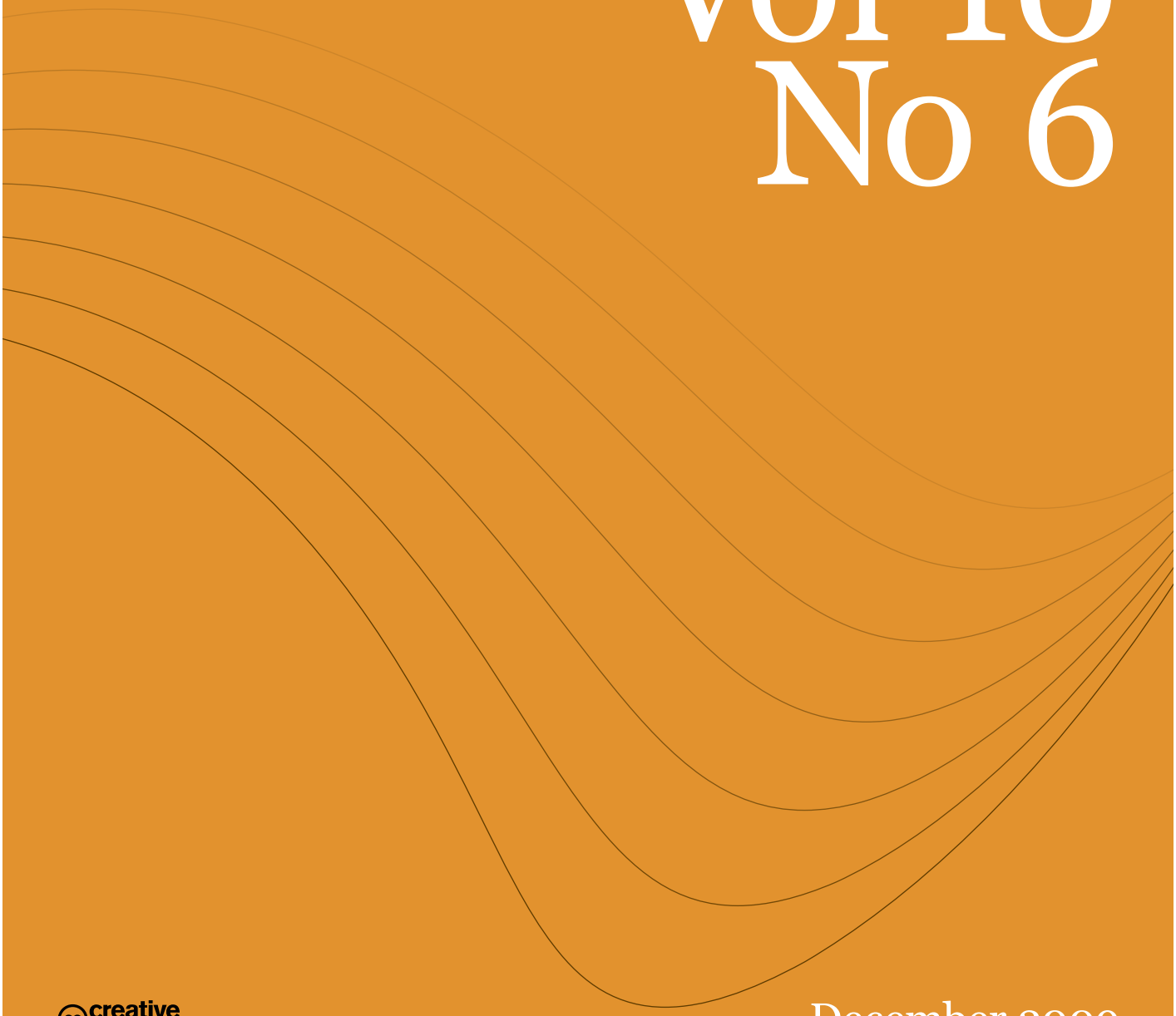
IRRODL

THE INTERNATIONAL
REVIEW OF RESEARCH IN
OPEN AND DISTANCE LEARNING

Vol 10 No 6



December 2009

International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

Editorial

IRRODL Year in Review

Terry Anderson
Editor

The end of the calendar year with its seasonal celebration of the winter solstice, Diwalhi, Eid al-Adha, Christmas, Hanukkah, New Year's and many secular feasts and parties brings moments of both celebration and of thankfulness. We are very pleased to be celebrating IRRODL's most successful year to date. In this our tenth year we published our now normal three general issues, and we also released special regional issues on Africa and the Middle East and a special topical issue on Openness and the Future of Higher Education. This level of production has meant a great deal of reviewing, formatting, revision, and editorial oversight. I am very grateful to everyone who has contributed to IRRODL this year. Many of you have reviewed more than a single paper, seven scholars have served as guest editors, we have a new book review editor, and Ms. Brigette McConkey has had to learn the publishing game, at a new workplace, while working at record speed. We also upgraded to a new version of the Open Journal System, which provides a number of enhancements "under the hood" and will allow us to incorporate more interactive elements as the year unfolds. Additionally, we began to publish our articles in epub format, which allows their use on portable phones and on e-book readers. I hope you agree that the results of this year's publication have made all of our efforts worthwhile.

My hope is that each IRRODL reader, editor, reviewer, and contributor is able to look backwards at a fulfilling year of learning and achievement. Further, it is our hope that you face the upcoming year with confidence, energy, and excitement for the opportunities we have to enhance teaching, learning, and distance education research throughout the world.

In this issue, we present eight research articles, one article from the field, a book review, and the links to some recent Canadian Institute for Distance Education Research webcasts. The first article, Rory McGreal's *Case Study of an International E-Learning Training Division*, features a review of the Commonwealth of Learning's (COL) e-training section. COL undertakes a variety of activities and programs, which makes an overall evaluation of its disparate programs challenging. In this article both the accomplishments and the barriers yet to be overcome are clearly articulated. Although it may seem self-serving, we are very pleased to be publishing the results of Olaf Zawacki-Richter, Eva Maria Baecker, and Sebastian Vogt's *Review of Distance Education Research (2000 to 2008): Analysis of Research Areas, Methods, and Authorship Patterns.* During the eight years covered by the review of the five major DE journals, IRRODL

