be done and how it might be undertaken.

References

Ajami, R., & Khambata, D. (1991). Global Strategic Alliances: the New Transnationals. *Journal of Global Marketing 5*(1), 55-69.

Angeles, R., & Nath, R. (2000). An Empirical Study of EDI Trading Partner Selection Criteria in Customer-Supplier Relationships. *Information and Management 37*(5), 241-255.

Baldwin, R. G., & Austin, A. R. (1995). Toward a Greater Understanding of Faculty Research Collaboration. *Review of Higher Education 19*(1), 45-70.

Barringer, B. R., & Harrison, J. S. (2000). Walking a Tightrope: Creating value through interorganizational relationships. *Journal of Management 26*(3), 367-403.

Beamish, P. W. (1987). Joint Ventures in LDCs: Partner selection and performance. *Management International Review 27*(1), 23-37.

Bleeke, J., & Ernst, D. (1994). Collaborating to compete. In H. Mintzberg & J. B. Quinn (Eds.) *Directors and Boards* (pp. 174-8). Upper Saddle River, NJ.: Prentice-Hall

Bleeke, J., & Ernst, D. (1995). Is your strategic alliance really a sale? *Harvard Business Review 73*(1), 97-105.

Bogdan, R. C., & Biklen, S. K. (1992). *Qualitative Research for Education: An introduction to theory and methods.* Boston, MA.: Allyn & Bacon.

Brewer, D. J., Gates, S. M., & Goldman, C. (2002). *In Pursuit of Prestige: Strategy and competition in U.S. Higher Education.* Santa Monica, CA.: Transaction Publishers.

Chen, Z. Q., & Ross, T. W. (2000). Strategic Alliances, Shared Facilities, and Entry Deterrence. *Rand Journal of Economics 31*(2), 326-344.

Creswell, J. W. (1994). *Research Design: Qualitative and quantitative approaches.* Thousand Oaks, CA.: Sage.

Creswell, J. W. (2003). *Research Design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA.: Sage.

Das, T. K., & Teng, B. S. (2000). A Resource-Based Theory of Strategic Alliances. *Journal of Management 26*(1), 31-61.

Davidow, W. H., & Malone, M. S. (1992). *The Virtual Corporation: Structuring and revitalizing the corporation for the 21st century.* New York: HarperCollins.

Doz, Y. L., & Hamel, G. (1998). *Alliance Advantage.* Boston, MA.: Harvard Business School Press.

Dussauge, P., Garrette, B., & Mitchell, W. (2000). Learning from Competing Partners: Outcomes and durations of scale and link alliances in Europe, North America, and Asia. *Strategic Management Journal 21*(2), 99-126.

Duysters, G., Kok, G., & Vaandrager, M. (1999). Crafting Successful Strategic Technology Partnerships. *R&D Management 29*(4), 343-351.

Firestone, W. A. (1987). Meaning in Method: The rhetoric of quantitative and qualitative research. *Educational Researcher 16*(7), 16-21.

Harbison, J. R., & Pekar, P. (1998). *Smart Alliances.* San Francisco: Jossey-Bass.

Hitt, M. A., Dacin, M. T., Lavitas, E., Arregle, J., & Borza, A. (2000). Partner Selection in Emerging and Developed Market Contexts: Resource-based and organizational learning perspectives. *Academy of Management Journal 43*(3), 449-467.

Johnston, D. (2001). The e-Learning E-volution in Colleges and Universities: A pan-Canadian challenge. *The Advisory Committee for Online Learning.* Ottawa: Industry Canada.

Kanter, R. (1994). Collaborative Advantage. *Harvard Business Review 72*(4), 96-108.

Kanter, R. M. (2001). *Evolve!* Boston: Harvard Business School Press.

Lancy, D. F. (1993). *Qualitative Research in Education: An introduction to the major traditions.* New York: Longman.

Landay, W. (1996). *Rediscovering Strength in Numbers: Extended enterprises spell success.* Enterprise Reengineering, May.

Marshall, C., & Rossman, G. B. (1989). *Designing Qualitative Research.* Newbury Park, CA.: Sage.

Maslen, G. (2001). As Deadline Approaches, Universitas 21 Seeks Funds for its Online Institution. *The Chronicle of Higher Education 22*(47).

Merriam, S. B. (1988). *Case Study Research in Education: A qualitative approach.* San Francisco: Jossey-Bass.

Merriam-Webster (2004). *Merriam-Webster Collegiate Dictionary online.* Retrieved November 20, 2006 from: http://www.m-w.com/

Payton, D. (1999). Dynamic collaborator discovery in information-intensive environments. Paper presented at *Electronic Symposium on Computer-Supported Cooperative Work, National Institute of Standards and Technology*, June 17-19, Gaithersburg, MD.

Pfeffer, J. (1992). *Understanding the Role of Power in Decision Making. Classics of Organization Theory.* Belmont, CA.: Wadsworth.

Pidduck, A. B. (2006). Issues in Supplier Partner Selection. *Journal of Enterprise Information Management 19*(3), 262-276.

Saffu, K., & Mamman, A. (2000). Mechanics, Problems and Contributions of Tertiary Strategic Alliances: The case of 22 Australian universities. *Library Consortium Management 2*(2), 44-53.

Saltiel, I.M., Sgroi, A., & Brockett, R. G. (1998). *The Power and Potential of Collaborative Learning Partnerships: New directions for adult and continuing education.* San Francisco: Jossey-Bass.

Yan, A., & Gray, B. (1994). Bargaining Power, Management Control, and Performance in United States/ China Joint Ventures: A comparative case study. *Academy of Management Journal 37*(1), 1478-1517.

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

A Survey of a Study on the Reasons Responsible for Student Dropout from the Bachelor of Science Programme at Indira Gandhi National Open University

Bharat Inder Fozdar, **Lalita S. Kumar**, and **S. Kannan**
Indira Gandhi National Open University, India

Abstract

This paper presents a report on students who decided to drop out of the BSc programme offered by Indira Gandhi National Open University (IGNOU). This study was designed to determine the reasons leading to students' decisions to withdraw from the programme. Identified and reported in this study are nine major reasons leading to drop out. Results of this study lead to several suggestions for improving current instructional and delivery strategies of IGNOU's BSc Programme. Following such suggestions could help to reduce students' dropout rate for this particular programme through implementation of timely interventions at different critical stages of their learning journey.

Keywords: dropout; withdrawal; open distance learning; interventions; student retention; student support system

Introduction

Open Distance Learning (ODL) is now considered as a reputable method of education as evidenced by the establishment of numerous ODL institutions worldwide and increasing enrollment of students in these institutions. In India, currently 22 percent of the total number of students enrolled in India's higher education system are enrolled in ODL institutions (Dikshit, 2003, VC Report 2004). Concomitant with the growth of ODL, there is the problem of high rates of student dropout. Research has shown that ODL student dropout rates are typically higher than student dropout rates in conventional, face-to-face forms of higher education (Barefoot, 2004; Kember, 1995; Wojciechowski & Palmer, 2005). In this paper (which views dropout issues from different perspectives such as student retention, student persistence) the terms dropout and withdrawal are used synonymously.

Dropout studies are of major interest for distance education researchers, because high dropout is one indicator of teaching quality (DEST, 2005). In the United Kingdom, public funding for higher education is now based on the number of students who successfully complete courses (Simpson, 2005). If a large number of students fail to complete their programmes or courses,

there is a possibility that ODL institutions historically reliant on public funding may face withdrawal or reduction of such funding. As such, in North America a centre for the study of college student retention (see http://www.cscsr.org/) was established to provide retention resources to individuals and the educational community and arm them with the latest findings on the retention of students in higher education. This centre also started Journal of College Student Retention: Research Theory and Practices (see http://www.cscsr.org/retention_journal.htm) in 1999 to provide deeper insight to this area.

Nonetheless, in some cases, dropout can be viewed as a positive action. Studies conducted at Open University of UK indicate that students use their Open University study to enter full-time education elsewhere (Ashby, 2004). When viewed in this light, open learning institutions should not be always blamed for high dropout rates.

On the other hand, students may opt for ODL because they think these programme/ courses will be easier (Carnevale, 2000); however, this is not the case. Often students' expectations are shattered when they realized that ODL programme/ courses requires the same efforts – if not more – than traditional programme/ courses (Fozdar & Kumar, 2006).

The purpose of this study was to determine the reasons that influence students' decisions to dropout. We suggest some effective remedies that we feel might improve student retention. The findings presented here are based on a survey of students who elected to dropout from the Bachelor's Degree Programme (BSc) at Indira Gandhi National Open University (IGNOU).

Context

About IGNOU's BSc Programme

In this section, we will briefly outline the teaching and learning model used in IGNOU's Bachelor's Degree (BSc) programme. IGNOU offers a BSc in various science disciplines such as Chemistry, Physics, Mathematics, Botany, and Zoology. Two important objectives of the BSc programme are to provide higher educational opportunities to those who may have missed out on formal education (i.e., working persons, people living in rural or remote areas, housewives, and the disadvantaged). To complete the BSc programme either as general or major in any of the science disciplines on offer at IGNOU, learners must earn 96 credits (one credit = approximately 30 hours of learning activity), out of which 24 credits must be devoted to foundation courses, and eight to 16 credits to applied courses. The remaining 56 to 64 credits are subject-specific. It takes students a minimum of three years to complete IGNOU's BSc programme. Students enrolled in the year 1991 and 1992 were allowed between three to a maximum of eight years to earn 96 credits towards their BSc degree. Students enrolled after 2003, however, must complete BSc programme in no less than three years to a maximum of six years. At IGNOU, students are permitted to study at their own pace after they complete their first or second year of study, subject to a ceiling of 48 credits earned and a term-end examination used to measure students' mastery of the subject matter. If a learner has mastered the subject then they may proceed at their own pace.

Methods of Instruction

Instructional methods used in IGNOU's BSc programmes differ from those used by the conventional higher education systems. Most learning materials are disseminated through distance rather than face-to-face communication, as is true of any distance education course

offering. Because IGNOU is in the process of embracing a learner-centred approach to education, students are encouraged to become active participants in their own teaching and learning process. To this end, a variety of course learning materials are used, from multimedia to print. Other educational modalities used include audio and videocassettes (available from IGNOU's study centres), audio-video programmes broadcast via the National Network of Doordarshan and All India Radio (at selected stations), face-to-face classes held at IGNOU's study centres, assignments, laboratory work, teleconferencing, interactive radio counselling and video programmes through Gyan Darshan and EDUSAT Channels. While compulsory for laboratory-based courses, students are not compelled to attend the counselling sessions for theoretically-based courses.

BSc students must engage in compulsory laboratory components of their coursework at IGNOU's Study Centres located throughout India. Laboratory course components are typically offered to students during summer and autumn months, so that they can attend during their vacation. These courses are equivalent to two or four credits each. A typical two credit laboratory course requires students to attend full-time at the IGNOU Study Centre for a minimum duration of seven days. During this seven-day period, students typically invest 60 hrs or more to study. Of this 60-plus hours, students devote approximately 40 hours to practical experiments, while the remainder of their time is expended on calculations, preparing records, and viewing/ listening to the video and audio programmes. Unlike theoretical courses, attendance in the face-to-face laboratory courses is compulsory for all students. Experiments, which are guided by instructors and evaluated daily, comprise 70 percent of students' course weight, while an unguided assignment (i.e., term-end exam) carries 30 percent of the course weight. For theoretical courses, continuous assessment is weighted at only 30 percent, while term-end exams carry 70 percent of the course weight.

Examination of admission and registration patterns over the past six years shows that, on average, only 51.7 percent of IGNOU's BSc students enrolled go on to the second year of study; of this, approximately 71.8 percent of students will further enrol1 their third year of study (see Table 1) (Annual Reports 1998-99 to 2002-2003). After the first year, 37.1 percent of students chose to enroll in the third year of the programme. This means a large number of students (62.9 %) are not registering for the full length of the programme. This data suggests that IGNOU's BSc programme's dropout rate is very high and hence, the retention rate is unsatisfactory.

Table 1. Admission and Subsequent Registration Pattern for the Last Six Years

Year of Admission	B.Sc. First Year	B.Sc. Second Year	B.Sc. Third Year
1998-1999	2348	1322 (56.3%)	968 (73.2%)
1999-2000	2334	1208 (51.7%)	900 (74.5%)
2000-2001	3959	2008 (50.7%)	1349 (67.20%)
2001-2002	4396	2115 (48.1%)	1532(72.4%)
2002-2003	5235	2701 (51.6%)	--
2003-2004	4678	--	--

N.B.: Data in brackets indicate % re-registration in subsequent years

Literature Review

A number of ODL institutions have carried out dropout studies. Some notable studies have been undertaken by the British Open University (Ashby, 2004; Kennedy & Powell, 1976; Tresman, 2002; Woodley, 2004); Canada's Athabasca University (Powell, 1991); Korea National Open University (Shin & Kin, 1999); and Australia's Deakin University (Brown, 1996). Different models have been used by these researchers to describe the factors found to influence student achievement, course completion rates, and withdrawal, along with the relationships between variable factors. U.S. researchers have taken the lead in developing a wide range of models that attempt to explain key factors that contribute towards student withdrawal from higher education (Tinto, 1975, 1993; Bean, 1980, 1983; Bean & Metzner, 1985; Astin, 1977, 1985; Braxton, 2000). One British researcher, Woodley (2004), has also discussed the strengths and weaknesses of some important models such as Tinto's model (Tinto, 1975), Sweet's model (Sweet, 1983), and Kember's model (Kember, 1995). These models are widely used by ODL researchers to predict which students are more likely to dropout, and identify interventions aimed at decreasing student dropout rates (Bernard & Amundsen, 1989). Such theoretical approaches have limitations, however, especially when applied to different contexts and situations (Woodley, 2004; Woodley, Delange, & Tanewski, 2001; Yorke, 2004). According to Woodley (2004) most dropout research falls into one of two categories: surveys seeking to find out students' reasons for dropping out (Davies & Elias, 2003; Woodley & Parlett, 1983; Yorke, 1999), or studies that look at students' progress in relation to likely predictive variables of dropout (Johnes & Taylor, 1989). In conclusion, Woodley (2004) suggests that rather than pursuing an elusive general model of student retention, researchers should aim to conduct large-scale controlled experiments. In doing so, Woodley suggests that researchers can only then determine whether or not it is more cost-effective to increase social integration by, say, putting students in touch with each other, or to increase academic integration by improving feedback on assignments, for instance. Otherwise, Woodley cautions, we are likely to descend into a tautological situation wherein we say that lack of integration leads to student dropout and that students who drop-out are not integrated.

The most commonly cited model of dropout studies is one developed by Tinto (1975). According to Tinto's Model, withdrawal process depends on how students interact with the social and academic environment of the institution. In an ODL context, researchers tend to place more emphasis on the influence of external environment, such as student's occupation and support from their family, while the concept of social integration into an ODL institution's cultural fabric, is given less weight (Kember, 1995). Students enrolled in ODL are typically adults, attend part-time, and may be full-time jobholders who are also shouldering family responsibilities (McGivney, 2004). For such students, factors such as 'lack of time,' 'poor guidance,' 'lack of feedback on assignments,' 'time management,' 'unrealistic expectations,' and so on, all contribute to withdrawal (Garland, 1993; Ostman & Wagner, 1987). Other factors also reported include 'lack of guidance and information prior to registering and enrollment,' 'lack of support from faculty,' and difficulty 'contacting faculty' (Brown, 1996; Cookson, 1989; Pierrkeas, Xenos, Panagiiotakopoulos, & Vergidis, 2004; Tresman, 2002).

In examining and following the literature on student dropout, we developed a questionnaire designed to elicit and measure students' opinion on 20 reasons/ factors they felt as being responsible for their decision to withdraw from IGNOU's BSc programme. Emphasis was placed on three broad areas: 'the personal,' 'programme-related,' and 'student services'. Collected data was analysed using percentages.

Survey Method

A structured questionnaire was developed that consisted of 21 items. The survey sample consisted of BSc students enrolled in the 1991 and 1992 academic years. All students were required to complete the BSc programme within eight years.

Previous research has shown that in countries like Australia, Canada, the United Kingdom, and the United States, distance learners typically attend college part-time, and many never intend to complete an entire programme of study (Ashby, 2004; Grayson, 1997; Yorke, 2004). For this reason, research on student drop-out in distance education in these countries, typically focuses on individual course completion rates, rather than on whole programme completion rates. Unlike in these countries, however, IGNOU's students are registered in an entire programme of study – not piecemeal in discrete courses that may, or may not, be applied to a final degree programme as is the case elsewhere. Unlike these other countries that require students to complete pre-requisite courses prior to the next level of the programme, INGOU's BSc students have the flexibility to attempt any course related to the programme during the maximum time-period allowable.

In light of this feature of India's ODL system, we elected to start our survey in 2001-2002 for students who had originally registered in IGNOU's 1991 and 1992 academic year, and had completed their maximum period of their study (eight years). For the years 1991 and 1992, IGNOU admitted 1,224 and 1,477 students respectively. Of these combined numbers, 250 students who were found to be representative of all regions and who had not completed the BSc programme with eight years, were randomly selected. The questionnaire was administered to 250 students who dropped out after reaching various stages of the 96 credit programme (e.g., students who completed 0-30 worth of credit courses (n = 80); students who had completed 30-60 worth of credit courses (n = 80); and students who had completed greater than 60 credits (n = 90 students). The questionnaire was mailed by post in November 2001. One follow-up reminder was mailed via post, six months later. By late May 2002, a total of 68 student drop-outs (25.6%) had completed the questionnaires. As more responses are preferable, further attempts were made in late 2002 and 2003, but we were unable to elicit any further response from our pool of subjects. It is determined that such low response rates may be attributable to address changes or perhaps students were simply not willing to participate. The data collected from students was analysed using percentages.

Research Findings and Discussions

The sample comprised of 85 percent males and 15 percent females. This compares to an average ratio of 70 percent male: 30 percent female for all students registered in the last five years in all the programmes of IGNOU (Annual Reports, 1998-1999 / 2002-2003). The different ratio in terms of sex might be due to the over representation of males in random selection of the sample. Respondents were in the age group of 17-40 years. The mean age of the sample was 23.5 years. As per IGNOU's programme admission requirements, all respondents must have prior educational qualifications of 10+2 (XII standard) in Science.

The distance of the Study Centre from the residence of learner varied from three km to 450 km, yielding a mean distance of 136.5 km. Of our sample of 68 respondents, 50 percent indicated they were married and 50 percent indicating they were unmarried. In terms of urban versus rural split, 41.18 percent indicated they were from the rural backgrounds, compared to 58.82 percent from urban backgrounds. In terms of prior education, 52.94 percent indicated they had graduated from

high school (XII pass), while 47.06 percent had earned a diploma or other qualifications in addition to completing high school (XII pass). The majority of respondents (64.71%) were employed; 35.29 percent were unemployed. Most indicated that they had resumed study of BSc after average period of 4.7 years. The total number of credits completed by students before deciding to dropout ranged from a low of eight credits to a high of 90 credits. Students had taken anywhere from one to eight years before deciding to withdraw from IGNOU's BSc Programme.

Reasons for Discontinuing

Base on a review of the literature, 20 reasons were identified for the measuring 'relative importance' of student drop out. These 20 reasons were then broadly grouped in to three basic categories: 1). personal reasons (n = 6 factors); 2). programme/ course related reasons (n = 7 factors) ; and 3). Student-support related reasons (n = 7 factors) (see Figure 1).

Figure 1. Categories of reasons for discontinuing BSc Programme

A.	**Personal Reasons:**
i)	Lack of sufficient time for study due to: a) change in family circumstances, b) change in employment status and c) marriage
ii)	Poor health condition
iii)	Absence of interaction with other students
iv)	Financial constraints due to: a) high programme fee and b) high expenditure on account of attending laboratory courses
v)	Admission to B.Sc. Programme of conventional system
vi)	Admission to some professional programme/course
B.	**Programme/course related reasons**
i)	Difficulty in learning science through distance
ii)	Expectation of programme not met
iii)	The language (English or Hindi) used was quite difficult to understand
iv)	Unavailability of the programme in mother tongue
v)	Difficulty in term-end examination papers
vi)	Difficulty in doing assignments
vii)	Programme was too time consuming to study all the courses
C.	**Student support related reasons**
i)	Insufficient academic support from study centres
ii)	Study centre too far from residence
iii)	Insufficient counselling sessions
iv)	Difficulty in attending laboratory sessions due to: a) personal reason, b) family problem c) employment and d) distance
v)	Lack of proper intimation regarding theory and lab counselling sessions
vi)	Lack of responsiveness from: a) study centre, b) regional centre and c) head quarters
vii)	Non-receipt of: a) course material, b) assignment and c) other relevant information

Personal Reasons

Personal Reasons, such as changes in status of employment or family circumstances, play an important role in determining withdrawals (Brown, 1996). Problems cited such as 'lack of time' are particularly acute, especially in cases where students are employed and/ or must shoulder domestic commitments. Such students, therefore, may not be in a position to balance their personal obligations and their educational pursuits, and are often left with little or no choice but to dropout (McGivney, 2004).

The students' responses for the factors under the category of 'personal reasons' for their withdrawal are in Table 2. Note that consideration has been given to the fact that the questionnaire allowed students to select more than one reason for withdrawal. In this survey, results regarding 'personal reasons' indicated that the main reasons students gave for withdrawal were: absence of interaction with fellow students (47.06 %), high cost of attending to laboratory work (38.24 %), lack of time due to changing family circumstances (35.29 %), followed by changes in employment status (35.29%). Other personal factors found to effect students' decision to withdraw included marriage obligations (8.82%), poor health conditions (8.82%), high programme fees (8.88%), admission to similar programme (2.94%), and admission to some professional programme (5.82%).

Table 2. Personal Reason as response for withdrawal (expressed as a percentage of total number of respondents)

	Factor	Percentage
i)	Lack of sufficient time for study due to:	
	a) Change in family circumstances	35.29
	b) Change in employment status	35.29
	c) Marriage	8.82
ii)	Poor health condition	8.82
iii)	Absence of interaction with other students	47.06
iv)	Financial constraints due to:	
	a) High programme fee	8.88
	b) High expenditures on account of attending laboratory courses	38.24
v)	Admission of B.Sc. Programme of the conventional system	2.94
vi)	Admission to some professional programme	5.88

Ostman and Wagner (1987) found 'lack of time' to be the single most commonly cited reason given by distance education students for dropping out. Similarly, Tresman (2002) suggested 'lack of time' as the most significant factor influencing students' decision to withdraw. However, as per Table 2, along with 'lack of time,' other significant factors leading to students' decision to withdraw include 'absence of interaction with fellow students' and 'financial problems because of the laboratory courses.' In conventional university settings, students are brought together to interact face-to-face on various activities such as classes, seminars, group activities, etc. Such opportunities in ODL settings are very limited, however. In IGNOU's BSc programme, students interact with fellow students at their regional Study Centre during face-to-face classes and

laboratory sessions. On the other hand, few students attend face-to-face theory classes, as attendance is not compulsory. Because of this, students feel isolated and decide to dropout (Utley, 2002). The IGNOU feedback survey reported here, however, found that students who had taken Biochemistry as their chemistry elective, cited two major reasons for not attending their scheduled classroom sessions: 'lack of information regarding schedules of classroom sessions from the university' and 'the distance of the Study Centre from their residence.' Forming local study groups or circles and providing timely information regarding any face-to-face sessions could thus help mitigate students' feelings of isolation.