published the most articles, and it was the most international of the journals (authors from outside the country of journal publication) Also, it had the second highest number of references per article. As well, the authors found that 6 of the 39 most prolific authors are associated with Athabasca University. So besides reading to discover what a wonderful journal IRRODL is ☺, there is much to learn from this article about the type and methodology of distance education scholarship.

The third article attempts to quantify the amount of time students spend reading conference forums. Asynchronous threaded discussion forums remain the mainstay of online distance education, and thus understanding how much time is required and expected in reading this important component of online distance education is important. Abbie Brown and Tim Green's *Time Students Spend Reading Threaded Discussions in Online Graduate Courses* provides a necessary understanding of a major determinant of the effectiveness and efficiency of online learning. The fourth article adds insights relating to the now quite familiar community of inquiry model. Zehra Akyol, D. Randy Garrison, and M. Yasar Ozden's *Online and Blended Communities of Inquiry: Exploring the Developmental and Perceptional Differences* explores the differences between students' perceptions of purely online and blended learning contexts using the COI survey instrument, transcript analysis, and interviews. Next, George Veletsianos and Irene Kleanthous provide *A Review of Adventure Learning*. Adventure learning allows online and classroom students to travel with explorers, scientists, and other role models, allowing virtual participation in many of the most exciting and important activities on our planet. The authors identify results, models, further research opportunities, and challenges for those engaged in this motivating type of distance education. The last research article details the challenges of delivering science education at a distance to large numbers of students. Arundhati Mishra, Vijayshri and Suresh Garg's *Evaluation of an Undergraduate Physics Programme of Indira Gandhi National Open University: A Case Study* helps us to realize the challenges and the opportunities afforded by distance education in meeting the large and growing needs for quality educational opportunity throughout the world.

The Field Notes section contains an article that provides an overview of Athabasca University's new Doctorate of Education program. Dorothy (Willy) Fahlman writes in *The First Doctoral Program in Distance Education in North America* from the perspective of one of the students in the first cohort of this program. The explosion of interest in and practice of distance education around the globe means we need an ever-growing supply of quality DE researchers, teachers, and scholars. Non-resident, part-time programs such as the one described by Fahlman are critically important in meeting this need.

Our best for a relaxing yet invigorating holiday, and we hope to find you reading and contributing to IRRODL in the new year.

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A Case Study of an International E-Learning Training Division: Meeting Objectives

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Abstract

This paper presents an evaluation of the work of the Commonwealth of Learning's (COL) eLearning with International Organisations (eLIO) section. Participants in the investigation included a representative sample of the learners (N = 15), their supervisors (N = 5), and the COL staff, including all of the eLIO staff (N = 10). The methodology consisted of an examination of all relevant documents, interviews that formed a learning history, and a sample survey. The investigation concluded that the eLIO achieved its goal of developing a distance learning model, and it met or exceeded identified objectives, with a high degree of satisfaction expressed by all participants. This included teaching +2000 satisfied learners; partnering with eight international organizations; achieving a 62% female participation rate and a high completion rate (75%) in the courses provided; testing, piloting, and delivering two new elearning courses; conducting needs analyses; recruiting/training highly qualified tutors; monitoring; and using appropriate technologies. Shortcomings of the programmes include the lack of pre- and post-tests, little analysis of pricing structures, some unclear instructions (a need for plain English), unclear copyright licensing, only very limited use of available OER software, and the absence of a succession plan for the manager. Based on the high level of satisfaction among all participants, it was recommended that the section maintain its present work and address these shortcomings.

Keywords: Distance education; open learning; e-learning; online learning; elearning management

Commonwealth of Learning's E-Learning for International Organisations Section

The Commonwealth of Learning (COL) is an intergovernmental organisation created by the Commonwealth Heads of Government to encourage the development and sharing of open learning and distance education knowledge, resources, and technologies. The COL eLearning for International Organisations (eLIO) section provides technology-enhanced, customised training solutions for international organizations, such as the World Bank and UNESCO. Services include needs analyses, development of customized culture- and gender-sensitive training materials, and

course delivery at a distance using expert tutors. Many international organizations, aware of COL's international reputation for distance education in the developing world, are contracting with the eLIO for their training needs. This paper provides an evaluation of this COL section and makes recommendations for improvements (Commonwealth of Learning, 2008h).

Significance of the Investigation

The increased availability of computers and the Internet has made possible the delivery of training to populations, particularly those in developing countries who previously could only be reached by using traditional classroom-based teaching approaches or by using often ineffective correspondence courses, which have high dropout rates. In order to ensure the effective adoption of these new technologies for learning, open access to case studies and other investigations of these distance education initiatives is important. These can serve as useful guides to others who are planning similar or complementary implementations. Knowledge of the research on successful or even unsuccessful training practices can help others to better plan their own systems (Cruickshank, 1990).

The rapid advance of technology combined with the ever-increasing need for skilled professionals with technological and English language skills must be addressed. How to reach these professionals in widely dispersed international organizations, especially employees in developing countries, remains a serious concern. As researchers, we have an obligation to study programme implementations that address this problem and to provide an understanding of the difficulties and of the successes of the real-world implementations.

For example, distance educators must evaluate the technologies that they choose for delivery. Which technologies are appropriate given the target population and their degree of access to computers and the Internet? As far back as 1983, Clark determined that the technology was neutral, conferring no learning benefits regardless of the media used.

More closely related to this investigation is an examination of the role of the administration in an implementation project and in the training system as a whole. In recent times there has been a (perhaps necessary) focus on the learner as the centre of the process. This has often led to a de-emphasis on the training system as a whole and on the part that it plays. This study focuses on the administration of the training system.

As a case study, this investigation may shed some light on what is needed for a successful implementation of distance training internationally. Flyberg (2006) reminds us that our understanding may be strengthened by the execution of a greater number of good case studies. Mathur and Oliver's (2007) case study of an international blended learning programme for developing countries sheds light on the need for technological knowledge and also on the problems and pitfalls of collaboration between organizations.

Oliveira, Cortimiglia, and Marques' (2003) case study of a data technology distance education course implementation looked at the technology requirements, financial results, and market

possibilities. They concluded that their web course was capable of reaching remote areas and the instructional contents were capable of delivering professional qualifications.

Hills (1999), in her case study of Lloyd's bank training, focused on the organizational culture and its effect on training. She concluded that a learning culture is needed for the exploitation of multimedia for training. A faculty learning community was the subject of Long, Janas, and Kay, et al.'s case study (2009) of a small college online learning implementation.

Failed implementations are also worthy of our attention, especially when the implementation is similar to one under investigation. Nchindila (2007) investigated the conditions for the success of the writing process in English using online mentoring in the workplace, concluding that in this case study the implementation was evaluated as not successful, based on questionnaires for the students and mentors.

Outcomes and Outputs and Related Success Indicators

The original outcomes and outputs were as stated in Table 1.

Activities Implemented

The eLIO team developed and delivered technology-mediated distance learning programmes with international organizations in different regions around the world. They formed partnerships with international organizations in order to accomplish this. The learning materials were developed and customized for each organization to promote the learning of relevant occupational skills, based on an analysis of the learners' needs and on the capacity of the technological infrastructure available. Qualified tutors were engaged and trained in order to facilitate the delivery of the programmes. Seven international partners participated as partners in eLIO programmes.