'Costs associated with attending laboratory courses' was the second highest personal reason for withdrawal. Laboratory courses, however, are difficult to offer – if not impossible – in alternative modes of study. BSc laboratory courses are intensive programmes of study that take place over one to two weeks' duration at local study centres. Attendance in laboratory courses is compulsory. If the student does not live in the same city as the study centre, the cost of staying for a week or more is often very difficult, and in some cases impossible, for students to bear. This problem was cited as 'very acute' among students surveyed and who were registered in IGNOU in 1991 and 1992; at that time, however, IGNOU only had 32 study centres. Today, IGNOU's BSc programme is now offered at 152 study centres, and increases in expansion will likely address the problem of 'proximate access' to a much greater extent.

Programme/ Course Related Reasons

Programme/ course related issues like 'workload' and 'difficulty' are the issues that might compel ODL students to withdraw. These issues become much more critical when science programmes like IGNOU's BSc is on offer, as many courses within the larger programme of study deal with difficult concepts. To maintain high academic standards and quality, course syllabi can be difficult to master. For example, previous research examining students' experiences of one physics course revealed that they spent more time studying the course materials than they expected (Garg, Vijayshri & Panda, 1992).

Table 3. Programme/ Course related reasons as response for withdrawal (expressed as a percentage of total number of respondents)

S. No.	Reasons	Percentage
(i)	Difficulty in learning science through distance mode on account of concepts of high difficulty level	47.06
(ii)	Expectation of programme not met	23.53
(iii)	The language (English/ Hindi) used was quite difficult to understand	17.65
(iv)	Unavailability of the programme in mother tongue	5.88
(v)	Difficulty in term-end examination paper	47.06
(vi)	Difficulty in doing assignments	35.29
(vii)	Programme was too time consuming to study all the courses	55.88

In terms of the factor of programme/ course, students indicated their reasons for withdrawal were: 1). the programme contained too much material and was thus too time consuming (55.88 %); 2). difficulty of learning science via distance (47.06 %); and 3). difficulty in completing the term-end examination paper or test (47.06 %). Other factors like 'difficulty in doing assignments' (35.21

%); 'the student's expectations of the programme as not being' (23.53 %); and 'unavailability of the programme in the student's mother tongue' (5.88 %) were also cited as reasons for withdrawal (see Table 3). These findings are supported by an OUUK end-of-course survey conducted in November 2002; in this survey, the most common reason cited by students leading to their withdrawal was 'workload'. Students indicated that they fell behind with the course work. Over 50 percent of students in this British survey indicated that they spent more time studying than expected (Ashby, 2004). In light of this previous research and data from our survey, it becomes very clear that IGNOU's BSc course contents and workload must be rigorous, but not to the point of overwhelming students. Further, the faculty must provide workload maps/ detailed schedules to help students to manage their time more effectively.

The second important issue in this category is 'studying science via distance education.' IGNOU provides information about the courses and specialized distance delivery of the programme. Understanding students' – often unrealistic or misguided – perceptions about ODL and the effort it takes to be a successful student is central to IGNOU's communication strategy. As such, IGNOU's goal is to inform and fine-tune students' expectations about the realities of studying at a distance using programme brochures both prior to and during their studies via the course website, face-to-face academic counselling at the study centres prior to, and at the beginning of the programme.

Difficulty in term-end examination paper was third important reason of this category for withdrawal. This problem could be because students were appearing for term-end examination without much preparation. To tackle this, students should be advised to attend counselling sessions regularly and student should do assignments before appearing in the term-end examination. These steps will help the students in their preparation for the term-end examinations and may improve their retention in the system. Some researcher suggested that supplement tutoring could also provide similar and enhanced benefits (Castles, 2004; McCracken, 2004).

Student Support Related Reasons

To provide effective student support, IGNOU has established study centres all over the country. Students are assigned to one study centre based on their place of residence or work. Study centres provide students with: 1). course-specific academic counselling; 2). audio-listening, video-viewing, and tele-conferencing facilities; 3). library facility; 4). submission and evaluation of assignments; 5). information services; 6). laboratories for conducting experiments; 7). final, term-end examinations. Activities of the Study Centres are monitored through IGNOU's Regional Centres. Student support services have a very important and vital role to play in helping students successfully complete their programmes of study (Peach, 2005). Counsellors at a IGNOU Study Centre shoulder the responsibility of providing timely and quality feedback to students via written evaluations or verbal comments on assignments, and overseeing students' lab work. Clearly, ongoing feedback forms a crucial and critical link between teacher and student learning outcomes in distance education contexts. Feedback along with face–to-face counselling by teachers is considered to be an important component that can positively influence on bottom-line student retention. These activities overcome students' sense of distance, a factor that may challenge and isolate students.

The survey results indicated that the major reasons leading to students decision to withdraw were the distance of study centre from their residence (64.70%) and insufficient academic support from the study centre (58.82%). This finding proves that many students were not getting full benefits of student support services provided by IGNOU. Students reported that they encountered

problems in attending the laboratory sessions due to distance (52.94 %). Overall reasons regarding student support were given in Table 4.

Table 4. Student support related reasons as response for withdrawal (expressed as a percentage of total number of respondents)

S. No.	Reasons	Percentage of responses
(i)	Insufficient academic support from study centre	58.82
(ii)	Study Centre too far from residence	64.70
(iii)	Insufficient counselling sessions	47.06
(iv)	Difficulty in attending lab sessions due to following reason(s):	
	a) Personal	5.88
	b) Family	2.94
	c) Employment	38.24
	d) Distance	52.94
(v)	Lack of proper intimation regarding theory and lab counselling sessions	29.41
(vi)	Lack of responses from	
	a) Study Centre	47.06
	b) Regional Centre	20.59
	c) Head Quarters	35.29
(vii)	Non receipt of :	
	a) Course material	38.23
	b) Assignment	35.29
	c) Other relevant information	41.17

Other reasons students cited as leading to their decision to withdraw are: insufficient counselling sessions (47.06 %); lack of responsiveness from study centre (47.06 %); and difficulty in attending laboratory session because of employment (38.24 %).

For students enrolled in IGNOU's BSc programme, distance from the study centres seems to be a crucial issue. As reported earlier, the mean distance of the study centre from the residence of student is 136.5 km. This indicates that for students to benefit from the facilities and services provided by IGNOU -- even for basic information -- many must travel considerable distances to reach their nearest Study Centre. This factor becomes more critical, especially for women students (Hramiak, 2002). Most of IGNOU's students are employed (64.71%), and therefore they face considerable time constraints. Clearly, a long commute would only serve to exacerbate this situation. In fact, some students, even after they have earned many credits towards their degree, elect to dropout rather than endure more travel and costs associated with travel.

Possible explanations for high responses for the factor (i), (iii) and (vi a) outlined in Table 4, are that students are enrolling in IGNOU programmes after an average gap of 4.7 years between their prior education and enrolling in IGNOU; as such, these students are informed by their prior experiences in the formal educational system and thus have little familiarity with the demands of studying via ODL. Such students discover, often to their dismay, that they are not receiving same amount of support as they were accustom to receiving in their previous face-to-face learning environments. This finding is supported by earlier research by McGivney (2004). In IGNOU's BSc programme's instance, 47.06 percent of respondents cited 'insufficient counselling sessions.'

Science courses, however, generally demand high perseverance on the part of students, and therefore they typically need much more guidance and counselling.

Summary

From this study, nine main reasons for withdrawal have been identified. These nine main reasons comprised 45 percent of the responses received. They are listed below in decreasing order:

1. Study Centre too far from residence (64.70 %)
2. Insufficient academic support from study centre (58.82 %)
3. Programme was too time consuming to study all the courses (55.88 %)
4. Difficulty in attending lab sessions due to distance (52.94 %)
5. Absence of interaction with other students (47.06 %)
6. Difficulty to study science through distance (47.06 %)
7. Difficulty in term-end examination paper (47.06 %)
8. Insufficient counselling sessions (47.06 %)
9. Lack of responsiveness from Study Centre (47.06 %)

Conclusion

This study suggests that out of the top nine reasons cited by students for their withdrawal, three factors (1, 4, and 5) involved distance, specifically the distance students must travel to their closest Study Centre. Because of this distance, students find it very difficult to obtain student support system available at their local IGNOU Study Centre. Indeed, this is the often the only place where students can interact with fellow students, take part in face-to face counselling sessions, and generally be acculturated into IGNOU. Being not able to come to the study centres to attend various counselling sessions, such students indicated they felt isolated and thus triggered their decision to withdraw from IGNOU's BSc programme. By increasing the number of study centres throughout India, and providing information in advance about upcoming counselling sessions, help students to anticipate problems related to travel and time management. Factors 2 and 9 could be addressed by proper monitoring to improve the management of the larger Study Centre network. As Woodley and colleagues (2001) point out, ODL is dependant on effective management. As such, effective management becomes doubly important for universities like IGNOU, where student enrollments currently stand at more than 1.4 million students, registered at 1,500 Study Centres located across India, and even abroad. In this, our era of market economies and increasing globalization – where students are our bridge to a brighter, more prosperous and stable future – we cannot afford to leave them behind. Students are major stakeholders in the ODL equation, so we need to provide the best services and student support to help students succeed.

The BSc programme related-problems, such as content and workload, could be best tackled through provision of more systematic information, study guides, encouraging motivation at

different levels of their study via the establishment of study goals, and supplemental counselling, particularly for difficult courses.

IGNOU's dropout rate among BSc students can be further reduced by providing better student support at the study centres, by increasing the number of study centres available to students, providing programme-related information on a timely basis, by strengthening the study guide, and by setting and suggesting study goals. Below are some suggestions, which emerged out of the survey analysis, and which aim to decrease student dropout rates at IGNOU's BSc programme:

Science faculty must play a proactive role. Faculty should be in contact with students through email, postal mail, the EDUSAT network, etc. Faculty must consistently seek feedback from students, assess students' performance, and address programme-related problems promptly. Doing so, will help increase students' sense of belonging to their local Study Centre, to the larger institution, and more importantly, to themselves as students. Such actions will clearly work to decrease students' sense of isolation.

Counsellors must provide timely feedback on students' academic performance via their assignments. Timely feedback and assessment will not only motivate students' but also prepare them for their term-end, final exam.

Students must have a clear idea about the course content and workload requirement. As such, in-depth and comprehensive information about the BSc programme must be made available to students before they enroll.

IGNOU must work to improve and widen the scope of their student support system, so that students can obtain full benefit of the counselling sessions available, and can participate in peer group interactions needed to help allay students' feelings of isolation and build sense of community. Intensive orientation of the academic counsellors should also be undertaken from time to time so that they can effectively transact the BSc programme.

Course materials and information describing and outlining laboratory courses and other course related information, should also reach the student well before they commence their course work.

Students' successful completion of the BSC programme is not only in the best interest of the institution, but also in the best interests of the students. Non-completion not only can lead to financial loss to both the students and the institution, at times it can lead to psychological distress. Some fragile students may feel they have personally failed, when in reality it is the system that may have failed them. Dropout studies, such as that reported here, help to inform the design of effective information and course materials, laboratory components, and overall implementation of the programme. Such studies can also help inform the design of interventions that anticipate stages that students tend to drop-out, and pre-empt such decisions (Simpson, 2004).

References

Annual Reports (1998-99 to 2002-03). *Indira Gandhi National Open University.* IGNOU Press: New Delhi.

Ashby, A. (2004). Monitoring Student Retention in the Open University: Detritions, measurement, interpretation and action. *Open Learning*, *19*(1), 65-78.

Astin, A. W. (1977). *Four critical years.* San Francisco: Jossey-Bass.

Astin, A. W. (1985). *Achieving academic excellence.* San Francisco: Jossey-Bass.

Barefoot, B. O. (2004). Higher Education Revolving Door: Confronting the problem of student dropout in US colleges and University. *Open Learning, 19*(1), 9-18.

Bean, J. (1980). Dropouts and Turnover: The synthesis and test of a casual model of student attrition. *The Review Higher Education, 12*,155-187.

Bean, J. (1983). The application of a model of turnover in work organizations to the student attrition process. *The Review Higher Education, 6*,129-148.

Bean, J., & Metzner, B. S. (1985). A conceptual model of nontraditional student attrition. *Review of Educational Research, 55*, 485-540.

Bernard, R., & Amundsen, C. (1989). Antecedents to Dropout in Distance Education: Does one model fit all? *Journal of Distance Education, 4*(2), 25-46.

Braxton, J. M. (Ed.) (2000). *Reworking the student departure puzzle.* Nashville, TN.: Vanderbilt University Press.

Brown, K.M. (1996). The role of internal and external factors in the discontinuation of off campus students. *Distance Education, 17*(1), 44-71.

Carnevale, D. (2000, January). Online instructor takes step to reduce dropout rate. *The Chronicle of Higher Education*, p A48. Retrieved on June 1, 2006 from: http: //chronicle.com/infotech/

Castles, J. (2004). Persistence and the adult learner. *Active Learning in Higher Education, 5*(2), 166-179.

Cookson, P. (1989). Research on Learners and Learning in Distance Education: A review. *The American Journal of Distance Education, 3*(2), 22-34.

CSCSR (*n.d.*). Centre for the Study of College Student Retention. Retrieved on June 1, 2006 from: http://www.cscsr.org/about/html / http://www.cscsr.org/retention_journal.html

Davies, R., & Elias, P. C. (2003). *Dropping Out: A study of early leavers from higher education.* Research Report RR 386: London Department for Education and Skills.

DEST (2005). *Department of Education, Science and Training. Learning and Teaching Performance Fund 2006: Administrative information for providers*. Retrieved June 1, 2006, from: http://www.dest.gov.au/NR/rdonlyres/018DB581375G-4BDF-ABD8-1F5E608A4382/7637/FINALAIP2August2005.pdf

Dikshit, H. P. (2003). Growth of Open and Flexible Learning in India: Emerging challenges and prospects. *Indian Journal of Open Learning, 12*(1,2), 7-15.

Fozdar, B. I., & Kumar, L. K. (2006). Teaching Chemistry at Indira Gandhi National Open University. *Turkish Online Journal of Distance Education, 7*(2), 80-89.

Garland, M. (1993). Ethnography penetrates the "I didn't have time" rationale to elucidate higher order reason for distance education withdrawal. *Research in Distance Education, 8*(2), 181-198.

Garg, S., Vijayshri, & Panda, S. (1992). A preliminary study of student workload for IGNOU Physics Elective Courses. *Indian Journal of Open Learning, 1*(2), 19-25.

Grayson, J. P. (1997). Institutional failure or student choice? The retention of adult students in Atkinson College. *Canadian Journal for the Study of Adult Education, 11*(2), 7-30.

Hramiak, A. (2002). Widening participation and ethnic minority women. *Learning and Skills Research, 5*(2), p. 35.

Johnes, J., & Taylor, J. (1989). Undergraduate Non-Completion Rates: Difference between UK universities. *Higher Education, 18*, 209 - 225.

Kember, D. (1995). *Open Learning Courses for Adults: A model of student progress.* Englewood Cliffs, NJ.: Educational Technology Publications.

Kennedy, D., & Powell, R. (1976). Student progress and withdrawal in the Open University. *Teaching at a Distance, 7*, 61-78.

McCracken. H. (2004). Extending Virtual Access: Promoting engagement and retention through integrated support system. *Online Journal of Distance Learning Administration, 7*(1). Retrieved June 2, 2006 from: http://www.westga.edu/

McGivney, V. (2004). Understanding persistence in adult learning. *Open Learning, 19*(1), 33-46.

Ostman, R., & Wagner, G. (1987). New Zealand management student's perceptions of communication technologies in correspondence education. *Distance Education, 8*(1), 47-63.

Peach, D. (2005). Ensuring Student Success: The role of support services in improving the quality of student learning experience. *Studies in Learning Evaluation Innovation and Development, 2*(3), 1-15.

Pierrkeas, C., Xenos, M., Panagiiotakopoulos, C., & Vergidis, D. (2004). A comparative study of dropout rate and causes for two different distance education courses. *International Review of Research in Open and Distance Learning, 5*(2).
Retrieved June 1, 2006, from:
http://www.irrodl.org/index.php/irrodl/article/view/183/265

Powell, R. (1991). *Success and Persistence at Two Open Universities.* Centre forDistance Education: Athabasca University.

Shin, N., & Kin, J. (1999). An exploration of learner progress and dropout in Korea National Open University. *Distance Education, 20*(1), 81-95.

Simpson O. (2004). The impact on retention of intervention to support distance-learning students. *Open Learning, 19*(1), 78-95.

Simpson, O. (2005). The costs and benefits of students retention for students, institutions and governments. *Studies in Learning, Evaluation Innovation and Development, 2*(3), 34-43.

Sweet, R. (1983). Student Dropout in Distance Education: An application of Tinto's model. *Distance Education, 7*, 201-213.

Tinto, V. (1975). Dropout from Higher Education: A theatrical synthesis of recent research. *Review of Education Research, 45*, 89-125.

Tinto, V. (1993). *Leaving College: Rethinking the cause and cure of student attrition*. Chicago: University of Chicago Press.

Tresman, S. (2002). Towards a Strategy for Improved Student Retention in Programme of Open, Distance Education: A case study from the Open University U.K. *International Review of Research in Open and distance Learning, 3*(1). Retrieved June 1, 2006 from: http://www.irrodl.org/index.php/irrodl/article/view/75/145

Utley, A. (2002, September). Lonely student quit as hard-up hang on. *Times Higher Education Supplement, 13*.

VC Report (2004). *Indira Gandhi National Open University*. IGNOU Press: New Delhi

Wojciechowski, A., & Palmer, L. B. (2005). Individual student characteristics: Can any be predictors of success in online classes? *Online Journal of Distance Learning Administration, 8*(2). Retrieved June 1, 2006 from: http://www.westga.edu/~distance/ojdla/summer82/wojciechowski82.htm

Woodley, A., Delange, P., & Tanewski, G. (2001). Student Progress in Distance Education: Kember's model re-visited. *Open Learning, 16*(2). 113-131.

Woodley A. (2004). Conceptualizing student dropout in part -time distance education: pathologizing the normal? *Open Learning, 19*(1), 47-64.

Woodley, A., & Parlett, M. (1983). Student dropout. *Teaching at Distance, 24*(1), 2-23.

Yorke, M. (1999). *Leaving Early: Undergraduate non-completion in higher education.* London: Falmer.

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Problem Formulation and Resolution in Online Problem-Based Learning

Richard F. Kenny
Athabasca University – Canada's Open University

Mark Bullen
British Columbia Institute of Technology, Canada

Jay Loftus
Athabasca University, Centre for Distance Education

Abstract

This paper discusses an exploratory study to investigate the existence, and nature, of student problem formulation and resolution processes in an undergraduate online Problem-Based Learning (PBL) course in Agricultural Sciences. We report on the use of a content analysis instrument developed to measure problem formulation and resolution (PFR) processes in online asynchronous discussions (Murphy, 2004a, 2004b) to analyze students' text-based, online discussions. The results offer evidence that students do engage in problem formulation and resolution and that these processes appear to be consistent with the PBL process carried out in this course. However, the nature of the PBL pedagogy, at least in this instructional context, ties the PBL problems to be solved tightly to a marked assignment structure and, therefore, appears to restrict the PFR process in its early and late stages.

Keywords: online learning; problem-based learning; problem-solving; Constructivism; instructional design; content analysis

Introduction

In a discussion on the *International Forum of Educational Technology and Society*, Nichols and Anderson (2005, ¶ 12) make two important points about instructional design for e-Learning:

> 1. E-Learning pedagogies must be *defensible*, used with some reference to proven educational practice and underpinned by accepted educational theory.
>
> 2. E-Learning pedagogies are *evolving* in the sense that new modes of practice and enhanced technological tools are continually emerging. E-Learning practice cannot remain static, but should instead seek to make the most of new opportunities.

In essence, in designing e-Learning, instructional designers must be guided by research and theory and must be willing to use it to guide them to new and justified instructional practices. In this paper, we examine the use in e-Learning of an established and well-researched pedagogy,

Problem-Based Learning (PBL), an educational strategy in which complex, ill-structured problems serve as the context and the stimulus for learning and then we report on a study to investigate the existence and nature of student problem formulation and resolution processes in an undergraduate online Problem-Based Learning (PBL) course in Agricultural Sciences.

Literature Review

PBL contrasts with more traditional subject based approaches where students are first taught a body of knowledge and then may have an opportunity to apply what they have learned to sample problems. With PBL, students work collaboratively in groups to identify what they need to learn in order to understand the problem and to learn about the broader concepts and principles related to the problem. PBL, therefore, is designed to encourage active participation by the students by immersing them in a situation. It requires them to define their own learning needs within broad goals set by faculty, then to identify and search for the knowledge that they need to obtain in order to solve the problem.

PBL, as a pedagogical approach, was developed the 1960s and has been most widely used in Medical Education. It has also been employed in a range of other fields, however, including Nursing, Dentistry and Agriculture (Barrows, 1996, 1998; Boud & Faletti, 1991; Savery & Duffy, 2001).

Defining PBL

Barrows (1998) articulated what has become one of the most widely used definitions of PBL. He termed it "authentic PBL" and argued that it has four key characteristics:

1. ***Problem-based.*** It begins with the presentation of a real life (authentic) problem stated as it might be encountered by practitioners.

2. ***Problem-solving.*** It supports the application of problem-solving skills required in "clinical practice." The role of the instructor is to facilitate the application and development of effective problem-solving processes.

3. ***Student-centred.*** Students assume responsibility for their own learning and faculty act as facilitators. Instructors must avoid making students dependent on them for what they should learn and know.

4. ***Self-directed learning.*** It develops research skills. Students need to learn how to get information when it is needed and will be current, as this is an essential skill for professional performance.

5. ***Reflection.*** This should take place following the completion of problem work, preferably through group discussion, and is meant to enhance transfer of learning to new problems.

Research on PBL

Research on PBL, especially as used in medical schools, has focused primarily on comparing the outcomes of PBL methods to more traditional instruction (Albanese, 2000; Albanese & Mitchell, 1993; Colliver, 2000; Smits, Verbeek & Buisonjé, 2002; Vernon & Blake, 1993). Much of this research has focused on the effectiveness of the pedagogy to foster learning.

A review of the literature on effectiveness on PBL in face-to-face instructional settings leads to mixed conclusions. Vernon and Blake (1993) used meta-analysis to compare 35 studies of PBL in medical education. The authors found that PBL was superior with respect to students' clinical performance, but PBL and traditional methods did not differ substantially on tests of factual knowledge. Albanese and Mitchell (1993) produced similar findings. Students of conventional curricula outperformed PBL students on measures of basic science while PBL students scored higher on clinical examinations.

A more recent study (Dochy, Segers, Van den Bossche & Gijbels, 2003) produced similar overall results. They found a mild negative effect favouring traditional approaches for the assessment of student knowledge, although these differences were encountered in first and second year of medical school and evened out in the last two years. PBL students gained slightly less knowledge but remembered more of it over time (retention). The results for skills were consistently positive favouring the PBL curriculum.