Table 1

Planned Outcomes and Outputs

Outcomes

- Development and delivery of technology-mediated distance learning programmes with international organisations to enable access to learning by a dispersed and diverse international workforce.
- By 2009, at least 6 major international organisations active in delivering the Millennium Development Goals (MDGs) have formed a partnership with COL in customising gender- and culture-sensitive workplace eLearning programmes.
- An additional 2,000 adult learners (a 6 to 4 ratio of women and men) will be trained by 2009.
- At least two new contextually relevant sets of ODL/ICT-based learning materials for occupational skills development created and each is taken up by at least two major institutions.
- Did the COL eLIO achieve its goals through the activities posited? Activities:
- Actions to achieve the outputs
  1. Analyse and understand the learners' needs, learning objectives and outcomes, the learning environment and technology infrastructure of the organizations.
  2. Design courses and develop materials through customization.
  3. Test all training materials and delivery designs
- Build responsive infrastructure and clear processes for course production and presentation. This includes
  - preparing storyboards/templates;
  - using robust, affordable and user-friendly technology and media;
  - recruiting and maintaining a cadre of trained and committed tutors;
  - using OERs software as far as possible.
  - Monitoring Data
    a. pilot evaluation reports
    b. monthly progress reports
    c. tutor listservs®
    d. end of course evaluation feedback
    e. programme evaluation studies

Outputs

	Success Indicators
• number of participants	+2000 by 2009
• number of organizations served	6
• number of regions served	not stated
• revenue	self sustaining by 2009

Limitations of the Study

This plan is limited to an evaluation of the activities of the COL eLIO and does not address the wider issues associated with the COL organization. The evaluation is for this particular section only, and it is recognized that the external validity or generalisability is limited. Reliability is always an estimate. It was addressed by triangulating the data collected using at least three different programme case studies, documents, a survey, and interviews with a random sample of

participants, COL eLIO staff, and others using similar questions and interviewing techniques. Through this triangulation a hybrid was attempted between quantitative and qualitative methods (See Leedy, 1993).

The validity of the evaluation conclusions, in this case, cannot be assured by a control group. There is often a multi-group threat to the validity of an evaluation when comparing different groups taking the same programme. As this evaluation did not compare the outcomes of the different groups, but rather considered the section's activities overall, including the programmes with different organizations, this was not a problem.

Method

The evaluation was conducted using triangulated data collected from several different pilot and programme evaluations, published papers, a simple survey instrument, and other documents as well as interviews with a random sample of participants (student, partners, and tutors). The COL staff and a sampling of others were interviewed using similar questions and interviewing techniques. These included seven COL staff members, five tutors, three partners, and 10 learners. The interviews were collated into a *learning history* document.

The information collected consisted of a large corpus of documents, including previous project evaluations supplied by the COL eLIO, the COL, and other relevant websites' published articles. Documents were obtained directly from the eLIO and from Internet searches. The documentation was positive in the extreme with none pointing to serious or even minor criticisms. At first this seemed suspicious but was borne out in the triangulation with the interviews and questionnaires.

In addition, interviews were conducted with the COL eLIO staff, other COL personnel, and a small sample of participants in the COL eLIO projects. A random sample of representatives from three of the eight participating organizations was contacted and interviewed. A random sample of tutors (five from a list of 20) was also contacted and interviewed. Thirty students were randomly selected and asked to participate in an online survey using Survey Monkey. Ten responded and one agreed to be interviewed by telephone. The random samples were elicited using the application available at Random.com. The participants in each group were given a number and then the numbers were input into the random.com application, which randomized the total and picked a sample. The participants contacted were sent a consent agreement.

A list of questions was used as the main instrument for the interviews. Other supplementary questions were used as they emerged out of the discussion with participants. The analysis included an examination of the question responses from which data was collected. This data from the quantitative questionnaires was analysed statistically (See Nunan, 1992).

These surveys were triangulated with the interviews and documentation. The reliance on a variety of sources in this investigation is supported by Yin (1994), who argued that one of the benefits of a case study is that it depends on multiple sources of data as evidence.

The interviews were conducted either by telephone or in a face-to-face format in June 2008. The information was collected, converted into a learning history format, and analysed for this report. A learning history methodology provides organisations with a special approach to learning from the experiences of the participants. In the right-hand column, relevant observations are described by the people who took part. The participants are quoted directly, and their statements are placed in a category defined by their role to increase anonymity. The researcher then attempts to weave the words into a coherent story based on the information provided, including facts, results, and assumptions of the participants. This methodology is based on approaches and techniques in a variety of fields, including organizational learning (See Roth & Kleiner, no date).

This evaluation consists of a summative assessment of the outputs and achievements of the COL eLIO for formative input into planning future programme implementations as well as for expanding partnerships and for increasing the efficiency and effectiveness of the sector. The key performance indicators – output and outcomes – have been identified from COL documents and in consultation with the COL eLIO representative. These include information on the organizations served and on the participants in the programmes delivered (See Table 1). Appropriate documentation and access to interviewees was made available to the evaluator, who developed a strategy for analysing the data provided. Indicators included data on the growth of the initiative (e.g., number of courses created and delivered, number of learners, learner achievement, engagement of technology, lessons learned, threats & opportunities, expansion, gender equity, etc.).

This evaluation can be used by COL to inform its planning processes and to report on activities to COL stakeholders.

Findings

A 6R assessment criteria (relevance, results, reach, regions, resources, and relationships) was used. These criteria were triangulated with the documentation and survey results.

Relevance

There was a consensus among the COL staff that the eLIO is marginalized or “peripheral” primarily because it is the only section of COL that has been mandated to be self-supporting. They note that the eLIO, in fact, contributes significantly to the core mandate of COL as expressed in the *COL Three Year Plan* (Commonwealth of Learning, 2006). The eLIO’s relevance to COL is something more than revenue generation.There is a strong alignment of its goals in serving international organizations with those of COL in increasing capacity and demonstrating the effectiveness of open and distance learning (ODL). It strives to serve as a successful example of the use of technology for ODL in developing countries, including the Commonwealth. The section is responsible for adding to the reputation of COL as a professional organization that serves the developing world by using the best approaches and techniques in DE. As an organisation that works with governments at the policy level for human resource

development, COL's reputation is enhanced when the eLIO, at the grassroots level, demonstrates the viability, effectiveness, and sustainability of international ODL. As one interviewee noted, COL "needs something to crow about."

Unexpected Outcomes

The eLIO has also demonstrated its relevance by its actions because other opportunities have come to COL as a result of eLIO's reputation for delivering ODL. UNICEF is interested in a wider opportunity for COL in HR development (possibly $1.9 million) along with a major capacity building project for South African civil servants. These opportunities have come to COL by word-of-mouth. Without advertising, the eLIO programmes have built viable relationships and have increased COL's visibility among international organisations, particularly major funders.

Results

The results to be measured include in the first instance the stated intended results of the eLIO section as per the COL strategic plan. They are listed below along with information on the success of each.

Goal
Development and delivery of technology-mediated distance learning programmes with international organisations to enable access to learning by a dispersed and diverse international workforce.
Results
Successful: The eLIO developed and delivered several distance learning programmes to international organizations with widely dispersed and diverse international workforces.

Goal
By 2009, at least six major international organisations active in delivering the Millennium Development Goals (MDGs) have formed a partnership with COL in customising gender- and culture-sensitive workplace eLearning programmes.
Results
The eLIO surpassed this goal, partnering with eight international organizations active in delivering e-learning that support MDGs. These have been generally described as being sensitive to gender and cultural issues in the workplace. The following organizations participated as partners with eLIO:

1. World Health Organisation,
2. UN High Commissioner for Refugees,
3. International Labour Organisation,
4. International Federation of the Red Cross and Red Crescent Societies,
5. The Joint UN co-sponsorships for HIV/AIDS,

6. World Bank,
7. UNICEF, India Country Office,
8. Office of Internal Oversight Services (OIOS).

Goal
An additional 2,000 adult learners (a 6 to 4 ratio of women and men) will be trained by 2009.
Results
1,766 adult learners (62% female) have received training from the eLIO section. This number increased to more than 3000 in 2009.

Goal
At least two new contextually relevant sets of ODL/ICT-based learning materials for occupational skills development created and each is taken up by at least two major institutions.
Results
Two new elearning courses have been developed, adapting the materials and contextualizing them to different organizations.