Less work has been done on the specific learning processes occurring in students engaged in PBL (Arts, Gijselaers & Segers, 2002; Hmelo, Gotterer & Bransford, 1997; Kamin, O'Sullivan & Deterding, 2001; Norman & Schmidt, 1992). Gijbels, Dochy, Van den Bossche, & Segers (2005) evaluated 40 studies in order to examine the depth of student knowledge acquisition. They applied Sugrue's (1995) integrated model of the cognitive components of problem-solving, which proposes that learners' knowledge structures consist of three levels: 1) understanding of concepts; 2) understanding of the principles linking concepts; and 3) understanding the links from concepts and principles to conditions and procedures for application. The results supported PBL at all three levels but showed that it had the most positive effects when constructs were being assessed at the level of understanding principles that link concepts.

Research on the applicability of this approach in an online, Distance Education, context is also limited (e.g., Atan, Sulaiman & Idrus, 2005; Brown, Johnson, Lima, Boyer, Butler, et al., 2004; Chanlin & Chan, 2004; Ortiz, 2004), although there has been some more extensive work on blended learning or distributed problem-based learning (dPBL) (e.g., Barrows, 2002; Björck, 2002; Bowdish, Chauvin, Kreisman & Britt, 2003; Cheaney & Ingebritsen, 2005; Lehtinen, 2002; Lopez-Ortiz & Lin, 2005; Lou, 2004; Orrill, 2002; Pearson, 2006; Ronteltap & Eurelings; 2002).

Arts, Gijselaers, and Segers (2002) reported the redesign of a course in Business Education to offer PBL in a blended learning environment. Students accessed problem materials on CD-Rom and on the Internet, but met in face-to-face PBL groups. Scores on a knowledge application test indicated that the redesigned PBL-format contributed significantly to improved cognitive gains compared to the regular PBL-setting. However, this was not a fully online PBL course.

Brown et al. (2004) discuss a problem-based learning simulation delivered via the Web for middle and high school students during a five-week period. Both males and females significantly increased their knowledge scores after the completion of the simulation, but from the project description, it seems clear that this instruction did not meet Barrows' criteria for authentic PBL.

Atan, Sulaiman, and Idrus (2005) compared the performances of students in an undergraduate Physics lesson using the Web-based PBL to that of the same students using a Web-based Content-Based Learning (CBL) in a subsequent lesson. Results significantly favoured the Web-based PBL approach, but are based on a brief, 7-item posttest. The PBL treatment was clearly quite limited in scope and likely could not be considered authentic PBL.

Finally, Pearson (2006) described the design, implementation and evaluation of a module in Business Education in which PBL was used to investigate the challenges associated with the

adoption and use of ICT in Hong Kong secondary school classrooms. An evaluation examined five questions dealing with the implementation of PBL, the extent to which PBL facilitated academic discourse, the extent of new knowledge about ICT created, the role of the tutor, and the online learning environment provided, but did not assess the instructional effectiveness of the approach.

Overall, then, there appears to be some evidence that PBL is an effective pedagogy when used over time in whole curricula. However, given the mixed results, it is uncertain that it would make any difference in instruction of shorter duration and it is not yet clear if it can be effectively employed in an online context.

Nonetheless, experimental research studies and quantitative review methods may permit relatively strong statements of certainty about effectiveness, but these statements are typically quite broad – e.g., PBL facilitates the learning of clinical reasoning skills. Such conclusions still tell us little about the cognitive processes underlying learning in such contexts and how specific instructional strategies affect such processes. For instance, Barrows and other proponents of PBL have argued strongly that this instructional approach sets the conditions for effective and deep learning of both disciplinary knowledge and of problem-solving (e.g., Albanese, 2000; Barrows, 1998, Norman & Schmidt, 1992, 2000). Moreover, Barrows (1998) claimed that only "authentic" PBL could foster both the acquisition of a deeply understood knowledge *integrated* from a variety of disciplines and *the development of effective clinical problem-solving* [emphasis added].

Purpose of the Study

While all the characteristics of PBL can be seen as important, problem-solving may be key. What does it mean to support problem-solving skills required in clinical or professional practice? What exactly are these skills? How does the instructor facilitate the application and development of effective problem-solving processes and how would one know that problem-solving was occurring?

This paper reports on an exploratory study to investigate the existence and nature of student problem formulation and resolution processes in an undergraduate online Problem-Based Learning (PBL) course in Agricultural Sciences. We accept Jonassen's (1997) model for solving ill-structured problems, which holds that problem-solving consists of two main categories: Problem Formulation and Problem Resolution (the PFR process). We describe the use of a content analysis instrument developed to measure problem formulation and resolution processes in online asynchronous discussions (Murphy, 2004a, 2004b) to analyze students' text-based, online discussions and the modification of this instrument to more closely match the specific problem-solving processes occurring in PBL. The following research questions guided the investigation:

1. What evidence is there that undergraduate Agricultural Sciences students exhibit problem-solving behaviours and skills in an online PBL course?

2. What is the nature of the problem-solving process that students apply when engaged in online PBL activities?

Methodology

Participants

The participants in this study consisted of the 11 students registered in the course and their instructor. The students were divided into two PBL groups of five and six students respectively and one student dropped the course part way through Case 1 (early October). The membership of the two groups was restructured after each case so that all students in the course worked with each other at some point in the course.

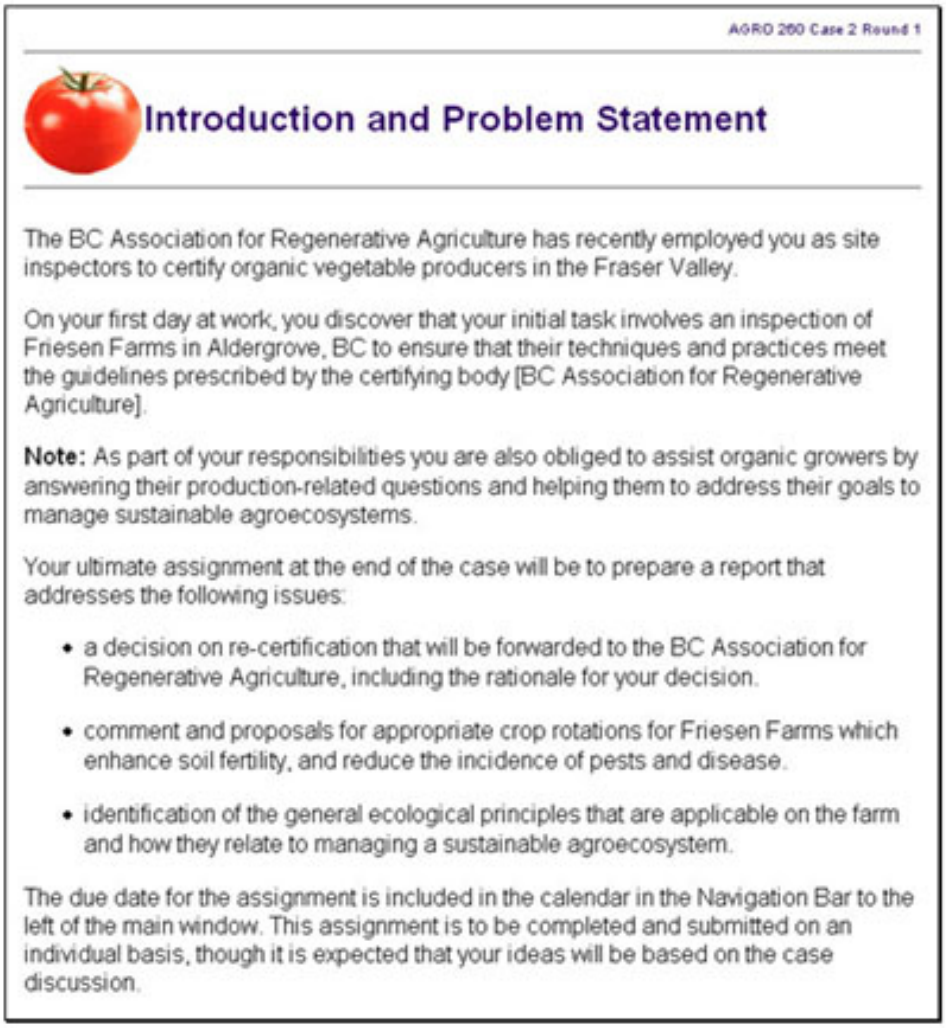
Research Setting

This study examined student and instructor interactions in an online course on AgroEcology, one of two online PBL courses taught in the Faculty of Land and Food Systems at a Western Canadian university. These courses were delivered using *WebCT™ Campus Edition 3.8.*

The use of incomplete case studies. Barrows (1998) states that a PBL approach must be *problem-based* – i.e., it should begin with the presentation of an ill-defined, complex, authentic problem. These problems usually consist of descriptions of sets of events that need explanation and provide only limited information. The course material in AgroEcology was introduced through the study of four cases impacting on the practice of Agroecology: 1) grazing ecosystems; 2) organic vegetable production; 3) tree fruit agroecosystems; and 4) genetically modified organisms and rural communities. Students were asked to play the role of consultants to "clients" presented in the case and the four assignments (one for each case) were structured as reports to these clients.

Each case was comprised of multiple rounds, each of which includes several disclosures. These disclosures presented students with the scenario that introduces the problem that they are being asked to address (See Figure 1) or else provides more information about it (supplementary disclosures). In most cases, supplementary disclosures are made available as learners discuss the scenario and identify further information that they require.

Figure 1. AgroEcology Case 2 problem statement.



AGRO 260 Case 2 Round 1

Introduction and Problem Statement

The BC Association for Regenerative Agriculture has recently employed you as site inspectors to certify organic vegetable producers in the Fraser Valley.

On your first day at work, you discover that your initial task involves an inspection of Friesen Farms in Aldergrove, BC to ensure that their techniques and practices meet the guidelines prescribed by the certifying body [BC Association for Regenerative Agriculture].

Note: As part of your responsibilities you are also obliged to assist organic growers by answering their production-related questions and helping them to address their goals to manage sustainable agroecosystems.

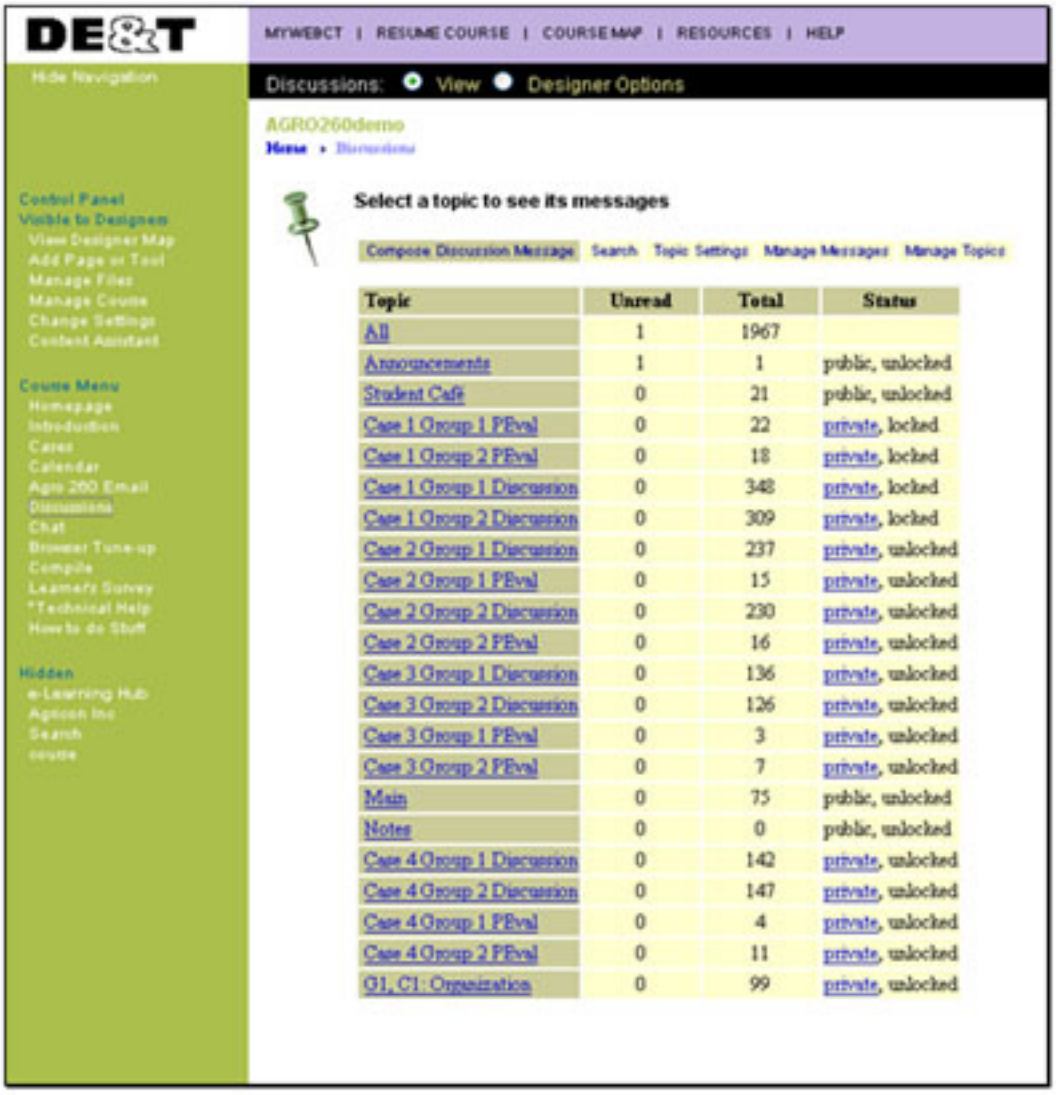
Your ultimate assignment at the end of the case will be to prepare a report that addresses the following issues:

- a decision on re-certification that will be forwarded to the BC Association for Regenerative Agriculture, including the rationale for your decision.
- comment and proposals for appropriate crop rotations for Friesen Farms which enhance soil fertility, and reduce the incidence of pests and disease.
- identification of the general ecological principles that are applicable on the farm and how they relate to managing a sustainable agroecosystem.

The due date for the assignment is included in the calendar in the Navigation Bar to the left of the main window. This assignment is to be completed and submitted on an individual basis, though it is expected that your ideas will be based on the case discussion.

In AgroEcology, each PBL group had two available discussion forums: a Process and Evaluation Forum (See Figure 2) used by the group to review and discuss ground rules for collaboration as well as the overall process for conducting work within each working round, and a Working (Discussion) Forum used by the group to carry out the actual PBL process itself.

Figure 2. AgroEcology discussion groups.



The Working Forum took the place of face-to-face meetings in which learners engage in various group processes including definition of the problem, development of working hypotheses, organization of the elements of the problem, agreement on research tasks and reporting back on research completed. The instructor participated by monitoring the discussions and making timely postings to encourage student participation, guiding the discussion of controversial points, ensuring that concepts were mastered, encouraging depth of thinking, and verifying the quality of resources used.

Analysis

Garrison, Cleveland-Innes, Koole, and Kappleman (2006) argue that a sound theoretical framework and model is essential to address validity and to guide a transcript analysis. It is the research question and purpose of the discourse that should determine the model and coding scheme used. Several transcript analysis instruments have been developed recently to measure critical thinking in an online environment (e.g., Garrison, Anderson, & Archer, 2001; McLean, 2005; Meyer, 2004). While they appear to be closely related processes however, it is not certain

that problem-solving and critical thinking are the same thing. A common definition of critical thinking (e.g., Bullen, 1998; Bailin, Case, Coombs & Daniels, 1999) is that it is thinking that is reasonable and reflective and focused on what to believe or do. Garrison et al. (2001, p. 8) view the outcome of critical thinking to be the acquisition of deep and meaningful understanding and to include problem-solving. Bailin et al. (1999), on the other hand, consider problem-solving as an arena in which critical thinking may take place. Jonassen (2000), however, regards problem-solving as a more distinct process. A problem is an unknown entity in some situations (the difference between a goal state and a current state) and problem-solving is the process of finding this unknown (p. 65).

This analysis was carried out using a content analysis instrument recently developed to measure Problem Formulation and Resolution (PFR) processes in online asynchronous discussions (Murphy, 2004a, 2004b) because it was designed specifically to measure the problem-solving process which was the focus of the research questions in this study. This instrument is based on the conceptual framework of Jonassen's (1997) model for solving ill-structured problems and consists of two main categories: Problem Formulation and Problem Resolution (the PFR process). Each category is in turn divided into several sub-processes and a series of 19 indicators for these processes (See Table 1).

In a previous pilot study (Kenny & Bullen, 2005), we conducted a post-hoc, descriptive content analysis of all discussions of the Working Forums for both PBL groups for Case 1. This consisted of 348 separate postings for Group 1 and 309 postings for Group 2. This initial analysis applied Murphy's (2004b) revised instrument. On the basis on this pilot analysis, we then further modified the instrument to more closely match the PBL process occurring in this online course. Murphy (2004b) points out that, to accurately measure the construct (problem-solving) that they purport to measure, such instruments must adequately encompass important aspects of the construct and eliminate aspects distinct from, or surplus to, the intended construct being measured. To do so, the construct can be refined empirically through its manifestations in real contexts. The version of the instrument used in this study is shown in Table 1.

Table 1. Processes and Indicators for Identifying and Measuring PFR in PBL.

Process	Indicator
Problem formulation	
Articulating problem space	No indicator provided
Defining problem space	Agreeing with problem as presented in OAD
	Specifying ways that the problem manifests itself
	Redefining problem within problem space
	Minimizing and/or denying problem
	Identifying extent of problem
	Identifying causes of problem
	Articulating a problem outside problem space
Building knowledge	Identifying unknowns in knowledge
	Seeking information to resolve lack of knowledge
	Clarifying (meaning, importance, accuracy of) information
	Accessing and reporting on sources of information
	Identifying value of information
	Reflecting on one's thinking
Problem resolution	
Identifying solutions	Proposing solutions
	Hypothesizing about solutions
Evaluating solutions	Agreeing with solutions proposed by others
	Weighing and comparing alternative solutions
	Critiquing solutions
	Rejecting/eliminating solutions judged unworkable
Reaching conclusions	Coming to agreement about solutions
Acting on solutions	Planning to take action to resolve the problem

Specifically, we discovered that several aspects of the instrument either did not apply in PBL as implemented in this particular course, or else we found the description of some processes and indicators confusing, missing or out of order. First, no indicator was provided for the process, articulating problem space. This process is a part of the overall PFR process, but, as was also the case in Murphy's studies, PBL problems are given to the learners, so it is not necessary to include indicators in the instrument.

Second, we added a new indicator, Clarifying Information, because our analysis revealed that students spent a considerable part of their discussion clarifying the meaning of, the importance of, or the accuracy or currency of information. This indicator added specificity to the process of building knowledge. An example of a posting from Case 1 demonstrating this process is listed below:

> *At the end, AUM does mean the number of animals, but this is where the unit kg comes from.*
>
> *I hope this is clear to everyone. Ask me more questions if anything doesn't make sense (it's 1:39am and i'm not thinking too clearly anymore . . .).*

Third, we added a new process, Reaching Conclusions, to the second phase of Problem Resolution. In Murphy's (2004b) most recent version of the instrument, this was included as an indicator under the process, Acting on Solutions. We considered this to be a process in and of itself and that it followed directly from the process of evaluating solutions, i.e., one which takes place prior to actually taking action to implement a solution. Murphy (2004b) added this category as a result of the analysis leading to the revisions of the first version of the instrument. She noted that "there were cases where participants indicated intentions, but did not explicitly state a plan of action. Instead, they may have simply reached a conclusion . . . (p. 350)."

Finally, we kept the last process, Acting on Solutions. In her first paper, Murphy (2004a) notes that Acting on Solutions represents the culmination of PFR "whereby individuals can apply the results of a problem in an actual context (p. 10)." Since we had moved Reaching Conclusions up to become a new process, this left only one indicator for this process, which was "planning to take action to resolve the problem." For instance, Murphy (2004a, p. 12) gives the following example of Planning to Act: "Personally, I have decided to speak English the first day of classes." This is clearly a statement about what the individual will do as a result of the problem solving process.

However, we concluded that this stage was not relevant for the PBL process as used in this course because students were not actually asked to go out on the farm and apply the solutions. The solution was, in effect, the final assignment for the case, the mock consultant's report. Initially, the first author considered the following posting from Case 1 an example of planning to act if this process included creating the report:

> *I was hoping we'd all "vote" for one, although i know it's early, but I think Joan will need some cow math for tomorrow, so for now I am gonna go with my plan as described above and do herd calculations. It's not final, but just to get some numbers . . . :)*

After discussion, we decided it did not fit into Planning to Act because it doesn't refer to how the student might apply a solution they worked out. Instead, it simply states what more he is going to do to reach a solution and refers to the organization of the PBL group activities in order to move forward with the class process. We eventually included postings of this sort into a catch all

organizational category that we labelled PBL Organization. This may well be an issue of the "artificiality" of PBL problems in that they are realistic, but not actual real life activities.

Garrison et al. (2006) characterize transcript analysis as an exploratory, qualitative methodology and point out that the goal is descriptive, to attempt to understand the existing interactions. As such, they recommend the use of a negotiated agreement in which coders first code transcripts separately and then discuss their respective coding to arrive at a final version in which coded messages have been brought into alignment. This approach was applied to this analysis. The first author coded the discussions for both Group 1 Case 2 and for Group 2 Case 2, while a graduate assistant (the third author) also coded Group 1 Case 2 and the second author coded the Group 2 Case 2 discussion. To code, we followed the data analysis processes outlined in Murphy and Ciszewska-Carr (2005), in which the authors advocate the paragraph as unit of analysis and recommend a three level analysis process: 1) first to code units at the level of the category (i.e., is this unit an example problem formulation/understanding or is it problem solving/ resolution?); 2) next to re-code at the level of the process; and 3) to code a third time using the indicators. While the paragraph was taken as the unit of analysis, we coded each paragraph for instances of (one instance each of) multiple indicators. Finally, each pair of coders met in several sessions to discuss and reconcile disagreements and to arrive at a negotiated agreement as reported below.

Results

As indicated above, we followed a three level analysis process: 1) to first code paragraphs at the level of the category, i.e., as problem formulation or as problem resolution; 2) to next re-code at the level of the process; and 3) to code a third time using the indicators. The total number of postings for the Case 2 Group 1 discussion was 237 and 230 for Group 2. Table 2 shows the results of the coding at the level of category for Case 2 Groups 1 and 2. Nearly half of the postings for Group 1 were viewed as problem formulation while nearly two thirds of the postings for Group 2 were placed in that category, while postings judged as problem resolution ranged around twenty percent. One third of all postings for Group 1 and 20 percent for Group 2 were judged as organizational or social and not representative of the problem-solving process.

Table 2. Coding of PFR Categories in AgroEcology Case 2 – First Pass

Category	# Codings - Group 1	% of Codings[a]	# Codings - Group 2	% of Codings
Problem Formulation	228	48.7	365	63.3
Problem Resolution	85	18.2	147	22.2
PBL Organization	144	30.8	60	19.5
Social Postings	11	2.4	5	1.5

a. Percentage in Table 2 is based on the total number of codings made overall during the first pass through the data. This includes PBL Organization and Social postings.

Table 3 provides the results of the codings at the level of process for Case 2 Groups 1 and 2. Two thirds of the postings for both Group 1 and Group 2 were judged to involve the process of building knowledge. Within the category of Problem Formulation, the process of defining problem space was represented by only five percent of the postings for each group.

Table 3. Coding of PFR Processes in AgroEcology Case 2 Group 2- Second Pass.

Process	# Codings -Group 1	% of Codings[b]	# Codings - Group 2	% of Codings
Problem Formulation				
Defining problem space	17	5.1	25	4.8
Building knowledge	217	65.6	349	66.3
Problem Resolution				
Identifying solutions	40	12.1	96	13.1
Evaluating solutions	41	12.4	44	8.4
Reaching conclusions	16	4.8	12	2.3
Acting on solutions	0	0.0	0	0.0

b. Percentage in Table 3 is based on the total number of Process level codings made during the second pass through the data. PBL Organization and Social postings were not included.

Less than one third of the postings for each involved the category of Problem Resolution and these were fairly evenly divided between identifying and evaluating solutions. The two groups engaged in the process of reaching conclusions in less than five percent of their activities and there were no coded instances of acting on conclusions.

Table 4 provides the results of the codings at the level of indicator for Case 2 Groups 1 and 2. These findings necessarily mirror those of Pass 2 and provide detail about the nature of the problem-solving processes. Five percent of codings fell within the process of Defining the Problem Space. Of these, the majority (four percent of the total indicator codings) were assessed as identifying the extent of the problem. The majority of codings in Pass 2 were judged as being representative of the process of Building Knowledge.

Table 4. Coding of PFR Processes in AgroEcology Case 2 Group 2- Third Pass.

Indicator	# Codings - Group 1	% of Codings[c]	# Codings - Group 2	% of Codings
Defining problem space				
Agreeing with problem	1	0.3	0	0
Ways problem manifests	1	0.3	7	1.1
Redefining problem	3	0.8	0	0
Minimizing problem	0	0.0	0	0
Extent of problem	14	4.0	13	2.1
Cause of problem	0	0.0	7	1.1
Outside problem space	0	0.0	0	0
Building knowledge				
Identifying unknowns	23	6.0	41	6.7
Seeking information	37	9.3	57	9.3
Clarifying information	70	17.5	70	11.4
Reporting information	97	24.3	222	36.2
Value of information	26	6.5	13	2.1
Reflecting on thinking	10	2.5	2	0.3
Identifying solutions				
Proposing solutions	35	8.8	73	11.9
Hypothesizing	22	5.5	65	10.6
Evaluating solutions				
Agreeing with solutions	19	4.8	13	2.1
Weighing alternatives	15	3.8	10	1.6
Critiquing solutions	5	1.3	16	2.6
Rejecting solutions	5	1.3	5	0.8
Reaching conclusions				
Coming to agreement	16	4.0	0	0.0
Acting on solutions				
Planning to take action	0	0.0	0	0.0

c. Percentage in Table 4 is based on the total number of Indicator level codings made during the third pass through the data. PBL Organization and Social postings were not included.

Most of these were seen as examples of mainly three indicators:

1. Accessing and reporting sources of information, which encompassed nearly twenty-five percent of the indicator codings for Group 1 and well over one third for Group 2.

2. Clarifying the meaning, importance or accuracy of information, which covered nearly eighteen percent of postings at this level for Group 1, and over ten percent for Group 2.

3. Seeking information, which involved nearly ten percent of the activities of both groups.

The processes of Identifying Solutions and Evaluating Solutions were the next most highly represented processes in Pass 2 and evenly represented. The process of Identifying Solutions was described by two indicators, proposing solutions and hypothesizing about these solutions. Both indicators were relatively evenly covered in this analysis and ranged from nearly six percent to twelve percent of the codings in Pass 3. The process of Evaluating Solutions included four indicators: agreeing with solutions proposed by others, weighing and comparing solutions, critiquing solutions, and rejecting solutions judged unworkable. The coverage of these indicators in our analysis was quite variable, ranging from a high of nearly five percent for agreeing with solutions for Group 1 to a low of less than one percent for Group 2.

The process of Reaching Conclusions was described by only one indicator, coming to agreement about solutions. This indicator was judged as occurring in four percent of the codings for Group

1, but the coders for Group 2 were unable to agree if the 12 instances of this process found in Pass 2 were described by this indicator. Rather, it was felt that a new indicator was needed.

Discussion

The PFR Process and PBL

The students in this course were engaged in a highly structured PBL process. In each of the four cases, they were presented with an explicit, if relatively ill-defined, problem situation to resolve and were asked to produce a solution in a specific format. For example, for Case 2, they were asked to produce a consultant's report in the form of recommendation of the re-certification of a farm as organic and to provide a crop rotation plan (see Figure 1). Since this solution was also a course assignment (worth marks), they were not likely to deviate substantially from it. The overall results show that all aspects of the problem formulation and resolution process were being fostered within the parameters of the PBL process applied in this course with the exception of the process of Acting on Solutions.

As indicated previously, analysis of the PFR process occurred in three stages (passes): 1) first at the level of category (Problem Formulation and Problem Resolution); 2) at the level of sub processes for each category (see Table 1); and 3) at the level of indicators for each process. Nearly half of the postings for Group 1 and two thirds of the postings for Group 2 were viewed as Problem Formulation, while postings judged as Problem Resolution ranged around twenty percent. The PBL process is structured to direct learners, within their collaborative groups, to quickly determine what they do and do not know, then to conduct research to fill in the missing information and report back to the group. Only then do they attempt to come to conclusions or develop solutions. Therefore, where students are new to the subject domain, it is not unexpected that a substantial part of the activity of the group be focused on Problem Formulation, especially on the process of building knowledge. This appeared to be the case in this course since the course was offered at the second year undergraduate level (Agro 260) and the course instructor noted that these students were just getting used to the PBL model of instruction (K. Nolan, *personal communication*, July 15, 2005).

The analysis of the PFR processes occurred in the second stage (Pass 2). No indicator was provided for the process of Articulating the Problem Space and it was not coded. As in Murphy's (2004a) study, while this process is recognized as a part of the PFR model, explicit and relatively detailed problems were given to the students and they were not required to engage in this activity. Moreover, for both PBL groups, the investigators found low activity (five percent) in the first category of defining the problem space. This is not surprising given the nature of the PBL process and the strong structure of this course. Since the students were required to produce written assignments for marks based on the problems as presented, they were unlikely to disagree with it as stated or to attempt to redefine it. Indeed, for both PBL groups, the greatest number of postings coded as representing this process fell under the indicator, Identifying the Extent of the Problem, which would indicate that the students were not engaged in redefining the problem, articulating new problems, or otherwise redefining the problem space. In PBL as represented in this course, the problem space comes pre-defined.

For each group, the investigators discovered the highest activity by a wide margin under the process of Building Knowledge. Whether conducted in a face-to-face instructional setting or online, the PBL process puts considerable onus on the students to decide what they do and do not know about the problem to be solved and then to conduct research on those topics which are unknown. Topics to be researched are typically divided up between group members, who then report back to the group with their findings. In Case 2 of this course at least, the students clearly

focused mainly on seeking and reporting back information and on clarifying the meaning and the importance of what they had found.

After Building Knowledge, the next mostly highly coded processes were those of Identifying Solutions and Evaluating Solutions. Students in this course engaged in both processes nearly equally. The solutions to the problems the students were required to solve in this course, as in all PBL instruction, were complex and composed of multiple components. Group members needed to determine the nature of these sub-solutions and to agree on them. It was, therefore, to be expected that there would be evidence of the processes of identifying solutions, evaluating them and drawing conclusions. While they differed in the quantity of their assessments, both sets of coders found multiple instances of most indicators of these processes. The one exception was that, while they found 12 instances of the process, Reaching Conclusions, the investigators coding Group 2 did not code any instances of the indicator, Coming to Conclusions. Rather, after extensive discussion, we decided that a new indicator, Proposing Conclusions, was needed. The following postings from Group 2 members represent this indicator:

> *I agree . . . If any certification is granted, there are a lot of things that need to be substantiated. It is strictly against the guidelines to use animal manure from animals that are not 'organic' ones. Because this hasn't been specified, I think it is safe to grant the farm a conditional certification as Joan has suggested.*

And

> *SO as we have been discussing in the thread below on water quality, maybe the pH level in the water (resulting in it not being classified as acceptable water to rinse the veggies in) is reason enough for Friesen farms not to be recertified? What do you all think?*

The most significant finding in this second analysis was that neither investigator coded any instances of Acting on Solutions. This is consistent with our concern about whether this stage is relevant for the PBL process because students were not actually asked to go out on a farm to actually apply the solutions. Rather, they had to write up their solutions as recommendations in a course assignment. Since these assignments were not available to the investigators, there was not a visible product to allow us to verify the existence of this process. This finding is also consistent with the nature of the problems that students were given in this case. That is, they did not require solutions to be implemented but only that the solutions are articulated in a "consultant's" report. One would not reasonably expect to find examples of Acting on Solutions given this type of assignment.

Limitations of the Study

There are two potentially related problems with the use of the PFR instrument as applied in our analysis: 1) the choice of the unit of analysis; and 2) the accuracy of the current instrument for representing the PFR processes in a PBL context. A third potential limitation relates to the possibility that the transcripts analysed may only be reflecting a restricted component of the PBL process.

Choice of the unit of analysis. As indicated above, we assumed the paragraph to be the unit of analysis. This procedure allowed us to code the same postings consistently among coders. Fahy (2001) pointed out that when the focus is on the meaning [original emphasis] of the interaction of the conference, the unit of analysis [original emphasis] must be something obvious and constant within transcripts. He concluded that this should be the sentence or independent clauses that

could be structured as sentences if punctuated differently. The semantic or notional meaning may indeed transcend textual structures, but structural elements of text help form and convey [original emphasis] the notional relationships of the argument (Fahy, 2001, ¶12). Murphy (*personal communication*, October 4, 2005), however, disagrees with the choice of the sentence as the unit of analysis, arguing that it is insufficient to convey meaning and represents a potentially onerous analysis process. Having now completed two full analyses of PBL cases from this course, we would agree with Murphy that the sentence is rarely sufficient to convey full meaning in this circumstance. We also found, however, that it was often difficult to determine exactly when a part of a posting was a paragraph (e.g., many times, one sentence was separated from the others) and, even when the paragraph structure was clear, this unit was often still insufficient to convey meaning. We found many instances where the meaning of a posting carried over two or more paragraphs. For instance, on a number of occasions, the second author argued that the two indicators, Proposing Solutions and Hypothesizing about Solutions, were inseparable and should be one. Yet, all three coders found instances where a student proposed a solution in one paragraph and then explained it in the following paragraph.

Representing the PFR processes in a PBL context. A second issue concerns the suitability of the PFR instrument for measuring problem solving in a PBL context. Murphy and Ciszewska-Carr (2005) obtained a high level of inter-coder agreement (a kappa coefficient of 0.825 for the two categories of Problem Formulation and Problem Resolution), but they also used the instrument to analyze a discussion that was specifically structured to parallel the problem formulation and resolution process. The discussion was divided into eight tasks, each of which asked the learners to apply a step in the PFR model; e.g., the first task required participants to reflect on their initial knowledge of the problem and to post a message describing their understanding of the problem.

Our results indicate that the PBL process can be seen to broadly follow the PFR scheme. The process of Defining the Problem, however, is minimally represented and only then by one principle indicator (Identifying the Extent of the Problem) and there were no instances of the process, Acting on Solutions. The degree to which learners fully engage in the PBL process depends on guidance they receive via instructional materials and the interventions of the PBL instructor, their understanding of the process and the complexity of the material being engaged. In essence, PBL represents a real life problem-solving activity, but one which may not cleanly compliment the PFR model.

This being said, as discussed above, we did modify the original instrument to more fully match the PBL process on the basis of findings of our pilot study, (Kenny & Bullen, 2005), so one would expect better agreement. It may be necessary to modify the instrument further or else select a different instrument. In particular, the terminology of category, Problem Formulation, creates confusion because, on the face, it suggests that students would be engaged in defining what the problem is. The PBL approach, however, as manifested in this course, provides students with the problem and, through supplementary disclosures, much of the additional relevant information. Their task is to clearly identify the nature of the problem, identify what missing information they need, and to develop solutions. There was no need for the learners to formulate the problem in the sense represented by many of the PFR indicators, such as “specifying ways that the problem manifests itself” or “redefining problem within problem space.”

Rather than a question of clarifying terminology, this may require the recognition of the overlap in these problem-solving processes, that is, to accept that problem-solving is highly recursive in nature. Murphy (2004a) clearly views Problem Formulation as both understanding the problem within its context and building a body of knowledge about the problem area. In applying the instrument in this analysis, we frequently found that those postings we regarded as Building

Knowledge fit more within the realm of Problem Resolution than Problem Formulation because they focused on gathering and clarifying information for constructing solutions rather than clarifying the nature of the problem itself. An example follows of a posting which might fit into either (or both) the problem formulation and problem resolution categories. The posting discusses the use of commercial and "home grown" manure on an organic farm.

> *Right now, I'm not sure what 'words of wisdom' I can offer Ann [the farmer in the case study for whom the report if being written] (I myself am still unsure about integration of all the research info into specific applications for the case). The only thing I can suggest from this info is that Ann is safer to use processed manure from a company, although this is likely to be more expensive than unprocessed manure from a producer. If economics are a concern, and Ann wishes to continue using manure from a producer (or from her own animals; this issue is still up in the air) she must ensure that it ages long enough to avoid the risk of pathogens and introduction of weeds. I think once we have a firm grasp on the soil condition, we can make a good decision on what type of fertilizer should be used (i.e. from what animal and amount it has been processed) and whether or not animals should be kept on the farm.*

Clearly, when the students refer to integrating research into specific applications for the case, they are engaging in developing a solution and, therefore, Problem Resolution. Learning more about the issue of which form of manure to use, however, could be seen as either understanding the problem or elucidating a solution.

Possible use of other methods of communication in the PBL process. Did the students also use email or instant messaging, talk on the telephone, or meet in person? Did our analysis miss a significant part of the PBL group process, and hence, the problem-solving activity that occurred during the course? While we did not examine this question directly, there are several reasons to believe that the students in this course did not use other methods to collaborate and that they restricted their PBL deliberations to the working forum provided. First, the course instructions, which directed the students to use the discussion forum provided for group collaborations, were clear and very detailed. Moreover, the instructor was present from the start and very active in guiding the discussions throughout and she only used the discussion forum. The PBL groups appeared to closely follow her guidance in the PBL process and to restrict themselves to the working forum in particular (i.e., there was little use even of the Process and Evaluation Forum). Second, we found no instance in any of the transcripts of students asking fellow members of the PBL group to use a different communications medium (e.g., exchanging instant messaging usernames). In fact, in several postings, group members asked if another student was currently online, that is, the PBL group members were sometimes using the discussion forum as a form of instant messaging by posting and then waiting for a reply. And finally, we did find one instance where two of the PBL group members discussed encountering each other in a different, face-to-face, course. They mentioned how nice it was to meet in person, but made no reference to meeting in this way for the PBL process. In fact, one of the students in one group moved to Central America during the course and communicated from that location for half the course, so meeting in person was not in any case always feasible.

Conclusions and Implications

This was an exploratory study designed to examine two questions within the context of the specific, online PBL course examined: 1) what evidence is there that PBL fosters problem-solving behaviours and skills; and 2) what is the nature of the problem-solving process which students apply when engaged in PBL activities? From our analysis, it appears that online PBL can

foster problem-solving behaviours in learners, at least in the sense that learners are required to engage in problem-solving activities. The more causal question of whether or not online PBL of this nature teaches or enhances problem-solving skills cannot be answered in an exploratory study and with this data. A future study examining the impact on student activities of both the instructional design of the course and the behaviour of the instructor might begin to shed some light on this question.

Based on our results, it also appears that problem-solving in the online PBL context, as represented by Jonassen's (1997, 2000) PFR process, is constrained by the instructional design of the course, and, therefore, somewhat limited in nature. Learners were not asked to engage in Articulating the Problem Space and only minimally focused on Defining the Problem Space, nor did they employ the process of Acting on Solutions. Jonassen (2000) differentiates between well-structured and ill-structured problems. Well-structured problems have a clear initial state (what is known) and the nature of the solution is well defined, while ill-defined problems have solutions that are not predictable or convergent which may also require the integration of several content domains.

In this context, students were provided with limited information about the problems, but the problems also had well-defined initial states and required a clear and specific form of solution. Learners were presented with a clear problem statement (See Figure 1) and several further disclosures of information throughout the case. They were also presented on the second day with an extensive set of questions to consider, which helped the students considerably to determine the learning issues they had to address. In other words, they were well-structured problems. In order to more fully engage learners in the initial processes of the PFR model of problem solving, instructors and instructional designers may need to provide much less structure in terms of ill structured, open-ended problems and to allow for more flexibility in the directions that learners can take in arriving at solutions to the problems. It may, for instance, be advisable to avoid linking the PBL problems to specific marked assignments and, instead, base course assessments on other measures of the knowledge and skills acquired through the PBL process.

Finally, while the course instructor regarded the problems as "quite realistic" and, therefore, having some of the characteristics of ill-structured problems by virtue of being similar to those are encountered in professional practice (K. Nolan, *personal communication*, July 15, 2005), they are not actual, real life problems in which the solutions are to be put into practice. PBL problems tied to field or practicum type experiences might well engender the full range of PFR behaviours and lead to a more complete problem-solving process.

Barrows' (2000) concept of "authentic" PBL is intended to support the application of problem-solving skills required in "clinical practice." While this study provides some evidence that online PBL experiences can be designed which do foster problem-solving, more studies examining a range of online PBL contexts and instructional designs will be needed to confirm and detail this conclusion.

References

Albanese, M. A. (2000). Problem-Based Learning: Why curricula are likely to show little effect on knowledge and clinical skills. *Medical Education*, *34*, 729-738.

Albanese, M. A., & Mitchell, S. (1993). Problem-Based Learning: A review of the literature on its outcomes and implementation issues. *Academic Medicine*, *68*(1), 68-81.

Arts, J. A. R., Gijselaers, W. H., & Segers, M. S. R. (2002). Cognitive effects of an authentic computer-supported, problem-based learning environment. *Instructional Science, 30*(6), 465-495.

Atan, H., Sulaiman, F., & Idrus, R. M. (2005). The effectiveness of problem-based learning in the web-based environment for the delivery of an undergraduate physics course. *International Education Journal, 6*(4), 430-437.

Bailin, S., Case, R., Coombs, J. R. & Daniels, L. B. (1999). Conceptualizing critical thinking. *Journal of Curriculum Studies, 31*(3), 285-302.

Barrows, H. S. (1996). Problem-Based Learning in Medicine and Beyond: A brief overview. *New Directions for Teaching and Learning, 68*, 3 – 12.

Barrows, H. S. (1998). The essentials of problem-based learning. *Journal of Dental Education, 62*(9), 630-633.

Barrows, H. S. (2002). Is it truly possible to have such a thing as dPBL? *Distance Education, 23*(1), 119-122.

Björck, U. (2002). Distributed problem-based learning in social economy – key issues in students' mastery of a structured method for education. *Distance Education, 23*(1), 85 – 103.

Boud, D., & Faletti, G. (1991). *The challenge of problem-based learning.* London: Kogan Page.

Bowdish, B. E., Chauvin, S.W., Kreisman, N., & Britt, M. (2003). Travels towards problem based learning in medical education (VPBL). *Instructional Science, 31*(4-5), 231-253.

Brown, S., Johnson, P., Lima, C., Boyer, M., Butler, M., Florea, N., & Rich, J. (2004, June). The GlobalEd Project: Problem-solving and decision making in a web-based PBL. *World Conference on Educational Multimedia, Hypermedia and Telecommunications*, Lugano, Switzerland. Retrieved June 15, 2006 from: http://dl.aace.org/15686

Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education, 13*(2), 1-32.

Colliver, J. A. (2000). Effectiveness of Problem-Based Learning Curricula: Research and theory. *Academic Medicine, 75*(3), 259-266.

Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of Problem-Based Learning: A meta-analysis. *Learning and Instruction, 13*, 533-568.

Fahy, P. J. (2001). Addressing some common problems in transcript analysis. *International Review of Open and Distance Learning, 1*(2). Retrieved October 11, 2005 from: http://www.irrodl.org/index.php/irrodl/article/view/321/530

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7-23.

Garrison, D. R., Cleveland-Innes, M, Koole, M., & Kappleman, J. (2006). Revisiting Methodological Issue in Transcript Analysis: Negotiated coding and reliability. *Internet and Higher Education, 9*, 1-8

Gijbels, D., Dochy, F., Van den Bossche, P., & Segers, M. (2005). Effects of Problem-Based Learning: A meta-analysis from the angle of assessment. *Review of Educational Research, 75*(1), 27 – 61.

Jonassen, D. H. (1997). Toward a design theory of problem solving. *Educational Technology Research and Development, 48*(4), 63-85.

Jonassen, D. H. (2000). Instructional design models for well-structured and ill-structured problem-solving learning outcomes. *Educational Technology Research and Development, 45*(1), 65-94.

Kenny, R. F., & Bullen, M. (2005, October). A study of problem formulation and resolution in an online problem-based learning course. Paper presented at the annual meeting of the *Association for Educational Communications and Technology*, Orlando, FL.

Lehtinen, E. (2002). Developing Models for Distributed Problem-Based Learning: Theoretical and methodological reflection. *Distance Education, 23*(1), 109-117.

Lopez-Ortiz, B. I., & Lin, L. (2005). What makes an online group project work? Students' perceptions before and after an online collaborative problem / project-based learning (PBL) experience. *International Journal of Instructional Technology and Distance Learning, 2*(2). Retrieved July 7, 2005 from: http://www.itdl.org/Journal/Feb_05/article04.htm

Lou, Y. (2004). Learning to solve complex problems through between-group collaboration in project-based online courses. *Distance Education, 25*(1), 49 – 66.

McLean, C. L. (2005). Evaluating Critical Thinking Skills: Two conceptualizations. *Journal of Distance Education, 20*(2), 1-20.

Meyer, K. A. (2004). Evaluating Online Discussions: Four different frames of analysis. *Journal of Asynchronous Learning Networks, 8*(2), 101-113.

Murphy, E. (2004a). Identifying and measuring ill-structured problem formulation and resolution in online asynchronous discussions. *Canadian Journal of Learning and Technology, 30*(1), 5-20. Retrieved January 26, 2005 from: http://www.cjlt.ca

Murphy, E. (2004b). Promoting construct validity in instruments for the analysis of transcripts of online asynchronous discussions. *Educational Media International, 41*(4), 347 – 354.

Murphy, E. & Ciszewska-Carr, J. (2005). Identifying sources of difference in reliability in content analysis of online asynchronous discussions. *International Review of Open and Distance Learning, 6*(2). Retrieved October 11, 2005 from: http://www.irrodl.org/index.php/irrodl/article/view/233/408

Nichols, M., & Anderson, B. (2005). Strategic e-learning implementation. Discussion paper of the *International Forum of Educational Technology & Society*. Retrieved July 7, 2005 from: http://ifets.ieee.org/discussions/discuss_july2005.html

Norman, G. R., & Schmidt, H. G. (1992). The Psychological Basis of Problem-Based Learning: A review of the evidence. *Academic Medicine, 67*, 557-565.