Goal
Did the COL eLIO achieve its goals through the activities posited?

a. Analyse and understand the learners' needs, the learning objectives and outcomes, the learning environment, and the technology infrastructure of the organizations
Results
Needs analyses were conducted with the partner organisations, taking into account the learning environment and the technological infrastructure. Adjustments to the courses were made based on these analyses; for example, deadlines and examination schedules were changed, CDRoms were used for distribution, and email was used rather than more complex applications on the Internet.

b. Design courses and develop materials through customization
Results
Six courses were adapted and delivered specifically for each organization, taking into account their different cultures and learning environments. All partners interviewed agreed that this was done very well and according to their needs.

c. Test all training materials and delivery designs

i. build responsive infrastructure and clear processes for course production and presentation
ii. prepare storyboards/templates
Results
One partner reported on the difference between her organization's approach to instructional design and that of eLIO, specifically referring to eLIO's change in approach to accommodate her

organization's wishes. This included adopting storyboards and templates as part of the learning design process.

iii. use robust, affordable, and user-friendly technology and media

Results

The eLIO course designers deliberately focused on low technology solutions in order to ensure that the course would be robust, user-friendly, affordable, and, most importantly, accessible by the learners dispersed around the world in developing countries. This included the distribution of CDRoms for the course materials and the use of simple email for communications.

iv. recruit and maintain a cadre of trained and committed tutors

Results

The eLIO recruited and maintained a cadre of trained and committed tutors. The partners and students unanimously agreed that the tutors were indispensable and the most important part of the programme.

v. use OER software as far as possible

Results

No open educational resource (OER) software was used. The project was limited by the proprietary software available in the partner organizations. For example, MS Office, including MS Word, was a standard that was known and used by the participants.

d. Monitoring Data

i. pilot evaluation reports

Results

A selection of pilot evaluation reports was made available for this study (Commonwealth of Learning, 2003; Murphy, 2003; Ruhe, 2002; Shale, 2003)

ii. monthly progress reports

Results

Monthly progress reports supplied by the tutors in a standard format were a regular occurrence. A random sampling of these reports was provided to the evaluator.

iii. tutor listservs®

Results

Tutors were able to communicate with their students, the administration, and the administrators using listservs. In addition a web conferencing application was made available for discussion groups.

iv. end of course evaluation feedback

Results

Learners were asked in the evaluations to provide their views on the course, their estimation of its success, and their attitude towards it.

They were satisfied with their progress and very positive in their attitude towards the course and the tutors in particular. However, other than some very tenuous pre- and post-testing, there was no reliable testing of the achievement level of the learners. There are problems associated with administering such pre- and post-tests in a distributed environment. Nevertheless, as was pointed out by some of the participants, such a practical test should be an integral part of the programmes in order to show learners, partners, tutors, administrators, and outsiders that real progress in achievement levels was made through the course.

v. programme evaluation studies

Results

Programme evaluation studies were conducted and acted upon (Dunlop, 2005; John, 2005; Walker & Dzakiria, 2005; Wilson, 2006 & 2007).

The following questions were also addressed.

Does the existing data gathering mechanism adequately cover the necessary information for analysis and reporting? Where are the gaps?

The evaluations of both the pilots and the full courses were conducted in a professional manner. The learner feedback, although difficult to arrange, was adequate for analysis with a return rate of 30% to 40%. As previously stated, the only real gap in the learner evaluations is in the need for pre- and post- tests of achievement.

The time allotment by COL eLIO staff was set at 2% for initiative monitoring and evaluation. The staff budget was capped at 25% of the revenue generated. Was this goal achieved? By how much?

This refers to funding allotted for program monitoring and evaluation and it was achieved.

Table 2

Output Summary

Output summary
2007 – 2008 fiscal year
- Number of participants in programmes: 1,085
- Number of organizations served: 8
- Number of regions served: 4
- Revenue: ~$700 000 Costs:~$500,000; Difference: $200,000 (28%)
  * $578,032 (to Feb. 29, 2008)

2006 – 2007 fiscal year
- Number of participants in programmes: 681
- Number of organizations served: 6
- Number of regions served: 4
- Revenue: $544,193 Costs: ~$450,000; Difference: $100,000 (18%)
  - 138 countries; 28 Commonwealth countries
  - 15 of the least developed countries

Besides these outcomes and outputs that were the goals of the eLIO as set out in the *COL Three Year Plan*, there were other results that need to be taken into account in any reasonable evaluation of the section. Foremost is the fact that more than 2,000 learners became more confident in their English writing skills. Many of these learners are either in Commonwealth countries (28), or they liaise with officials in Commonwealth countries. The student survey results showed that learners overwhelmingly felt that their writing and analytical skills had improved and that the course content was sufficient, clear and easy to understand, and appropriate for their organizations. They were particularly emphatic about the value of the tutorial system.