Norman, G. R., & Schmidt, H. G. (2000). The effectiveness of problem-based learning curricula: theory, practice and paper darts. *Medical Education, 34*, 721-728.

Orrill, C. H. (2002). Supporting Online PBL: Design Considerations for supporting distributed problem-solving. *Distance Education, 23*(1), 43-57.

Pearson, J. (2006). Investigating ICT using problem-based learning in face-to-face and online learning environments. Computers and Education 47, 56–73.

Ronteltap, F., & Eurelings, A. (2002). Activity and interaction of students in an electronic learning environment for problem-based learning. *Distance Education, 23*(1), 11-22.

Savery, J. R., & Duffy, T. M. (2001). *Problem Based Learning: An instructional model and its constructivist framework* (Tech. Rep. No. 16-01). Indiana University, Center for Research on Learning and Technology.

Smits, P. B. A., Verbeek, J. H. A. M., & de Buisonjé, C. D. (2002). Problem-Based Learning in Continuing Medical Education: A review of controlled evaluation studies. *British Medical Journal, 324*, 153-156.

Vernon, D. A., & Blake, R. L.(1993). Does Problem-based Learning Work? A meta-analysis of evaluative research. *Academic Medicine, 68*(7), 550-563.

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Online Faculty Development and Assessment System (OFDAS)

Luis M. Villar
University of Seville
Spain

Olga M. Alegre
University of La Laguna
Canary Islands

Abstract

The rapid growth of online learning has led to the development of faculty inservice evaluation models focused on quality improvement of degree programs. Based on current 'best practices' of student online assessment, the Online Faculty Development and Assessment System (OFDAS), created at the Canary Islands, was designed to serve the dual purpose of faculty development and classroom learning environment assessment. Results, as illustrated in this paper, show that the OFDAS encouraged faculty to reflect on the professionalism of their teaching skills. Implications are discussed in terms of emphasizing the process of online teaching, knowledge acquisition, and incorporating varying perspectives, all which yielded a comprehensive view of faculty teaching attitudes and their relationship to student's perceptions of their classroom environment.

Keywords: Faculty development; teaching professional skills; online student learning; environment assessment; online professional development

Introduction

Online Faculty Development and Evaluation System

The Online Faculty Development and Assessment System (OFDAS) is a voluntary professional skill program. The course encompassed three components: 1) online faculty professional skill learning experiences; 2) faculty professional skills learning assessments; and 3) a student online learning environment assessment.

The critical issues in designing OFDAS included, among others, planning, organizing, structuring, tracking, reporting, and communicating assessments – efforts which took time and required orderliness on the part of the online program advisers. Based on their experiences, we found the following five-stage design process to be a highly effective strategy:

1. Provision of a face-to-to face workshops (four hours long)

2. The design of sequenced, structured, and comprehensive lessons. The learning activities of these lessons sought to engage and direct the OFDAS faculty participants in the 'process' of professional skills acquisition

3. An online support system was established to help faculty scaffold their teaching and learning, provide a mechanism for targeted feedback from mentors, and provide a safe forum for sharing ideas and problems with other faculty participants

4. Provision and coordination of learning resources to help faculty successfully complete their learning activities

5. Provision of a detailed inventory of students online classroom assessments, which enabled faculty to reflect upon and access feedback on their teaching performance

The OFDAS model recognizes faculty personal and professional objectives at various stages of their academic career. As such, it was necessary to create diverse training strategies. Accordingly, prior to the implementation of the OFDAS, the amount of time needed to complete the professional development program was negotiated with higher education institutions. A formal face-to-face workshop was delivered prior to starting the online course as well. Finally, in an attempt to ensure intrinsic motivation and to encourage participation among faculty, an official learning certificate was developed.

Faculty Continuing Learning Opportunities: Skills development

The authors developed a framework for training professional skills reflective of student-centred education (Villar, 2004); that is, a framework that focused student learning experiences and processes within the university social context (Badley, 2000). Prior to engaging in the OFDAS, it was expected that faculty have a deep understanding of their scientific field, as well as requisite pedagogical and didactic skills specific to their discipline. Accordingly, the concept of 'professional skill' was defined by the authors as: *"an integrated set of knowledge, beliefs, abilities and attitudes that were basic for good performance in various university teaching settings."* Common elements in the OFDAS program were to develop faculty competence in the design of curriculum and course material, and help faculty acquire didactic and guidance skills (Tigelaar, Dolmans, Wolfhagen, & Van Der Vleuten, 2004). Three basic principles predominated in OFDAS: helping faculty understand that, 1) academics and students are different, thus curriculum and implementation of classroom methods must be designed to respect student diversity and identity; 2) professoriate are dependent on one another in collegial and classroom interactions; and 3) online faculty development courses increase one's own decision-making processes and learning by online student assessment. Consequently, ten professional skills were proposed (see Figure 1).

Online Assessment and Feedback

Online assessment of classroom teaching and learning processes has been the focus of numerous studies that examine the degree this method of assessment influences and facilitates changes within learning organizations. Online assessment questionnaires should contain student demographic information such as age and gender, as well as other items seeking students' opinions about the quality of the course (Lounsbury, Saudargas, Gibson, & Leong, 2005). Recommendations for the online classroom climate assessment has components similar to conventional assessments. For example, some scholars focused their attention on 'grading procedures' and were very explicit when such tasks, projects, and tests should be assigned (Summers, Waigandt, & Whittaker, 2005).

From an administrative point of view, research has been conducted examining 'why' online course evaluation should be used. According to this body of research, online course evaluations lower costs, allow more time for teaching, lessens administrative burden, and so on (Ballantyne, 2003). The question remaining for us, therefore, was whether online student feedback gathered from questionnaires (see Appendices A and B) actually does lead to improvements in teaching quality. Until recently, these types of feedback tools (i.e., questionnaires) have formed the basis upon which to compare teachers, departments, and even universities. However, although correlations have been found to exist between teaching quality and online student feedback, it does not necessarily imply causality, as other factors could also affect the quality of teaching over time (Kember, Leung, & Kwan, 2002).

Literature on students' assessment of classroom environments has been on the rise for over a decade (Aldridge & Fraser, 2000) and the field of learning environments has undergone remarkable "diversification and internationalisation" (Fraser, 1998, p. 7). Evidence (largely derived from on-demand university teaching quality assessments) has accrued regarding the potential of classroom learning environment assessments and their ability to improve university-level teaching and learning, as well as staff development (Dallimore, Hertenstein, & Platt, 2004). For example, classroom climate questionnaires administered in a field-specific class were found to result in reflective changes in learning and instruction (Wildman, Hable, Preston, & Magliaro, 2000).

Designing Powerful Interactive Learning Environments: The case of OFDAS

Following are some key features of the online course used in this study:

1. Faculty were given a professional skills handbook (Villar, 2004). This handbook (with specific focus paid to teaching innovation and student learning) reviewed several sources on college teaching, and identified critical professional skills related to class preparation, classroom structure, and organization.

2. Materials were broken down into ten lessons and released weekly, with ongoing updates revolving around seven basic modules or dimensions, similar to the teaching competencies framework suggested by Tigelaar, Dolmans, Wolfhagen, and Van Der Vleuten (2004). The analytic structure of 'professional skill' comprised four phases: 1) purpose, 2) uses, 3) educational setting, and 4) case study. In total, 156 PDF and HTML documents, 114 websites, ten *PowerPoint* presentations, and over 500 glossary educational concepts and references, were published online and hyperlinked accordingly.

3. Faculty discussed two topics in an online asynchronous forum: 'European Convergence issues,' and 'Students' efforts to cope with the new European credit system.' These topics were organized and released on a bi-weekly basis, and were accessible throughout the course. The final forum included postings on reflective questions (i.e., Socratic questions). Because we determined that 'participation' is crucial for learning, we built asynchronous online interaction into the design of the course. Indeed, when considering faculty postings to asynchronous discussions in online courses, Blignaut and Trollip (2003) remarked: "Determining the elements of faculty participation and involvement can lead to the development of improved skills, which in turn may lead to improved learner satisfaction, instructor satisfaction, and the lowering of attrition rates" (p. 153).

4. Faculty accessed email from a central course website, which enabled one-on-one interactions with mentors and other participants.

5. Faculty had access to online curriculum materials hyperlinked to related articles and institutions, notes, and grades.

6. Faculty could also download *PowerPoint* presentations, key concept maps, study guides, and other resources, etc.

7. Faculty submitted their learning activity assignments online using the central course web-interface or via email. All course assignments, which presented faculty with complex teaching and learning tasks, were designed to be meaningful activities that had real-life relevance.

8. Faculty engaged in activities that were designed to be 'realistic representations' of the tasks that the authors wanted to evaluate. As such, we allowed faculty substantial freedom in selecting activities, which according to Uhlenbeck, Verloop, and Beijaard (2002) are features of authentic assessment.

9. Faculty completed ten online tests. Each 'professional skill' test was programmed (random selection) to be unique and to provide faculty instant feedback detailing their results on various tests. Faculty also assessed the quality of materials and the training process. In other words, an authentic assessment was woven into the course design, and provided faculty with a formative assessment of their understanding of the basic concepts covered in the course. This allowed faculty to make sense of their overall progress throughout the course.

10. Faculty evaluated the OFDAS using the Attitude Towards Course Learning Questionnaire (ACLQ).

11. Faculty assessed data on student classroom learning environments using the University Teaching Activities Questionnaire (AUTAQ).

12. Similarly, faculty also received student feedback via the AUTAQ.

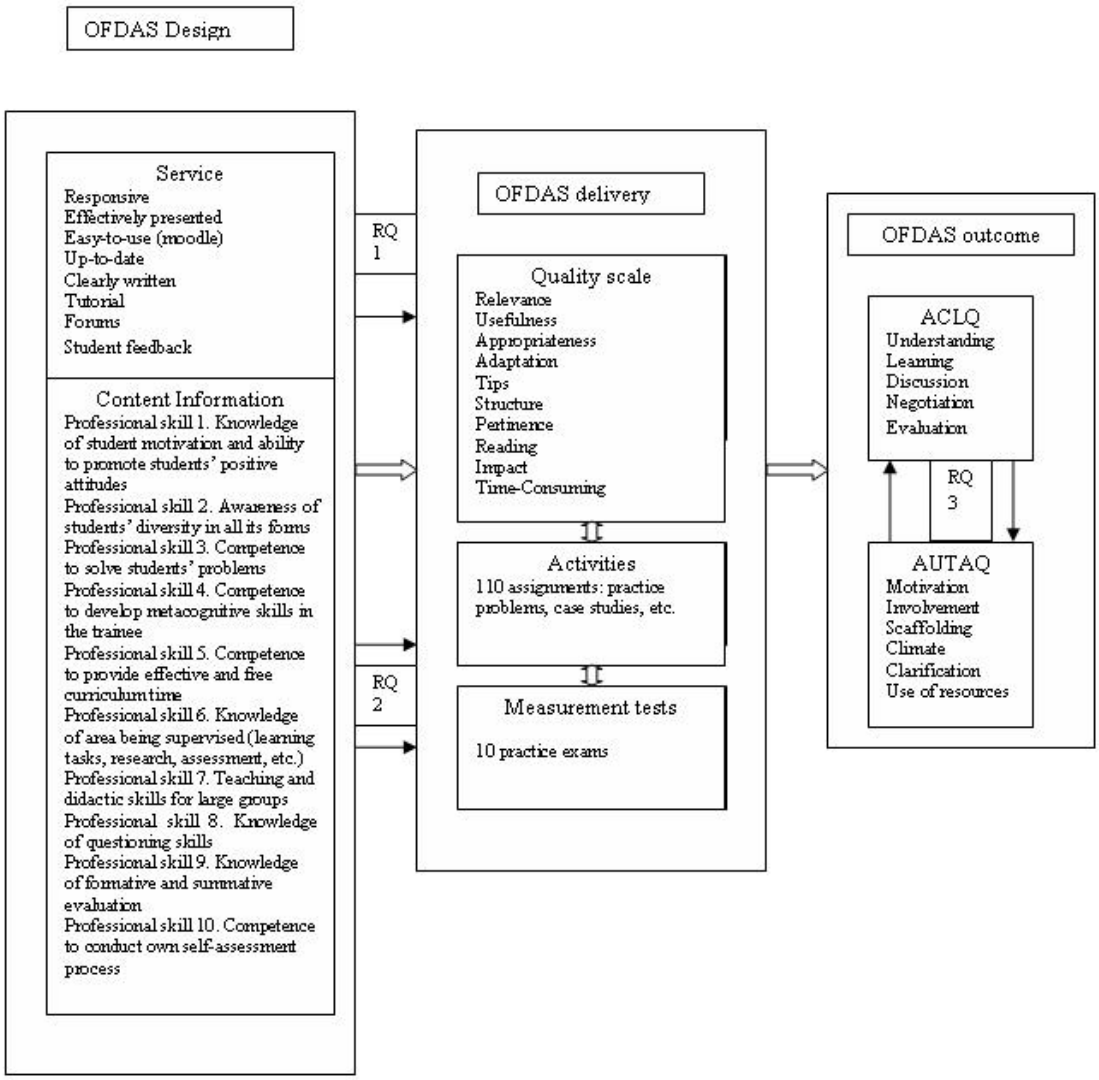
(see http://gid.us.es:8083):

Research

Research Questions

Our broad research question was: "*How did the online course elements and management activities affect professional skills learning and what were their impact on teaching attitudes and on the students' classroom learning environment assessment?*" This question was examined in light of three specific questions (see Figure 1). First, we asked was there a difference in faculty opinion about the quality of the online course? Second, did faculty learn professional skills? And third, after the course ended, was there a relationship between faculty teaching attitudes and students' assessment of their learning environment?

Figure 1. The OFDAS model and sample variables



Sample

Twenty-four (n = 24) faculty members volunteered for this study and all met the following selection criteria: (a) employees of a university campus, (b) scientific field, and (c) professional merit. All respondents were full-time faculty employed by two public Canarian Universities: 11 from *La Laguna* (45.8%) and 13 from *Las Palmas de Gran Canaria* (54.2%). Of the 24 faculty respondents, ten (41.7%) were male and 14 (58.3%) were female. Nineteen (n = 19; 79.2%) respondents were considered 'experts' (i.e., with more than five years of teaching experience). Most had a doctorate (n = 14; 58.3%). When disciplines were broken down into scientific fields, eight respondents (33%) reported that they taught in the social sciences; five (20.8%) in experimental sciences; four (16.7%) in healthcare sciences; three (12.5%) in humanities, and four (16.7%) in technical sciences. The OFDAS program took place during the spring quarter of the 2006 academic year and spanned an 11 week period.

The AUTAQ was administered to 102 students enrolled in courses the two universities taught by the faculty listed above. Four hundred eighty (n = 480) students were asked to provide feedback

on their classroom climate. The student sample was representative of gender, age, area of study, level of study, and other academic and social characteristics.

Measures, Data Collection, and Analytical Methods

Professional Skills Scale

The *Professional Skills Scale* was used to measure respondents' ability to understand the knowledge and skill acquisition levels, and the degree to which individuals or groups wished to use them (Cronbach's alpha = 0.944). Consisting of ten items used to measure 'expert skills,' 'conditions,' 'technologies' and 'teaching practices' (i.e., "The competence was relevant for my teaching"), this scale was designed to measure faculty's knowledge, skills, and attitudes. For items 1 to 17, a five point Likert-like scale was used: 1 = strongly agree; 2 = agree; 3 = average; 4 = disagree; 5 = strongly disagree. Items 8 to 10 had specific five point scales. All ten items measured various types of faculty 'opinions' over the duration of the course, such as professional skills relevance, usefulness, appropriateness, adaptation, tips, structure, pertinence, reading, impact, and time-consuming. This measure was developed for use in this study.

Attitude Towards Course Learning Questionnaire (ACLQ)

Faculty were asked to make 'attitude judgments' on teaching practice (Cronbach's alpha = 0.950). The measure consisted of 20 items (see Table 1, and Appendices A and B) scored on a 5-point Likert-type scale, ranging from 1 = 'strongly agree,' to 5 = 'strongly disagree.' The measure was developed for use in this study. Each scale consisted of four items.

Table 1. Description of Scales and a Sample Item for Each Scale of the ACLQ

Scale	Description	Sample item
Understanding	Extent to which faculty are able to re-conceptualize, explain and use received information about teaching	I take time to understand the aspects of my teaching in which I am mistaken
Learning	Extent to which faculty acquire knowledge, skills, attitudes, or values, through study, experience, or teaching, which lead to behavioral changes that are persistent, measurable, and specified	I discuss mistakes on authors' articles and books that I read about teaching
Discussion	Extent to which faculty use a method of interaction and position representational argument regarding teaching	I point out my colleagues' teaching weaknesses to help them clarify their educational rationale
Negotiation	Extent to which faculty agree on courses of action to take in teaching	I share odd opinions about teaching with colleagues
Evaluation	Extent to which faculty determine the merit, worth, and significance of teaching	I regard teaching as a problem situation because I carefully keep in mind results and evidences of my subject

Assessment of University Teaching Activities Questionnaire (AUTAQ)

The AUTAQ was designed to appraise students' perceptions of their classroom environment (Cronbach's alpha = 0.958). This questionnaire consisted of 22 items scored on a 5-point Likert-type scale, ranging from 1 'strongly agree' to 5 'strongly disagree' (see Table 2, and the Appendix). The design of the AUTAQ was guided by relationship, personal growth, and curriculum change dimensions for conceptualizing university quality assurance (Villar, 2001).

Table 2. Description of Scales and a Sample Item for Each Scale of the AUTAQ

Scale	Description	Sample item
Motivation (5 items)	Extent to which university students are involved in an innovative activity	I am motivated to work in classroom learning activities
Involvement (4 items)	Student perception that university teaching is student-centred and that he/she has been offered the opportunity to make decisions on his/her learning	These activities have changed my views on the role of university students
Scaffolding (5 items)	Extent to which instructors demonstrate the steps or structure of a problem and provide keys and help for successfully completing the activities	These activities relate new information to what I have previously learnt
Climate (4 items)	Extent to which conjecture, questioning, and discussion in activities are fostered, and to which students socially interact with each other to give meanings to and reach agreements on teaching activities and viewpoints	These activities encourage university students to ask questions and discuss answers given in a book
Clarification (2 items)	Extent to which university students are given explanations, examples and multiple forms of understanding a problem or difficult material	The instructor clarifies difficult aspects of these activities
Use of resources (2 items)	Extent to which new technological tools and other academic resources facilitate university students' generation of ideas and knowledge construction	These activities help to develop other study capacities in university students (e.g. handling of tools, document search, library use)

Data was collected online during and after the course. Faculty members explained to students the purpose of the AUTAQ and the research study, and assured them of full anonymity to encourage their participation.

Data analyses included descriptive statistical summaries, Alpha reliabilities of subscales of the two questionnaires, T-tests, analysis of variance (ANOVA), and intercorrelations among scales (Pearson product moment correlation coefficient).

Results

Research Question 1

Research Question 1 asked whether faculty opinion towards the quality of OFDAS was positive. In terms of the professional skills quality scale items, item means ranged from a high of 3.08 (Item 8, Reading: "I read websites and pdf documents which were linked to the professional skill") to 1.33 (Item 1, Relevance: "The competence was relevant for my teaching'). Standard deviations varied from 1.52 (Item 8, Reading) to .76 (Item 1, Relevance). All item mean scores exceeded the midpoint scale (3.00, normal), and Item 8, Reading, exceeded the midpoint scale (3.00, frequently).

T tests revealed significant differences with regard to gender in five quality items (usefulness, adaptation, tips, structure, and pertinence). Females held better opinions than males with respects to the quality of the professinal skills. As to degrees, significant difference was found in eight quality items (relevance, usefulness, appropriateness, adaptation, tips, structure, pertinence, and time-consuming). PhD prepared instructors/ teachers held better opinions than Bachelor's prepared instructors with respect to the quality of professional skills. With regard to the degree of teaching expertise, new faculty (those with less than four years teaching experience) and expert faculty (those with five years or more teaching experience) had different opinions with respect to five quality items (usefulness, appropriateness, adaptation, tips, and structure) (See Table 3).

Table 3. Significant t-Test Results for Demographic and Academic Factor Comparisons

Contrast	Variable	*t* (22)	*P* value
Male vs. Female	Usefulness	2.496	.021
	Adaptation	2.566	.018
	Tips	3.382	.003
	Structure	.453	.041
	Pertinence	2.452	.023
Doctor vs. Bachelor	Relevance	-3.246	.003
	Usefulness	-2.572	.021
	Appropriateness	-2.383	.031
	Adaptation	-2.456	.022
	Tips	-3.183	.005
	Structure	-2.713	.016
	Pertinence	-2,432	.030
	Time-consuming	-2.499	.022
Novice vs. Expert	Usefulness	2.800	.015
	Appropriateness	2.947	.013
	Adaptation	2.725	.018
	Tips	3.253	.007
	Structure	2.590	.037

Research Question 2

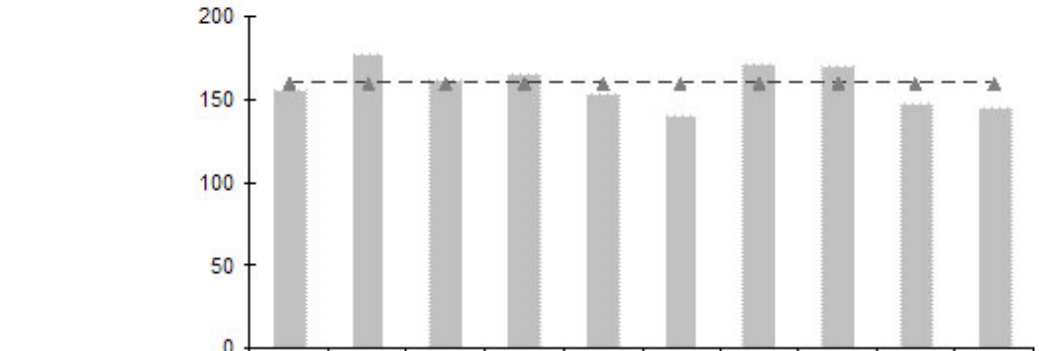
Research Question 2 asked whether the online course stimulated faculty learning. This question was divided into two sub-categories: 1) facilitating learning activities, and 2) assessing the cognitive domain of professional skills learning.

Facilitating Learning Activities: Oliver and Herrington (2003) assert: "Designing a learning environment by commencing with the design of learning activities creates a setting where the focus of the planning centres on formulating the forms of learning outcomes being sought, rather than considering what content will be covered" (p. 114).

Learning activities were developed to reflect the manner in which curriculum and didactic knowledge will be used in real-life university environments. Descriptive summaries detailed the ten professional skills being assessed during the learning activities. Results show that faculty respondents completed 1,587 learning activities (see Figure 2).

A principle of the learning process was peer assistance and peer review, which was provided via guidance and participant feedback. Online help was often needed. Thus, coaching and scaffolding of learning was provided by two OFDAS leaders assigned to diagnosed the strengths and weaknesses of each participant, and tailor any support needed. Figure 2 shows participant instructors' changes in their interest in, and willingness to, respond to learning activities as the course progressed over the 11 week duration. Participation in the learning activities was found to be more intense in the earlier stages of the course, than during the final activities. Data collected shows that participants' time commitment was not equally distributed. While participants engaged heavily in Professional Skill 2 (awareness of students' diversity in all its forms), they engaged very little in Professional Skill 6 (knowledge of area being supervised – i.e., learning tasks, research, assessment, etc.). The last module on 'evaluation' saw low rates of participation (Professional Skill 9 and Professional Skill 10). In spite of the ebb and flow of participation, learning was fluent as faculty participants were made aware of new possibilities concerning their teaching.

Figure 2. Participant Instructors' Responses to Learning Activities

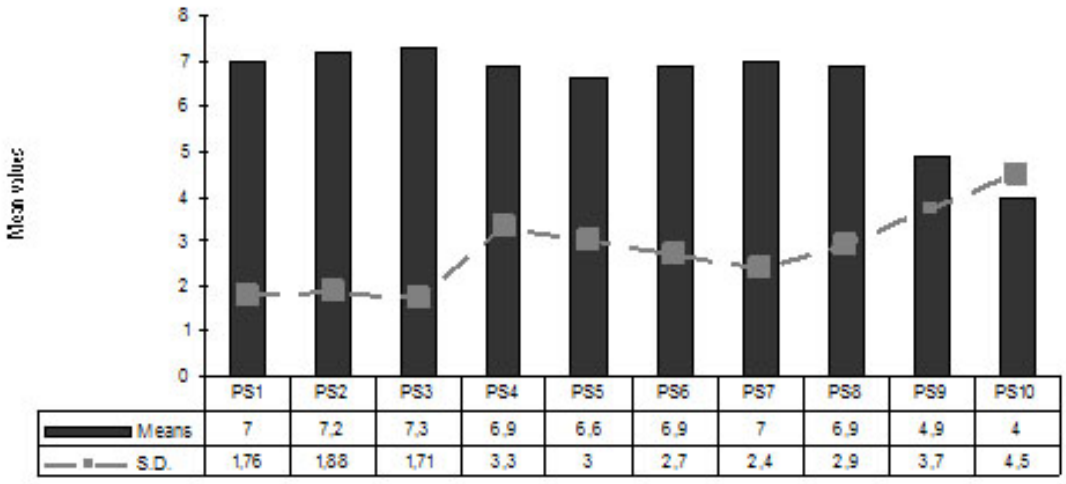


	PS1	PS2	PS3	PS4	PS5	PS6	PS7	PS8	PS9	PS10
Total Activities	156	177	162	165	153	140	171	170	148	145
Mean Activities	159	159	159	159	159	159	159	159	159	159

Content analysis was chosen as a methodology for analysing the online faculty learning activities; this involved comparing and contrasting the activities using a 10 point scale to code and interpret

the results. Activity transcripts were scored by the researchers, and the scores were then actively discussed to arrive at a final version where the learning activities had been brought into alignment. Learning activities were scored as: “Maximum Distinction (9-10),” “Important for its Intensity (7-8),” “Suitable (5-6),” “Minimum Qualification (3-4),” and “Differed the Execution (0-2).” Highlights are provided in Figure 3, which demonstrates the ability of participant instructors to apply previously learnt solutions to learning activities. All 'professional skills' were passed by participants, with the exception of the Evaluation Module (Professional Skill 9, knowledge of formative and summative evaluation, and Professional Skill 10, competence to conduct own self-assessment process).

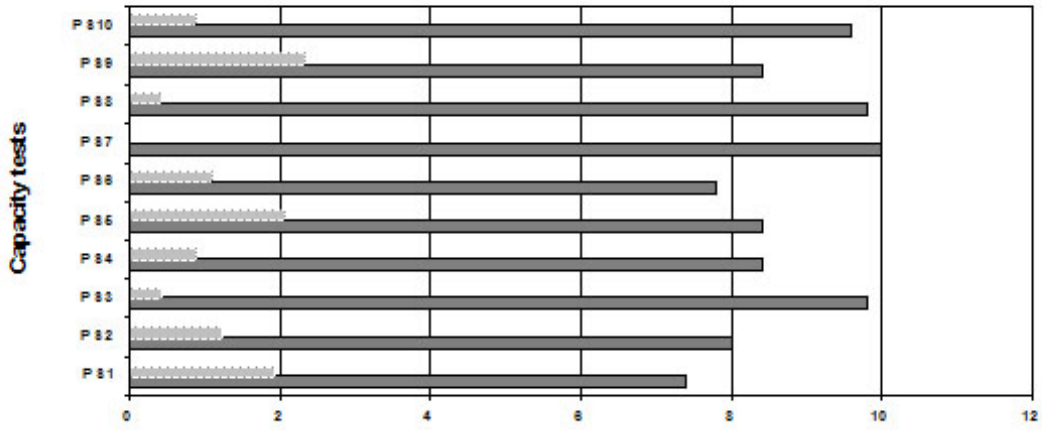
Figure 3. Learning Activity Qualifications



	PS1	PS2	PS3	PS4	PS5	PS6	PS7	PS8	PS9	PS10
Means	7	7,2	7,3	6,9	6,6	6,9	7	6,9	4,9	4
S.D.	1,76	1,88	1,71	3,3	3	2,7	2,4	2,9	3,7	4,5

Assessing the cognitive domain of professional skills learning: Ten tests (10 multiple choice items) measured participants’ knowledge and understanding of 'professional skills.' Test means varied from a high score of 7.4 (knowledge of student motivation and ability to promote students’ positive attitudes) to a very high score of 10 (teaching and didactic skills for large groups). All ten test means exceeded score 7 on the ten-point scale used.

Figure 4. Self-Assessment Test Scores



	P 81	P 82	P 83	P 84	P 85	P 86	P 87	P 88	P 89	P 810
S.D.	1,94	1,22	0,44	0,89	2,07	1,09	0	0,44	2,34	0,89
Means	7,4	8	9,8	8,4	8,4	7,8	10	9,8	8,4	9,6

Means and standard deviations on the ten self-assessment test scores are shown in Figure 4. It was found that faculty participants' learning was effective. However, objective testing of professional skills showed that faculty participants' performance was more effective in the 'competence of teaching and didactic skills for large groups,' than in the 'competence of knowledge of area being supervised' (i.e., learning tasks, research, assessment, etc.). There were significant differences in the learning of Professional Skill 3 (competence to solve students' problems) between participants in regards to gender (t (15) = 2.520, p = .018). Female instructors had more successful results than male instructors. Also, significant differences were found between instructors with and without previous educational knowledge in Professional Skill 1 (knowledge of student motivation and ability to promote students' positive attitudes) (t (15) = -3.119, p = .008), Professional Skill 3 (competence to solve students' problems) (t (15) = -2.477, p =.027), Professional Skill 4 (competence to develop meta-cognitive skills in the trainee) (t (15) = -2.385, p =.032), Professional Skill 7 (teaching and didactic skills for large groups) (t (15) = -2.449, p =.028), and Professional Skill 8 (knowledge of questioning skills) (t (15) = -2.590, p =.022). All were in favor of the instructors with previous educational knowledge. Finally, in terms of measuring teaching experience, significant differences in learning Professional Skills 3 (competence to solve students' problems) were found between new and expert faculty participants (t (15) = 2.800, p =.015).

Research Question 3

Research Question 3 asked if was there a relationship between faculty members' teaching attitudes and students' perceptions of their learning environment after completion of the OFDAS.

Differences between students' perceptions of actual and preferred environments: Table 4 shows means, standard deviations, and a series of t tests used for comparison between the two AUTAQ actual and preferred forms. The findings revealed some clear patterns of differences in the suitability of the current classroom environments. The scale for classroom climate showed the highest means in both forms.

Table 4. Means, Standard Deviations, and *t*-Values for Actual and Preferred forms of AUTAQ

Scale	*Means*	*Standard Deviations*	*t*
Motivation	Actual = 4.53 Pref. = 3.82	.637 .996	t(78) = 63.21, $p<.001$
Involvement	Actual = 4.46 Pref. = 3.83	.657 1.01	t(78)= 60.448, $p<.001$
Scaffolding	Actual = 4.39 Pref. = 3.83	.657 1.01	t(78)=43.497 $p<.001$
Climate	Actual = 4.74 Pref. = 4.74	.609 .518	t(78)=69.269 $p<.001$
Clarification	Actual = 4.40 Pref. = 3.93	.689 .991	t(78)=56.818 $p<.001$
Use of Resources	Actual = 3.784 Pref. = 3.493	1.117 1.130	t(78)=30.113 $p<.001$

Figure 5 shows the comparison between students' actual and preferred forms. Students were found to be more satisfied with the actual classroom environment scales, than what they perceived from the other scales in the preferred classroom environment form. Moreover, climate scale means were the same in the actual and preferred forms.

Figure 5. Significant Differences Between Student Actual and Student Preferred Perceptions of the AUTAQ

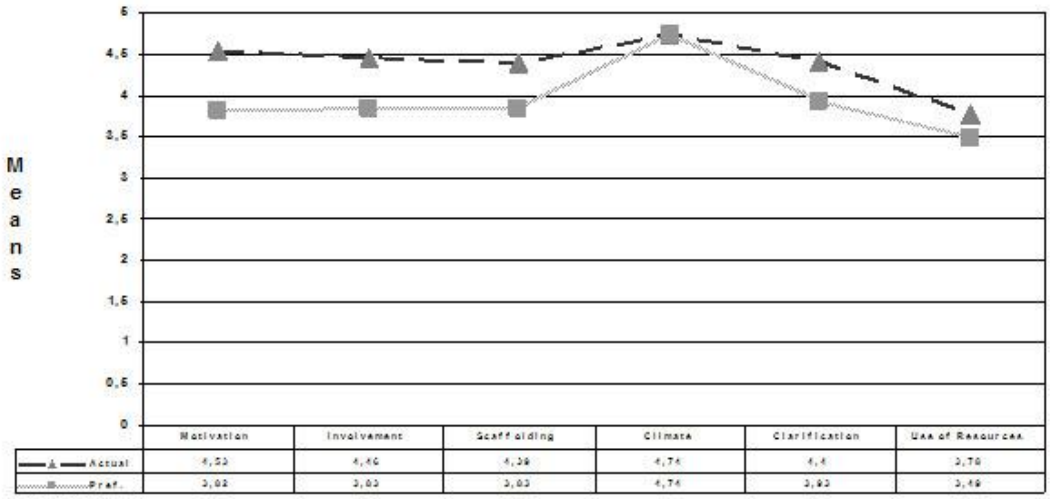


Table 5. Between Scale Correlations Calculated on Items Grouped into their Initial Tentative Scales

Means, Standard Deviations and *t* values for Actual and Preferred forms of AUTAQ

Scale	*Means*	*Standard Deviations*	*t* (78)
Motivation Pref. = 3.82	Actual = 4.53 .996	.637	63.21, $p<.001$
Involvement Pref. = 3.83	Actual = 4.46 1.01	.657	60.448, $p<.001$
Scaffolding Pref. = 3.83	Actual = 4.39 1.01	.657	43.497 $p<.001$
Climate Pref. = 4.74	Actual = 4.74 .518	.609	69.269 $p<.001$
Clarification Pref. = 3.93	Actual = 4.40 .991	.689	56.818 $p<.001$
Use of Resources Pref. = 3.493	Actual = 3.7841.117 1.130		30.113 $p<.001$

Discussion

This study was designed to assess faculty's professional teaching skills, which are believed to be useful for gaining a better understanding of teaching practice. The aim was to develop and validate a framework of professional skills taught in an online program. The three research questions are discussed below.

Opinion Towards the Quality of the OFDAS

Faculty agreed that the professional skills taught in the OFDAS had a positive impact on their teaching skills. The leaders also had a positive impact on participants' appreciation of the course and skills acquisition. This finding is supported by other researchers who have evaluated Web-based courses (Nijhuis & Collis, 2003). Based on gender, degree, and teaching experience, faculty gave different opinions on the usefulness of professional skills in terms of subject matter, resources, presentations, useful tips, learning goals for skills improvement, and the structure of these professional skills (purpose, uses, educational setting, and case study) for identifying, clarifying, and exploring educational situations. Thus, while the first research question was fully supported, it was found that participants' opinions varied on the usage and ease of use of professional skills taught in the OFDAS.

Learning Activities

Faculty completed a total of 1,587 learning activities over the 11 week duration of the OFDAS. Faculty reported that the learning activities to be generally useful. This finding answers a question raised by Caffarella and Zinn (1999): "Do professional development activities assist in a

faculty member's professional success?" (p. 253). Based on this outcomes of the OFDAS, our answer to this question is a resounding "yes." Indeed, all but two professional skills were approved by faculty: the Evaluation Module (Professional Skill 9, knowledge of formative and summative evaluation, and Professional Skill 10, competence to conduct own self-assessment process). All ten Professional Skills test means exceeded 7 on the ten-point scale used. This finding supports our hypothesis that faculty can successfully acquire professional skills using an online program. However, it should be reiterated that significant differences in 'learning' was found between participants in three nominal variables: gender, previous educational knowledge, and teaching experience.

Relationship Between Faculty's Teaching Attitudes and Students' Perceptions of their Learning Environment

The results stressed two somewhat different but conceptually related measures, which brought about new perspectives on assessing learning environments in higher education settings. The Climate scale in particular emphasized the importance of developing mature, interpersonal relationships, friendships, social bonds, and connections with other students, as a vector of behaviour of student development (Lounsbury, Saudargas, Gibson, & Leong, 2005). Results from the AUTAQ went to each faculty participant, just as Kember, Leung, and Kwan (2002) had done with the student feedback questionnaire used in their study.

Overall, the findings of this study are encouraging. We found that all 'professional skills' taught were perceived by faculty to be useful and easy to implement, though at varying levels depending on the elements employed for the course (i.e., time available). As Fitzgibbon and Jones (2004) previously noted, the coordination of the online program is crucial to its success. Directed and purposeful course design efforts, coupled with activities best suited for various scientific fields, faculty are able to enhance their subject area teaching, with professional pedagogical skills that are easy to use and more importantly, used.

The Attitude Towards Course Learning Questionnaire (ACLQ); the constructivist-based format of the Assessment of University Teaching Activities Questionnaire (AUTAQ); and the other faculty demographic and academic variables explored in this study, all addressed ongoing concerns about the need to improve online training in higher education, as well as emphasizing new ideas about important variables that might be measured as alternatives to the more traditional approaches in evaluation of faculty development (Ellett, Loup, Culross, McMullen, & Rugutt, 1997). The ACLQ and AUTAQ online systems facilitated timely data collection, feedback, and online assessment, a finding supported by previous research undertaken by Tucker, Jones, Straker, and Cole (2003). Finally, the AUTAQ consisted of two sections (although only Section II was used for this study). Section I collected student demographic, academic and social information, but was not used -- as had occurred in the Barfield (2003) study.

An issue arose from this study regarding student online assessment. Our response rates were low, a finding that is supported by previous research by Ballantyne (2003). Nonetheless, faculty reported that collecting feedback online with the AUTAQ system to be convenient, a finding that is supported by earlier research undertaken by Bullock (2003) who investigated a similar online feedback system. Based on this research, we opine that a good starting point for training to enhance faculty scholarship of teaching is built into the design of the OFDAS. In short, the OFDAS is a good starting point for this type of training, because it encourages faculty to become fully involved in the development of online faculty courses. It achieves this by inclusion of learning materials faculty themselves deem necessary to their learning within the scope of the face-to-face workshop, activities, quizzes, grades, and in the direction dialog takes within the OFDAS forum. The selection of 110 learning activities was the organising element of the user/

faculty development-design process of the program. Our focus on learning tasks had also been already underlined by other researchers (Oliver & Herrington, 2003).

One of the limitations found in this study was the fact that it examined solely one faculty online course at only two public urban universities in the Canary Islands. Because faculty volunteered their classes, our pool of respondents were not randomly selected. For these reasons, the study is not intended to be, nor should it be, generalized to other universities.

Conclusion

Based on our experiences at two Canarian universities, we opine that the OFDAS is an effective training model that can be used to improve reflective practice on professional skills. The OFDAS online system is a mechanism used to both enhance online faculty development program management and provide evidence of a quality-improvement process in such online development. Because professional skills framework had been field-tested in this study, faculty knew the impact of professional skills. Finally, no correlation was found between faculty's teaching attitudes and students' learning environment at the conclusion of the course.

References

Aldridge, J. M., & Fraser, B. J. (2000). A cross-cultural study of classroom learning environments in Australia and Taiwan. *Learning Environments Research, 3*, 101-134.

Badley, G. (2000). Developing Globally-Competent University Teachers. *Innovations in Education and Training International 37*(3), 244-253.

Ballantyne, C. (2003). Online Evaluations of Teaching: An examination of current practice and considerations for the future. *New Directions For Teaching And Learning, 96*, 103-112.

Barfield, R. L. (2003). Students' Perceptions of and Satisfaction with Group Grades and the Grouap Experience in the College Classroom. *Assessment & Evaluation in Higher Education, 28*(4), 49-64.

Blignaut, S., & Trollip, S. R. (2003). Developing a taxonomy of faculty participation in asynchronous learning environments-an exploratory investigation. *Computers & Education, 41*, 149-172.

Bullock, C. D. (2003). Online Collection of Midterm Student Feedback. *New Directions For Teaching And Learning, 96*, 95-101.

Caffarella, R. S., & Zinn, L. F. (1999). Professional Development for Faculty: A conceptual framework of barriers and supports. *Innovative Higher Education, 23*(4), 241- 254.

Dallimore, E. J., Hertenstein, J. H., & Platt, M. B. (2004). Classroom Participation and Discussion Effectiveness: Student-generated strategies. *Communication Education, 53*(1), 103-115.

Ellett, C. D., Loup, K. S., Culross R., McMullen, J. H., & Rugutt, J. K. (1997). Assessing Enhancement of Learning, Personal Learning Environment, and Student Efficacy: Alternatives to traditional faculty evaluation in higher education. *Journal of Personnel Evaluation in Education, 11*(2), 167-192.

Fitzgibbon, K. M., & Jones, N. (2004). Jumping the hurdles: challenges of staff development delivered in a blended learning environment. *Journal of Educational Media, 29*(1), 25-35.

Fraser, B. J. (1998). Classroom Environment Instruments: Development, validity, and applications. *Learning Environments Research, 1*, 7-33.

Kember, D., Leung, D. Y. P., & Kwan, K. P. (2002). Does the Use of Student Feedback Questionnaires Improve the Overall Quality of Teaching? *Assessment & Evaluation in Higher Education, 27*(5), 411-425.

Lounsbury, J. W., Saudargas, R. A., Gibson, L. W., & Leong, F. T. (2005). An investigation of broad and narrow personality traits in relation to general and domain-specific life satisfaction of college students. *Research in Higher Education, 46*(6), 707-729.

Nijhuis, G. G., & Collis, B. (2003). Using a Web-based Course-Management System: An evaluation of management tasks and time implications for the instructor. *Evaluation and Program Planning, 26*(2), 193-201.

Oliver, R., & Herrington, J. (2003). Exploring Technology-Mediated Learning from a Pedagogical Perspective. *Interactive Learning Environments, 11*(2), 111-126.

Summers, J. J., Waigandt, A., & Whittaker, T. A. (2005). A Comparison of Student Achievement and Satisfaction in an Online versus a Traditional Face-to-Face Statistics Class. *Innovative Higher Education, 29*(3), 233-250.

Tigelaar, D. E. H., Dolmans, D. H. J. M., Wolfhagen, I. H. A. P., & Van Der Vleuten, C. P. M. (2004). The development and validation of a framework for teaching competencies in higher education. *Higher Education, 48*(2), 253-268.

Tucker, B., Jones, S., Straker, L., & Cole, J. (2003). Course Evaluation on the Web: Facilitating Student and Teacher Reflection to Improve Learning. *New Directions For Teaching And Learning 96*, 81-93.

Uhlenbeck, A. M., Verloop, N., & Beijaard, D. (2002). Requirements for an Assessment Procedure for Beginning Teachers: Implications from recent theories on teaching and assessment. *Teachers College Record, 104*(2), 242-272.

Villar, L. M. et al. (2001,). Metaevaluación: Un inquietante modelo. *Revista de Enseñanza Universitaria, 17, Junio*, 43-76.

Villar, L. M. (2004). *Programa para la Mejora de la Docencia Universitaria*. Madrid: Pearson/ Prentice Hall.

Villar, L. M., & Alegre, O. M. (2004). *Manual para la excelencia en la enseñanza superior*. Madrid: McGraw-Hill.

Appendix 1

Assessment of University Teaching Activities Questionnaire (AUTAQ)

Instructions: This questionnaire is about your perception of the classroom learning environment. Your opinion is required for each question. For each sentence select the score that best suits your perception. Please answer by circling the number with 1 = 'strongly disagree', 2 = 'disagree', 3 = 'neutral', 4 = 'agree' and 5 = 'strongly agree'.

Dimension A. MOTIVATION (extent to which University students are provided with explanations, examples and multiple forms of understanding a problem or difficult material).	
1. I am motivated to work in classroom learning activities.	1 2 3 4 5
2. These activities improve my opinion about the content of the subject (practical vision).	1 2 3 4 5
3. I am more motivated in these activities than if I studied them in a theoretical way (useful vision).	1 2 3 4 5
4. I believe that these activities develop instructors' interest in teaching.	1 2 3 4 5
5. I believe that activities like these would significantly improve the quality of University teaching.	1 2 3 4 5
Dimension B. INVOLVEMENT (student perception that University teaching is student-centred and that he or she has been offered the opportunity to make decisions concerning his/her learning).	
6. These activities have changed my views on the University student's role.	1 2 3 4 5
7. These activities have changed my attitude towards the subject and the way of dealing with University studies.	1 2 3 4 5
8. I assume responsibilities in these activities.	1 2 3 4 5
9. I suggest possible educational problems and tasks with peers.	1 2 3 4 5
Dimension C. SCAFFOLDING (extent to which instructors demonstrate the steps or structure of a problem and provide keys and assistance for completing the activities with success).	
10. These activities relate new information to what I have previously learnt.	1 2 3 4 5
11. I use ideas and information that I already know to understand something new.	1 2 3 4 5
12. I have developed other cognitive capacities in these activities (e.g. analysis, synthesis, critical thinking).	1 2 3 4 5
13. These activities help me to investigate, build and relate ideas and facts.	1 2 3 4 5
14. I explore how information relates to other topics and subjects.	1 2 3 4 5
Dimension D. CLIMATE (extent to which conjecture, questioning, and discussion in activities are fostered, and students socially interact with each other to give meanings to and reach agreements on teaching activities and viewpoints).	
15. These activities encourage University students to ask questions and discuss answers given in a book.	1 2 3 4 5
16. I discuss correct and incorrect solutions to problems.	1 2 3 4 5
17. I share ideas, answers and visions with my instructor and peers in these activities.	1 2 3 4 5
18. I learn from peers how to think about a problem and to consider their points of view.	1 2 3 4 5
Dimension E. CLARIFICATION (extent to which University students are given explanations, examples and multiple forms of understanding a problem or difficult material)	
19. Instructor clarifies difficult aspects of these activities.	1 2 3 4 5
20. Instructor elaborates the most confusing information of these activities by means of outlines, diagrams or illustrations of the main ideas.	1 2 3 4 5
Dimension F. USE OF RESOURCES (extent to which new technological tools and other academic resources facilitate University students' generation of ideas and knowledge construction).	
21. These activities help to develop other study capacities in University students (e.g. handling of tools, document search, library use).	1 2 3 4 5
22. I find new information about the topics and subjects using new technologies.	1 2 3 4 5

Appendix 2 *(see next page)*

Attitude Towards Course Learning Questionnaire (ACLQ)

Instructions: This questionnaire is about your attitude towards the online learning course. Your opinion is required for each question. For each sentence select the score that best suits your attitude. Please answer by circling the number with 1 = 'strongly disagree', 2 = 'disagree', 3 = 'neutral', 4 = 'agree' and 5 = 'strongly agree'.