Unexpected Opportunities

Certainly, the unexpected opportunities with UNICEF and South Africa are among the unplanned results that can be used to further validate the section's work. The very high esteem for COL expressed by the partners is also important as their word-of-mouth advertising not only led to more partners within the UN system, but also to the above-named opportunities. There is real evidence of the success of the programme when partners renew their contracts while boasting of success to the others ("thrilled we found them!"). The customized curriculum for each organisation along with the personalized service was highly appreciated. The tutor system was also an important result that may not be apparent immediately. Tutors' empathy, flexibility, and personal skills, combined with a tight organizational structure, were critical components of the success of the programme. And it can be considered to be a key result of the programme itself when taken as a whole.

Another significant result for the benefit of the partner organizations, which might also be of service to COL if implemented internally, was the programme's emphasis on standardizing communication practices around plain English writing. Partners felt that this helped them to standardize core functions among the learners, who operate using disparate cultural norms. More widely, as the courses spread to the different international agencies, it has become "a first," one of the rare examples of sharing resources among the different UN organizations.

On the negative side, the learners, the partners, and the tutors, while valuing the content highly, feel that there is room for improvement; for example, there is a need for clear section markers, a need for more contextualization, and a lack of variety in the examples. Tutors felt that the materials should be edited to reflect good practice in plain English.

Reach

Partners are convinced that online courses are the only viable way that they can reach their distributed staff for training. They particularly emphasise this need for ODL in developing countries and for staff who are traveling or who have fragmented work assignments. In this regard, they support the distribution of the courses on CD because of the erratic nature of Internet connectivity in many countries.

Tutors see a need for organizations to be more proactive in supporting ODL as a means of extending their training reach. They need to develop a culture of using DE. Tutors could be used to train those within the organisation in ODL skills. In addition, more courses on a wide range of training subjects could be developed and delivered.

Internally, staff members refer to the need for other COL sections to benefit from the expertise and skills of those in the eLIO section. They feel that the section should be reaching out to other COL sections that could use its expertise in capacity-building and human resource development. Reaching out can also be achieved successfully by making the most effective use of new technologies as they emerge. The section should experiment more with novel applications as access to them becomes more common among the partners.

Regions

Courses were delivered in four regions of the Commonwealth (Africa, South Asia, the Pacific, and the Caribbean). As previously mentioned, among the most significant developments arising from the activities of the eLIO is the opportunity for a contract to deliver training to civil servants in South Africa. Using Canadian tutors to train South Africans as ODL tutors could strengthen COL's core mandate for capacity-building. The different regions could also be strengthened by using the technology to create regional groupings of learners, so they can engage in peer-to-peer learning and teaching.

Resources

The ambiguous position of the eLIO was referred to previously. COL's emphasis on extra budgetary financing has resulted in the section being perceived as different from other COL sections. The eLIO may not be considered as "core" by the COL board particularly because it serves many non-Commonwealth countries. The eLIO is perhaps both core and extraneous and is more useful to COL than it might be otherwise because from within the organisation it is able to provide an opening or a window to other international organizations involved in complementary activities. Therefore, eLIO can be seen as a resource.

The eLIO's emphasis on using simple technologies, while important for promoting access and supporting students, may not be the best strategy in the management and administration of its programmes. Staff members use applications like *Survey Monkey* for their surveys, so they are taking some advantage of the technologies available. The recent adoption of *Basecamp* for computer conferencing is another example. However, there are other open source applications that staff might experiment with to improve the management and the efficiency of the learning process. This experimentation with technologies could form part of an extended mandate for the section in the research and development of DE. For example, a customer relationship management (CRM) application may help to improve learner support and administrative efficiencies. Open source applications do exist (e.g. *SugarCRM, Vtiger, Campware*).

The Learning Manager

Many of the respondents commented specifically on the professionalism and competence of the eLIO staff, making specific reference to the learning manager. She was commended for turning her section from an "ugly duckling" to a "swan." Others refer to the section as being very "person-based." Others say that she runs a "tight ship" as an excellent organizer and administrator. Some wonder if the section would have a future if this particular learning manager was no longer running it, even suggesting that COL would have to review the section and perhaps re-organize it if she leaves.

Discussion

From the beginning, there has been debate about the role of the eLIO in promoting the organization, developing partnerships, raising funds, and providing support for ODL. An important development in the debate has been the evolving understanding of the section's role in supporting COL's overall policy direction and, hence, the section's alignment with the organization's goals. For example, the eLIO's efforts in delivering training to UN agencies have resulted in opportunities from UNICEF and possibly from the South African government for other COL sections. These opportunities can relate directly to COL's core goal of capacity-building in the Commonwealth.