Dimension A. UNDERSTANDING (extent to which faculty are able to reconceptualise, explain and use received information on teaching).				
1. I invest time in understanding the aspects of my teaching in which I might be mistaken.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. I put myself in other colleagues' shoes in order to understand their thoughts on teaching and why.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. I am aware of colleagues' opinions regarding teaching, although they might differ from mine, through empathy.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. I enjoy thinking about how colleagues from different disciplines experience teaching.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Dimension B. LEARNING (extent to which faculty acquire knowledge, skills, attitudes, or values, through study, experience, or teaching, which bring about a behavioural change that is persistent, measurable, and specified).				
5. I discuss faults with authors' articles and books that I read regarding teaching.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. I am interested in knowing what colleagues say and believe about pedagogic and teaching ideas.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. I enjoy listening to colleagues from other disciplines express their opinions on teaching.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8. Acquiring knowledge and skills from colleagues has been the most important aspect of my higher education experience.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Dimension C. DISCUSSION (extent to which faculty use a method of interaction and position representational arguments about teaching).				
9. I point out my colleagues' teaching weaknesses to help them clarify their educational rationale.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. I strengthen my own teaching stance by discussing my ideas with colleagues who have different ideas from mine.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. In evaluating what a colleague says, I only consider what he or she says about teaching and not who he or she is.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
12. I enjoy being the devil's advocate, arguing for the opposite viewpoint of what a colleague says about teaching.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Dimension D. NEGOTIATION (extent to which faculty agree with others on courses of action to take for teaching).				
13. I share odd opinions on teaching with colleagues.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
14. I agree with colleagues when they talk about teaching instead of personally evaluating them.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
15. I reason and compromise with colleagues on teaching concepts instead of quarreling with them.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16. I feel that the best way to get my own professional teaching identity is by interacting and bargaining with colleagues from disciplines different to mine.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Dimension E. EVALUATION (extent to which faculty determine the merit, worth, and significance of teaching).				
17. I regard teaching as a problem situation because I carefully keep in mind results and evidences of my subject.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
18. In examining teaching problems, I place more value on the use of logic and rationale than on my own personal interests.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
19. I have pedagogic approaches and models that I use to assess arguments about teaching.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
20. I stay objective when I analyze and measure teaching.				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

International Review of Research in Open and Distance Learning

Volume 7, Number 3 *ISSN: 1492-3831*

December – 2006

Technical Evaluation Report

58. RSS Windows Editors: First impressions

Steve Swettenham
Masters of Distance Education Program
Athabasca University - Canada's Open University

Background

An RSS feed is a list of topics made available from a webpage via a standard XML file format known as RSS, an abbreviation of either Really Simple Syndication or Rich Site Summary (Wikipedia, 2006). The end-user subscribes to their favorite Internet content site via RSS-aware software. Once subscribed, announcements with appropriate links are "pushed" from the publishing site whenever new material is added to that site (see Figure 1). This allows notification of new content of possible interest, fed with anonymity to subscribers, and reduces email clutter.

Figure 1 is an example of a simple organized subscription that was obtained by accessing a website only once, then each time afterwards the RSS feed automatically presents the updated information. The various subscribed RSS feeds can be organized to create personalized displays, much like a customized online newspaper, with stories, articles, podcasts, video, or graphics of interest tailored to each user. Given the plethora of daily Internet information, RSS is a real-time organizer that may save users time and frustration in covering the most with the least effort.

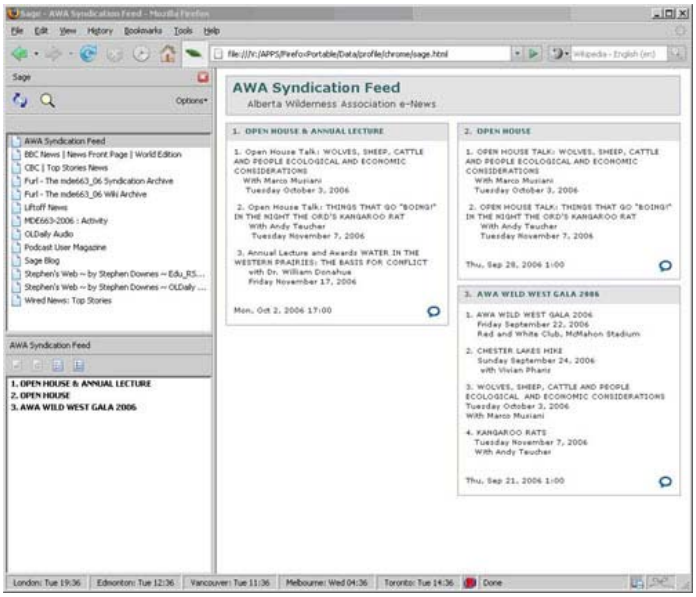


Figure 1. Web browser with a simple RSS reader add-on displaying a RSS feed with three items.

Given this potential communication connectivity, I was interested in exploring how one adds RSS feeds to their own web site so that items can easily be "pushed" to interested subscribers, much as is available by subscribing to the RSS feed for this journal (www.irrodl.org). From a publishing perspective, an email server and listserv are no longer needed to disseminate information. Instead, a properly formatted RSS file linked to a webpage is the basis for web syndication.

A correctly formatted RSS record consists of information about the publication site (the channel fields) and further information about each of the items being released (item fields). Optional fields can be filled with attachments, images, and data about the items or channel, but required fields include a title, brief description, and link to obtain the full item. An RSS feed is a simple text file, written in strict XML; thus, it is possible to create the file using any simple word processor or text editor. However, I wanted an authoring tool to easily create the RSS file, to reduce mistakes in hand-coding, and to minimize expertise required in the markup language. Thus, I was in search of a free, Windows- and PC-based RSS feed editor that would provide a correctly formatted RSS file in XML format. Fraboschi (2006) has a concise guide on RSS feeds, and Sullivan (2003) a quick demonstration on creating an RSS feed.

The RSS Compendium (http://allrss.com/rsseditors.html) website (Scott, 2006) provides a collection of both commercial and open-source RSS editors. I selected and installed from this list the following programs as likely candidates to meet my requirements:

1. *FeedSpring* 0.93b (UsableLabs, 2005)
2. *ListGarden* 1.3 (Software Garden, 2005)
3. *RSS Builder* 2.1.7 (Bokkers, 2006)
4. *RSS Editor* 0.91 (Mozdev.org, 2006)
5. *RSS Writer* 1.1 (Phelios, 2005)

All of the programs reviewed were stable, with easy installation and clean uninstall on a Pentium 4 with Windows XP SP2.

The interface of *FeedSpring* used the outliner mode, while *ListGarden* used a stand-alone executable to run a Web browser with detailed field explanations. Both programs had the same problem in output: the programs automatically added generator and docs elements (code), with links to software developer and Harvard Law School (Winer, 2005), references that were not essential to the feed. It then becomes annoying to have to remove that code with a text editor after saving the XML file. The aforementioned elements were not modifiable within the applications, and there was no warning to the end-user that the program would insert preset fields. I submitted my concern to FeedSpring, and perhaps the next version will provide greater options. The *FeedSpring* program was very useful in producing XML and Web previews of the RSS feed, and had an attractive design utilizing multiple windows for data entry. *FeedSpring* provides the source code and hopefully the developers will continue to enhance this user-friendly application.

RSS Editor is a well designed *FireFox* browser extension, having an attractive interface and option to hide or display fields in the channel and items panels. It is possible to use this extension while *FireFox* is disconnected from the Internet, as may happen in a dial-up situation. Using a web browser as an offline reader and editor may not be convenient for everyone, however. The *RSS Editor* extension has many features similar to those found in other editors. Unfortunately, there were a few awkward functions, such as the inability of the end-user to customize the default button values for the generator and docs fields. This may be a useful program for the end-user

who prefers everything compacted within one web browser. It is a program that may be worth watching for in the future; however, the last release was in 2004.

RSS Writer had a problem in not allowing reordering of items. However, it is a standalone program and simple to use. It would be nice to have field enhancements found in *RSS Builder*, such as date and enclosure settings. Similar to all the other RSS editors reviewed, *RSS Writer* can be used at no cost, and thus updates depend on time and good will of the developer(s), who offer spyware-free software to the world.

Figure 2. *RSS Builder* main work area with sample data. The left area depicts channel information (labeled as Feed Properties), while the right area is focused on item elements (designated as Topic Properties).

The final product, *RSS Builder*, edged out *Feedspring* and the *FireFox* extension with a well designed interface within one window (see Figure 2) and RSS output that did not include unexpected URLs or other code in the document field (see Figure 3). In addition, the program had a nice feature of automatically identifying parameters of enclosure objects, and the advanced tab provides a GUID (globally unique identifier) tag with a perma link option to create unique content and URL (RSS Advisory Board, 2006). *RSS Builder* also warned the end-user of fields that needed to be filled in, and had a nice drop-down calendar field and mini HTML editor for the Item description. The program has an FTP site manager, multi-language settings, and an XML preview. Some wish-list items for future versions would include an HTML preview (as found in *FeedSpring*), more HTML editor WYSIWYG functions, a help section, and automatic sizing identification in the image properties, similar to the function in the enclosure section. Hopefully that is not too much to ask for free [;-)].

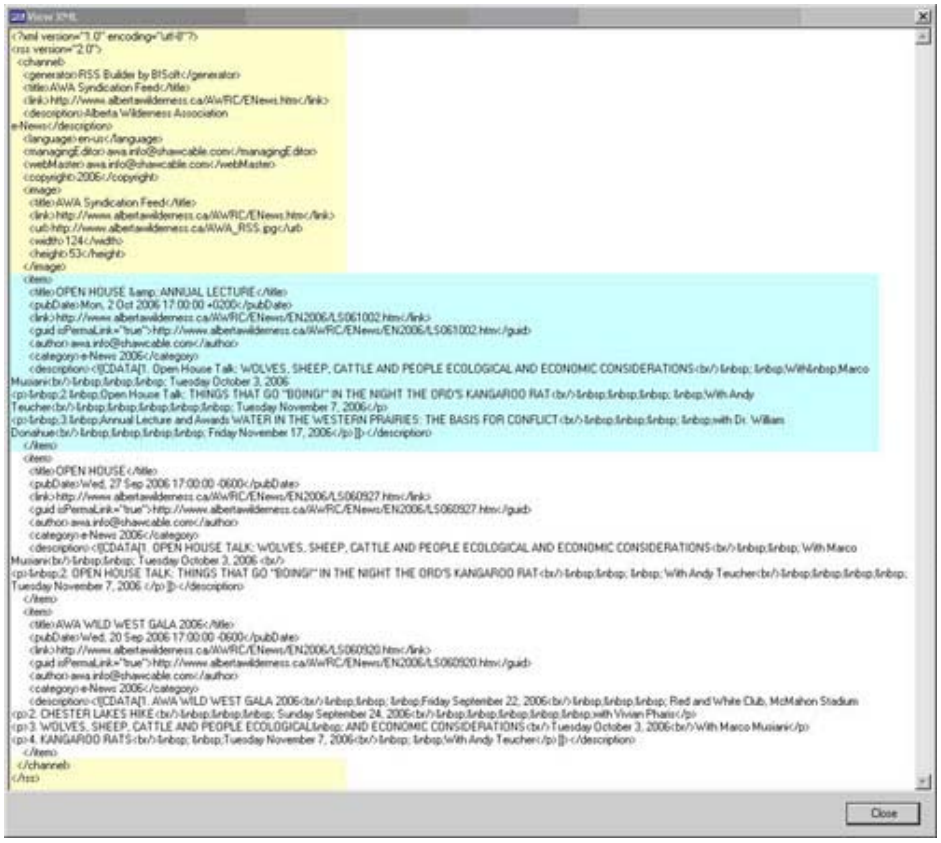


Figure 3. The XML preview window in *RSS Builder* displays machine readable format created from field entries in Figure 2. The XML highlighted in yellow represents then channel fields from the left area displayed in Figure 2. The XML highlighted in blue represents the first item fields from the right area displayed in Figure 2. Figure 1 is the resultant presentation for the end-user.

My recommendation is to choose the RSS editor that suites your taste. If you prefer an ASCII editor to produce the output in Figure 3, for eventual display in an RSS feed (as in Figure 1), then bon courage. For myself, however, I will stay with *RSS Builder* as long as it continues to be updated. The author seems to be very conscientious in responding to my inquiries in a timely manner (always a good sign). There appear to be a few other possibilities on the horizon for RSS editors, but I leave that for another discussion.

Overall for this review of RSS editors, what I found strangely familiar was the similarity of entering information in RSS fields as I used to do when creating metadata describing and indexing audio and graphic files. In the past, when you had to use a text editor to hand code the RSS file, it seemed more like writing JavaScript or HTML; now, these user friendly tools move this functionality from the geek to the everyday publisher. The 'intelligent bookmark' morphs as a metadata file.

References

Bokkers, W. (2006). RSS Builder Home. *B! Soft website.* Retrieved September 22, 2006 from : http://home.hetnet.nl/mr_2/43/bsoft/rssbuilder

Fraboschi, E. (2006). RSS Guide. *Indiana University Mathematics Journal.* Retrieved October 16, 2006 from: http://www.iumj.indiana.edu/News/rssguide.html

Mozdev.org (2006). RSS Editor. *Mozdev.org website.* Retrieved September 22, 2006 from: http://rsseditor.mozdev.org

Phelios (2005). RSS Writer. *Phelios, Inc. website.* Retrieved September 22, 2006 from: http://www.phelios.net/rss-writer.html

RSS Advisory Board (2006). Really Simple Syndication. *RSS Advisory Board website.* Retrieved October 16, 2006 from: http://www.rssboard.org/rss-specification#ltguidgtSubelementOfLtitemgt

Scott, P. (2006). RSS Compendium: RSS Editors. *Weblogs Compendium website.* Retrieved September 22, 2006 from: http://allrss.com/rsseditors.html

Software Garden (2005). Software Garden Products: ListGarden RSS Feed Generator. *Software Garden Inc. website.* Retrieved September 22, 2006 from: http://www.softwaregarden.com/products/listgarden/

Sullivan, D. (2003). Making An RSS Feed. *Search Engine Watch website.* Retrieved October 16, 2006 from: http://searchenginewatch.com/showPage.html?page=2175271

UsableLabs (2005). UsableLabs.com: FeedSpring. *UsableLabs.com website.* Retrieved September 22, 2006 from: http://www.usablelabs.com/productFeedSpring.html

Wikipedia (2006). RSS file format wiki. *Wikipedia*. Retrieved September 28, 2006 from: http://en.wikipedia.org/wiki/RSS_%28file_format%29

Winer, D. (2005). RSS 2.0 Specification. *Berkman Center for Internet & Society website.* Retrieved October 16, 2006 from: http://blogs.law.harvard.edu/tech/rss

---

N.B. Owing to the speed with which Web addresses are changed, the online references cited in this report may be outdated. They are available, together with updates to the current report, at the Athabasca University software evaluation site: http://cde.athabascau.ca/softeval/. Italicized product names in this report can be assumed to be registered industrial or trademarks. \

Editors Note: This paper reports on an edited version of a blog, which was part of a course at the *Me2U* site (http://me2u.athabascau.ca) of Athabasca University.

Patrick J. Fahy, Interim Series Editor (Jon Baggaley is on sabbatical.)

International Review of Research in Open and Distance Learning
Volume 7, Number 3. *ISSN: 1492-3831*

December – 2006

Research Notes

The Audiocast Diaries: Reflections on radio and podcasting for delivery of educational soap operas

Wendy Elliott
Masters of Distance Education Program
Athabasca University – Canada's Open University

Introduction

March 24, 2005: While studying Gender Issues in Distance Education at Athabasca University, I read about the nomadic Fulbe women in Nigeria who learned by radio. I could understand their concerns with uninspired educational radio programs that did "not take into consideration the rhythm of . . . [their] lives" (Usman, 2001, p. 98). There was one tiny reference to a drama series, but as a scriptwriter and a woman interested in the power of storytelling as education, I was intrigued. The idea of serial drama as education was planted in my mind.

September 15, 2005: Determined to take my remaining two electives of the Master of Distance Education (MDE) program as independent study courses, I began searching the Internet for ideas. Eventually I discovered the concept of entertainment-education which consists of "two equally important parts: the format (entertainment) and the message (education)" (Johns Hopkins, 1998, p. 7). One striking example of entertainment-education is an educational soap opera called *"Urunana."* After the 1994 genocide in Rwanda, over 70 percent of the remaining population was under 24 years of age. Because most of Rwanda's health staff had either been killed or had fled, there was no one left to provide "specific information on sexual and reproductive health . . . [so] vital to the health of the nation" (Booth, 2003, ¶ 1). The circumstances were shocking, but the solution – *Urunana* delivered via radio – was fascinating. I began collecting information on educational soap operas – serial dramas whose purpose is education or social transformation. They were mostly played in developing countries, and mostly played on the radio.

October 10, 2005: I was alerted by a Really Simple Syndication (RSS) feed from one of my favourite websites, *I Love Radio*, that Internet audio had overtaken radio as the music preference for young people (Maffin, 2005). "They will pick, swap, mix, rip, burn, podcast, mod, and mashup their media . . . to present them with a personalized view of the world" (¶ 2). Maffin referred readers to a study of youth in eleven countries conducted by *Yahoo* and *OMD Worldwide*. It found that "the Internet has surpassed radio as the preferred medium for music among youth in all [of those] countries" (Radio Currents, 2005, ¶ 6). Similar findings from a survey of 12 to 24 year old North Americans cited the tipping point to be September 2004, when more young people were listening to new media than to traditional radio. "The same survey indicate[d] that the 25 to 59 and 35 to 64 age brackets are head[ed] in the same direction"

(Burrill, 2004, ¶ 7). ***Note to self:*** Maybe a podcast educational soap opera would appeal to the more technologically sophisticated youth here in North America.

November 18, 2005: The 2006, Inukshuk Fund was launched in mid-October and the deadline for Canadian institutions or not-for-profit organizations to submit a proposal for innovative multimedia delivery of education was December 22 (Inukshuk Fund, 2005). Thinking I might interest an organization in my podcasting-soap opera idea, along with an offer of writing the proposal, I began to approach various organizations.

April 6, 2006: I spent several frustrating months contacting organizations, but was unable to spark any interest. ***Note to self:*** This may be an appropriate subject for an independent study course.

May 15, 2006: My independent study proposal for two courses on Radio, Podcast, and Soap Opera as Distance Education was approved by the MDE program director. I now had a supervisor, learning objectives, and renewed enthusiasm for the topic.

May 28, 2006: Watching an online streaming video, entitled *The End of Radio* (Giddens & Ghomeshi, 2006), gave me the structure for this paper. I decided to examine the state of radio and its audio rivals, especially podcasting, report on my attendance at the Podcasters Across Borders (2006) conference, and conclude with reflections on audio formats suitable for delivery of educational soap operas.

Radio

June 1, 2006: Radio is a 20th century phenomenon. Its origins can be traced back to the first transatlantic wireless signal by Marconi in 1901 from Cornwall, England to St. John's, Newfoundland. In the early years, radio was a two-way medium freely used by amateurs, much like ham radio is today. During World War I, however, governments in North America and Europe decreed that only the military could operate radio stations (Ellerman & Mackintosh, 2003; Sposato & Smith, 2005). After the war, the main purpose of radio changed from military communications to entertainment. Commercial radio stations began to appear, the first one in North America being XWA (later CFCF) in Montreal in 1919 (Ellerman & Mackintosh, 2003), although the Americans claim KDKA in Pittsburgh in 1920 as the first (Sposato & Smith, 2005). In any case, there was "an explosion in the demand for radio. In the United States, 100,000 sets were sold in 1922, and a half million the next year" (Ellerman & Mackintosh, 2003, Public Broadcasting, ¶ 1).

Governments began to regulate the radio industry heavily, turning it into a one-way medium, controlling content, and limiting frequencies and ownership (Ellerman & Mackintosh, 2003; Sposato & Smith, 2005; Thomas, 2001). Even so, people clamoured for the sound of the human voice.

Radio announcers were unusually young, and spoke with enthusiasm and spontaneity. Radio news was taken directly from the news wire and read without interpretation. This gave the broadcasts an appearance of honesty and immediacy that spoke eloquently to the poor, to women, and to people in rural areas (Ellerman & Mackintosh, 2003, Public Broadcasting, ¶ 4).

June 3, 2006: I was thrilled to discover the possibility that the first few educational serial dramas (or soap operas) were produced here in Canada. Buck (2006) documented the 1927 production of the Canadian National Railway's Radio Train, a program for children about a group of adventurers who traveled across the country on an imaginary train. In each episode, listeners would learn about the history and geography of a stop en route. In May 1939 the Canadian Broadcasting Corporation (CBC) broadcast the first of over 6,000 eight-minute episodes about The Craigs, an Ontario farm family. It was soon followed by other "families" in other regions in Canada dealing with farming practices (McNeil & Wolfe, 1982).

Following World War II, "educational radio spread from the industrialised nations of Europe and North America to the developing countries . . . especially in the areas of agriculture and health" (Thomas, 2001). One reason for this was probably due to the work of Mexican writer producer director Miguel Sabido who, in the 1970s, "developed a methodology for entertainment education soap operas" (Singhal & Rogers, 1999, p. 14). Several things also happened in the 1970s that contributed to the rise of entertainment-education radio soap operas: frequency modulated (FM) radio transmission was developed, miniaturization of radio transmitting stations became more common, and portable AM/ FM radio receivers became more available at a relatively low cost (Thomas, 2001).

Despite the popularity of television in Western nations, entertainment-education soap operas continue to be delivered via radio in developing countries because radio is still the dominant medium there. For example, in Rwanda there are still 101 radios for every television set (Booth, 2003), and gathering around the radio to listen is still a common group or community activity.

June 5, 2006: The digital revolution took its time getting to radio. Now it is exploding – and the big bang goes far beyond podcasting. As radio shows are turned into digital bits, they are being delivered many different ways, from Web to satellite to cell phones. Listeners no longer have to tune in at a certain time, and within range of a signal, to catch a show or a game. As the business goes digital, the barriers to entry – including precious airwaves – count for less and less (Green, Lowry & Yang, 2005, Easier Entry, ¶ 2).

The explosion in audio media includes satellite radio, high definition, online radio, Wi-Fi, podcasting, and cell phones. ***Note to self:*** Almost all sources regarding new technology are from North America or Europe, and most references are to commercial radio. Keep this in mind when considering entertainment-education soap opera delivery.

June 6, 2006: Commercial radio is a US $21 billion industry in the United States. Satellite radio is a subscription-based medium, and the few satellite-radio companies that exist are taking aggressive steps for a piece of that pie. *Sirius* hired shock jock Howard Stern at US $500 million over five years, and *XM* hired Bob Dylan and other famous personalities, to draw in paying customers (Green et al., 2005). There are 10 million satellite-radio subscribers worldwide, and both *Sirius* and *XM* expect to have 15 million subscribers in North America alone by the end of 2006 (Giddens & Ghomeshi, 2006). Even so, both companies are not "expected to turn a profit until at least 2008... [and] are at the beginning of their growth curve" (Green et al., 2005, Sky High Ambitions, ¶ 3).

June 7, 2006: High Definition (HD) radio, also known as Digital Audio Broadcast (DAB), has been around for a few years, but has not caught on because normal AM/ FM radio – now known as terrestrial radio – stations could not agree on standards (Giddens & Ghomeshi, 2006). HD radio produces CD quality sound. By the end of the decade, at least 2,500 stations in North

America are expected to have it. Radio executives are betting that HD will allow them to offer the kind of niche programming already available on satellite radio and on the Web. In the next few years, HD will feature *TiVo* like functions, enabling listeners to store music and news and get on demand content (Green et al., 2005, On Demand, ¶ 1).

June 8, 2006: Online radio seems to have the same problem that websites have – how to pay for it. Audiences of Internet radio players, such as *AOL*, *Yahoo* and *MSN*, have plateaued at around 19 million listeners, perhaps because "some companies limited the music people could hear online to avoid paying heavy royalties" (Green et al., 2005, On New and Improved, ¶ 1). Seeking advertisers is one way around the problem, but as one blogger wrote, this may not work. Referring to the Internet-versus-radio survey (see my diary entry for October 10), he noted that it found that the more personalized the media stream, the less receptive consumers are to accompanying advertising. "This seems intuitive: the more the product is supposed to be about meeting your desires, the more off putting it's going to be to be suddenly subjected to a message that's all about somebody else's" (Fine Young Journalist, 2005, Where Do We Go, ¶ 2).

Perhaps audience participation is the answer. *Infinity Broadcasting*, one of the largest American radio operators with 813 stations, played listeners' uploaded homemade digital audio files. "Infinity's [spokesperson] . . . said the decision to launch the 'open source radio' experiment came partly because the San Francisco station's current format has not been a great financial success" (Jardin, 2005, ¶ 11). As an indication that some see huge financial potential in online radio, however, *Fox News* paid US $580 million in 2005 for *myspace.com*, a music-driven website with over 70 million members and 1.5 billion page views per-day (Giddens & Ghomeshi, 2006).

June 8, 2006: So, is terrestrial radio dying? Probably not soon. Despite the rise of new technology, notably the Internet, in the 1990s and 2000s, there is still a large disparity in the distribution and use of media. Compare the use of the Internet versus radio around the world: 33.1 percent versus 81.3 percent in Europe; 1.5 percent vs. 19.8 percent in South Asia and sub-Saharan Africa; 0.4 percent vs. 27.7 percent in the Middle East and North Africa; and 9.2 percent vs. 41 percent in Latin America and the Caribbean (United Nations World Youth Report, 2005). Even in North America, with Internet accessibility at a very high rate – 78 percent in Canada (Canadian Radio television, 2006) – "no one is saying commercial radio is going away: It still draws more than 200 million listeners a week" (Green et al., 2005, Ads and Minuses, ¶ 3). Or, as one radio supporter said: "If I created a technology today that reached 95 percent of the population [in North America], was free, was portable, and was ubiquitous, what would you say about it? It's, like, well, it was created – it's radio" (Giddens & Ghomeshi, 2006, 1:11 - 1:25).

Podcasting

June 16, 2006: Podcasting is a new word for delivering compressed audio files (usually MP3) over the Internet. It is a combination of *iPod* (Apple's popular audio player) and broadcasting (Colombo & Franklin, 2005; Crofts, Dilley, Fox, Retsema & Williams, 2005; Jardin, 2005). It is a controversial word among podcasters because it implies that a person needs an *iPod* to listen to a podcast, which is not true (Campbell, 2005; Meng, 2005). Podcasts can be played on any computer, and downloaded to almost any portable music player.

It has been possible to download audio files for many years, almost since the World Wide Web was created. What is new is "the ease of publication, ease of subscription, and ease of use across multiple environments" (Campbell, 2005, p. 2). Podcasting became possible in 2004 when

software engineer Dave Winer adapted RSS software to handle audio files (Crofts et al., 2005), and Adam Curry developed podcasting software when he "saw the potential of technology to help provide greater flexibility in finding and downloading audio files . . . automatically . . . onto his *iPod*" (Crofts et al., 2005, Introduction, ¶ 5).

Podcasting enables independent producers to create self-published, syndicated "radio shows," and gives broadcast radio programs a new distribution method. Podcasting is not just about the digital audio, it is the process by which knowledge in an audio format around a certain theme or topic can be discovered, subscribed to, and downloaded. It is a process that helps the listener find interesting content that is relevant to them through classifications (. . . tagging) and it allows the listener to play the audio at a time that is convenient to them, simply and easily. This enables an occasionally connected person, particularly in the development and education context, to have a list of relevant content readily available at her/ his fingertips (Roberts & Sarkar, 2005, p. 3).

June 18, 2006: "Podcasts consist of any imaginable form of audio content, from spoken word programs by bloggers to shows made by professional radio organizations" (Jardin, 2005, ¶ 14). They are rapidly increasing in popularity because they are simple to produce and very inexpensive to deliver. "At it's [*sic*] simplest, all that is required to create a podcast is a personal computer with a sound card, an inexpensive or built-in microphone, sound editing freeware, and an Internet connection with access to a website. Because of the low cost of entry, anyone can be a publisher, or more accurately a broadcaster with their own radio show" (Meng, 2005, p. 3).

June 22, 2006: I downloaded my favourite CBC radio shows, educational audio-blogs, comedy podcasts, and music, then uploaded them to my MP3 player and headed down the road to Kingston, Ontario to attend the first Podcasters Across Borders (2006) conference. The four-hour drive, including bumper-to-bumper traffic through Metro Toronto, was made bearable by listening to the player with one "ear bud" rather than a headset (which, I think, is illegal while driving). ***Note to self:*** Look into the cost of a car radio that connects with a portable music player.

June 23, 2006: A friend in Kingston took me to a discount store to purchase a cassette with a cable that attaches to an MP3 player, enabling me to listen to podcasts headset-free from my car's cassette player! ***Note to self:*** A cassette device is cheaper than a new car radio; think creatively when thinking about alternatives!

Shelagh Rogers, host of CBC Radio's *Sounds Like Canada*, gave the keynote address to open the Podcasters Across Borders (2006) conference. She affirmed that podcasting had revolutionized independent radio, giving the individual a voice and an audience that was never before possible. She spoke about the power and intimacy of radio, and reminded those present to talk to one person – not to the masses – and to tell compelling stories.

June 24, 2006: There were seven presentations during the conference, covering such things as planning a podcast, interviewing techniques, building a studio, and niche programming. The latter was particularly pertinent because of the diverse nature of podcasting. The participants consisted of about 80 enthusiastic people, most of whom were podcasters whose shows were targeted to comic book devotees, paramedics, motorcycle enthusiasts, hip hop dancers, techno-geeks, and Marilyn Munroe fans, among others.

Because I have produced several digital videos, and have written many scripts for video and radio, I was familiar with most of the information covered in the presentations and discussions. I did pick up a few podcasting tips, however, and noted a few interesting things.

Although podcasting is a method of delivery, at least half of the conference attendees also consider it a culture. They are passionate about keeping its independent spirit, and are worried about the change or influence big business's participation might bring. They strive to produce podcasts that are more professional than amateurish, but not without the spontaneity that flubs or mistakes bring. Although Giddens and Ghomeshi (2006) estimate that there are currently about 10,000 podcasts on the Internet, the number 50,000 was bandied about at the conference. For every new podcast, however, it was assumed that at least one had ceased, due to the amount of work required to produce them regularly.

Some podcasters had a narrow definition of this culture, which did not include educational podcasts, which they equated with university lectures. The few people who saw podcasting as an alternative delivery for any content produce podcasts that had some educational elements, such as the man who founded a project for recording copyright-expired books, or the public relations expert who ran a podcast for his industry, or the lawyer who created a podcast on legal issues, or the emergency medical services guy who has an avid international audience.

Perhaps the most interesting thing is that although podcasting is much like radio, in that it is a one-way medium, most podcasters consider it as two-way communication because their podcasts are available on websites and they have either accompanying blogs to which listeners add comments, or provide email addresses for listeners to write to them. The podcasters consider it a point of pride that they respond to their listeners' comments, both in their blogs and in subsequent podcasts, thus creating an asynchronous dialogue.

June 24, 2006: On the way home, I listened to the podcasts of several people I had met, and reflected on the comments I'd heard during the conference that echoed things I'd read in the past few months:

- "The key technological advantage of podcasting is time-shifting – the ability to listen to audio material when we choose" (Crofts et al., 2005, Social Contributions, ¶ 2).

- "The Internet has surpassed radio as the preferred medium for music among youth" (Radio Currents, 2005, ¶ 6) and "younger people have become accustomed to personalizing their experiences with interactive media" (¶ 1).

- "As old fashioned radio struggles, listeners are creating the future" (Green et al., 2005, Buying a Song, ¶ 3). "With no licenses, no frequencies, and no towers, ordinary people are busy creating audio programming for thousands of others. They're bypassing an entire industry" (Green et al., 2005, Easier Entry, ¶ 1).

- "The strength of podcasting is in its technical simplicity . . . More exciting is the interest it has spawned in the creation of grassroots audio content from around the world" (Roberts & Sarkar, 2005, p. 4).

- "Around six million . . . people have downloaded podcasts, and podcasting is expected to reach 12.3 million households [in the United States] by 2010" (Crofts et al., 2005, Intro., ¶ 10).

- How will podcasts be funded? "While start-ups such as Odeo and The Podcast Network are providing technological support and creating a podcasting network, right now Ibbott has barely enough ads to cover expenses, and most podcasters work for free" (Green et al., 2005, ¶ 2).

- And as for educational soap operas? “Podcasting could have far reaching opportunities for international development in the creation of freely available educational and development content” (Roberts & Sarkar, 2005, p. 4).

Cell Phones

June 26, 2006: Not owning a cell phone, I did not considered it a device to deliver audio soap operas. I was wrong. It is already happening, albeit in a rudimentary fashion. User-subscribed, they are called "mobisodes," presumably for mobile soap episodes: “Some are cartoon strip images with captions, others use familiar soap locations and storylines with well known actors. At present the *mobisodes* are static images with text, rather than video scenes” (Millea, Green & Putland, 2005, p. 72).

A soap opera called Jong Zuid is already very popular on cell phones in the Netherlands and even won an award for best mobile application (Mobile Tech News, 2003). But full audio/ video "mobisodes" are no doubt coming soon. They will probably be delivered via wireless Multimedia Message Service (MMS) which can transmit video clips, sound files, text messages, and email. “Use in an educational context is still in the early days in that MMS-ready mobile phones are not yet ubiquitous, although take-up is increasing” (Millea et al., 2005, p. 72). Cell phones are already the preferred camera for many people (BBC News, 2006, June 6), in use as visual radio delivering FM music with artists’ photos (Jardin, 2005), and used as music or podcast players (Needleman, 2006). Although MP3 players, Personal Digital Assistants and other mobile devices flood the marketplace, with 815 million people buying cell phones last year (Giddens & Ghomeshi, 2006), and an estimated 2.5 billion mobile phones in use around the world (BBC News, 2006, June 6), is it any wonder Needleman (2006) said: “It’s a bit early to say definitively which model will win out, but it’s worth noting that for most people, a cell phone is a necessity . . . I think that indicates which way the market is going to tilt” (¶ 6).

Costs and Other Considerations

June 27, 2006: Millea et al. (2005) found “considerable agreement in the literature on the general trends in emerging technology” (p. 10). They include mobility, interoperability between devices, convergence of functionality but divergence of use, integration and customization, the richness and malleability of content, security issues, open source, and opportunities for creativity, interactivity and collaboration.

All these things come at a price, however. For example, listening to satellite radio requires between US $100-$400 for the hardware and about US $15 per month for the subscription fee (Giddens & Ghomeshi, 2006). Listening to podcasts requires a highspeed Internet connection, because most podcasts are a minimum of 9 MB and many run to 35 MB or more. The average monthly cost of highspeed connection is US $30-50/month, and MP3 players cost between US $100-500. It is even more expensive to create the podcasts. Even though they can be created with minimal software and hardware, the average podcaster’s studio costs between US $1,000-5,000 (Podcasters Across Borders, 2006). Moreover, the costs for downloading can increase relatively with the popularity of the podcast and amount of bandwidth used. “Most [Web] hosting plans define an allowable amount of bandwidth each month for a particular price” (Colombo & Franklin, 2006, p. 120) and charge extra for any bandwidth used above that. This cost is especially important for online radio:

> *You pay for every single listener who tunes in or streams your radio station. The broadcast model is absolutely opposite. You pay one time to put that stuff out in a giant pipe, and you can have ten people listening or ten million, and it'll cost you the same amount* (Giddens & Ghomeshi, 2006, 19:50 - 20:04).

So, terrestrial radio still seems to be cheaper – for the listener, at least. Producing radio is still a business (and therefore too costly for the average person to set up a station), and is still controlled by commercial enterprises, public radio, and community or campus radio. That is changing, too. Referred to as a radio station in a suitcase, there is a compact package designed and manufactured in Manitoba and distributed in developing nations by the Commonwealth of Learning. It has all the hardware needed to create portable radio transmission, including the ability to connect to commercial FM networks and satellite feeds. "It broadcasts up to a 50-km radius, runs on a car battery, and can be modified for solar power . . . all for around US $3,500 (Chin, 2000, p. 1).

But what of the listeners? While most in the Western world have access to radio (see diary entry June 8), listeners in the developing world are not so fortunate. "Nearly seven out of ten Bolivian households have radios, a proportion far greater than any of the other eighty poorest countries in the world" (Education Development Center, 1998). Organizations such as the *Freeplay Foundation* are trying to change this by selling inexpensive (subsidized) radios to those in need. Their *Lifeline Radio* is a self powered (wind-up or solar power) created "specifically for children living on their own, distance education or other humanitarian projects" (Freeplay, 2006, ¶ 3).

It would seem that radio might be the most appropriate delivery for educational audio in developing regions, except for this surprising fact: Some developing nations are going wireless. Mbarika and Mbarika (2006) note that "sub Saharan Africa – with 34 of the 50 poorest countries on Earth, according to the United Nations – is now the world's fastest growing wireless market" (¶ 3), mainly because the "national telecommunications monopolies are poorly managed and corrupt, and they can't afford to lay new [land] lines or maintain old ones" (¶ 4). Cox (2005) points out that most poor communities are off the electrical grid with only one in ten people having access to electricity. It makes economical and practical sense for people to use cell phones for communication, which run on either small batteries, car batteries with adapters, or solar power.

New mobile devices just might be the answer – with capabilities of a telephone, radio, text messenger, podcast, and computer combined. Already the new *Zing* device has the ability to connect to satellite radio and the Internet through its wireless technology, record through its microphone, play with its built-in speakers, and talk to others "walkie talkie style, over the Wi Fi network" (Needleman, 2006, ¶ 5), and some mobile phones have MMS capabilities (Millea et al., 2005).

Conclusions

July 1, 2006: Yesterday results of an *Ipsos* poll revealed that 20 percent of Americans over the age of 12 now own an MP3 player, a rise from 10 percent only three years ago (BBC News, 2006, June 30). While both radio and podcasting are appropriate current choices for delivery of educational soap operas, it is difficult to know which medium (if either) will dominate the 21st century. Recalling AM radio, Buck (2006) commented that "some of the ideas it embodied and other ideas that were tried and found wanting may be worthwhile to consider in light of 'new' approaches such as podcasts and netcasts" (p. 87). However, "predicting the likely adoption and

evolution of emerging technology is, of course, a best guess scenario, given the rapid state of change in the digital world" (Millea et al., 2005, p. 20).

In this challenge, however, is also the opportunity to provide all new classes of services for on campus, distance, and lifelong learners. In fact, the greatest opportunities for these technologies are in the ways they will be used that have not been imagined yet (Meng, 2005, p. 11).

My bet is on some sort of convergence of radio, podcasting, and mobile phones which will provide learners with the convenience of listening to episodes wherever, whenever they want, provided that connections and downloading costs are not too prohibitive. Maybe this new technology, which allows two-way communications, will change radio back to its origins of a two-way medium, as it was in Marconi's day. Maybe people will listen to the soap operas and discuss what they have learned with others, thereby supporting the trend in education toward collaborative learning. At the rate that technology is advancing, I do not think we will have to wait too long to see.

References

BBC News. (2006, June 6). *Handsets look to eclipse cameras.* Retrieved June 6, 2006 from: http://news.bbc.co.uk/2/hi/technology/5048966.stm

BBC News. (2006, June 30). *Digital music fans reach new peak.* Retrieved June 30, 2006 from: http://news.bbc.co.uk/2/hi/technology/5132398.stm

Booth, I. (2003). *Radio Soap for Health Education: Lessons learnt by Health Unlimited Rwanda 1997 2003.* Retrieved September 15, 2005 from: http://www.comminit.com/evaluations/steval/sld 2172.html

Buck, G. H. (2006). The First Wave: The beginnings of Canadian distance education. *Journal of Distance Education, 21*(1), 75 - 88.

Burrill, W. (2004). *Teens fleeing adult radio.* Retrieved November 1, 2005 from: http://friends.ca/News/Friends_News/archives/articles12060401.asp

Campbell, G. (2005, November/ December). There's something in the air: Podcasting in education. *EDUCAUSE Review*. Retrieved October 21, 2005 from: http://www.educause.edu/ir/library/pdf/erm0561.pdf

Chin, G. (2000). The Suitcase Station: Have radio, will travel. *The Commonwealth of Learning website.* Retrieved June 4, 2006 from: http://www.col.org/programmes/clippings/pdfs/suitcase.pdf

Colombo, G., & Franklin, C. (2005). *Absolute beginner's guide to podcasting.* Indianapolis, IN.: Que Publishing.

Cox, F. (2005). Coming Together: Energy from the sun. *The Commonwealth of Learning website.* Retrieved June 20, 2006 from: http://www.col.org/media/EnergyfromtheSun.doc

Crofts, S., Dilley, J., Fox, M., Retsema, A., & Williams, B. (2005). Podcasting: A new technology in search of viable business models. *First Monday, 10*(9). Retrieved September 19, 2005 from: http://www.firstmonday.org/issues/issue10_9/crofts

Education Development Center Inc. (1998). *Multichannel Learning Center: Ten years of sustained involvement in Bolivia.* Retrieved November 21, 2005 from: http://main.edc.org/newsroom/features/mcl.asp

Ellerman, E., & Mackintosh, J. (2003). Radio: The People's Medium. *Athabasca University's Communications Studies' website.* Retrieved November 1, 2005 from : http://www.athabascau.ca/courses/cmns/302/unit6guide.html

Fine Young Journalist (2005). *Slicing and Dicing.* Retrieved October 15, 2005 from: http://fineyoungjournalist.blogspot.com/2005/10/slicing and dicing.html

Freeplay Foundation (2006). What is Lifeline Radio? *Freeplay Foundation website.* Retrieved April 29, 2006 from: http://www.freeplayfoundation.org

Giddens, D., & Ghomeshi, J. (2006, May 6). The End of Radio. Online video of original television broadcast. *CBC Newsworld online.* Retrieved May 28, 2006 from: http://www.cbc.ca/theend/radio.html

Green, H., Lowry, T., & Yang, C. (2005, March 3). The New Radio Revolution. *Business Week Online.* Retrieved June 4, 2006 from: http://www.businessweek.com/technology/content/mar2005/tc2005033_0336_tc024.htm

Inukshuk Fund (2005). *Inukshuk Wireless website.* Retrieved November 18, 2005 from: http://www.inukshuk.ca/anglais/nous.html

Jardin, X. (2005, April 27). Podcasting killed the radio star. *Wire News.* Retrieved November 1, 2005 from: http://www.wired.com/news/digiwood/0,1412,67344,00.html

John Hopkins University (1998). *Johns Hopkins University Center for Communication Programs: A report on the second international conference on entertainment-education and social change.* Baltimore: JHU/ CCP. Retrieved April 13, 2006 from: http://www.jhuccp.org/pubs/ sp/9/9.pdf

Maffin, T. (2005). *Why radio needs to become interactive immediately.* Retrieved October 10, 2005 from: http://todmaffin.com/blogs/radio/category/other/trends/page/2

Mbarika, V. W. A., & Mbarika, I. (2006). *Africa Calling.* Retrieved June 29, 2006 from: http://www.spectrum.ieee.org/may06/3426

McNeil, B., & Wolfe, M. (1982). *The Birth of Radio in Canada: Signing on.* Toronto: Doubleday.

Meng, P. (2005). *Podcasting and Vodcasting: A white paper.* Retrieved September 19, 2005 from: http://edmarketing.apple.com/adcinstitute/wp-content/Missouri_Podcasting_White_Paper.pdf

Millea, J., Green, I., & Putland, G. (2005). *Emerging Technologies: A framework for thinking.* Australian Capital Territory Department of Education and Training. Retrieved October 1, 2005 from: http://www.det.act.gov.au/publicat/pdf/emergingtechnologies.pdf

Mobile Tech News (2003). *Ericsson's Best Mobile Application Award 2003.* Retrieved November 8, 2006 from: http://www.mobiletechnews.com/info/2003/11/30/002548.html

Needleman, R. (2006). *Coming Soon: The Wi Fi MP3 player.* Retrieved June 4, 2006 from: http://reviews.cnet.com/4531 10921_7 6535687.html

Podcasters Across Borders (2006). *Podcasters Across Borders Conference* in Kingston, Canada. June 23-24, 2006. Retrieved November 8, 2006 from: http://www.podcastersacrossborders.com

Radio Currents Online (2005, September 27). *Yahoo OMD Study: Youth prefer the Internet over radio.* Retrieved October 15, 2005 from: http://beradio.com/currents/radio_currents_092605/

Roberts, M., & Sarkar, P. P. (2005). *Podcasting: Knowledge sharing for development through dialogue.* Retrieved May 30, 2006 from: http://conversations.bellanet.org/Podcasting_concept_note.pdf

Singhal, A., & Rogers, E. M. (1999). *Entertainment Education: A communication strategy for social change.* Mahwah, NJ.: Lawrence Erlbaum Associates. Retrieved May 21, 2006 from: www.colby.edu/education/courses/ed116/Enter_Educa.doc

Sposato, S., & Smith, W. A. (2005). *Radio: A post nine-eleven strategy for reaching the world's poor.* Lanham, MD.: University Press of America.

Thomas, J. (2001). Using community radio for non formal education. *The Commonwealth of Learning website.* Retrieved February 16, 2006 from: http://www.col.org/Knowledge/ks_radio.htm

United Nations World Youth Report (2005). *Information and communication technologies.* Retrieved June 20, 2006 from http://www.un.org/esa/socdev/unyin/wpayinformation.htm

Usman, L. (2001). "No One Will Listen to Us" Rural Fulbe women learning by radio in Nigeria. In E. J. Burge & M. Haughey (Eds.) *Using Learning Technologies: International perspectives on practice* (pp. 92-101). London: Routledge-Falmer.