After the last evaluation, COL priorities moved in the direction of extra budgetary funding for the

eLIO. In the past, the role of COL has swung between supporting demonstration projects and providing limited funding of research. In the present three-year plan, COL has settled into a preference for intergovernmental relations and policy. This very brief recounting of the shifting forces that have shaped COL serves at least to signal the twists and turns of both COL's goals and management philosophy, which the eLIO learning manager has had to follow. Without an appreciation of these shifts, evaluating the successes and failures of the eLIO programme could have been a very frustrating and puzzling enterprise.

Conclusions

The eLIO achieved its intended results, yielding significant benefits in its principal outcomes and outputs. It developed a model for potential application in a variety of different (but possible) organizational and educational settings or environments with some important additions to the stock of open learning pedagogical knowledge. Although not directly generalizable to other organizations, this case study and its conclusions and recommendations could be used by others in formulating implementation plans and developing strategies. It does add to the body of case studies and can be useful, as Flyvberg (2007) suggests.

On the other hand, the section has not employed a consistent methodology for estimating and evaluating the benefits from its programmes. Evaluations tend to focus on attitudinal benefits regarding ODL and individual experiences, rather than taking into account the broader array of benefits (realized and otherwise) flowing from its grant work and other initiatives. Finally, the way in which the section's programmes were organized and managed made a real difference to the benefits that were produced by the initiatives undertaken.

To assess the benefits of the first iterations of the eILO programmes, the section engaged evaluators to examine the programmes, to report on the benefits and problems encountered, and to make recommendations. These evaluations can be seen as mini case studies of each programme. The projects were similar and the evaluations tended to cluster around the same set of benefits and recommendations, for example stressing the high quality of the instructional materials and the importance of the tutor-learner relationship. There were sufficient programme evaluations to reliably inform the analytical framework and to draw reliable conclusions about the success or failure of the overall program.

Perhaps the most difficult analytic problem is assigning to the section a proportion of the overall benefit of the programmes in a manner that properly reflects the section's contribution to it. For example, how much of the partners' and learners' input was responsible for the overall success? There is no reliable way to accurately quantify the section's contribution in most cases, and doing so remains a methodological challenge for the future; although, having a pre- and post-test of learner achievement should go a long way towards increasing the reliability of any evaluation. For the purposes of this study, the evaluator has attempted to specify in his analyses the role that the eLIO section has played. Based on this assessment a conservative judgment was used to characterize the section's contribution for purposes of developing findings and recommendations. What cannot be dismissed in any analysis of the work of this section is the fact that all of the

stated goals were met and in some cases exceeded, coupled with an overwhelming degree of satisfaction expressed by all of the participants, including the learners, the partners, the tutors, the COL staff, and the eLIO section employees.

Recommendations

Taking into account the general level of satisfaction and increasing number of clients, the following recommendations are suggested:

1. Keep doing what you are doing.
2. Edit and revise the material to model plain English.
3. Re-examine your pricing structure to maximize revenues as much as possible.
4. Negotiate with partners either copyright control or an open license.
5. Implement new technologies to support the learning management and administration (LMS, CRM).
6. Develop a succession plan for the section if the present manager leaves.

Acknowledgements

The author would like to acknowledge the help of Angela Kwan, the learning manager of eLIO, and her staff as well as the many interviewees who assisted in this case study.

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Appendix

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International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

Review of Distance Education Research (2000 to 2008): Analysis of Research Areas, Methods, and Authorship Patterns

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Abstract

This paper presents a review of distance education literature to describe the status thereof and to identify gaps and priority areas in distance education research based on a validated classification of research areas. The articles (N = 695) published in five prominent distance education journals between 2000 and 2008 were reviewed for this study. The conclusion is that distance education research is strongly dominated by issues related to instructional design and individual learning processes; whereas, other important areas (e.g., innovation and change management or intercultural aspects of distance learning) are dreadfully neglected. There is a significant trend towards collaborative research and more qualitative studies. Over 80% of all articles originate from only five countries.

Keywords: Review of distance education research; research areas; Delphi study

Research on Distance Education

Research on distance education has been subject to harsh and consistent critique (Berge & Mrozowski, 2001; Bernard et al., 2004; Perraton, 2000; Saba, 2000). Moore (1985) stated that there is "a massive volume of amateur, unsystematic, and badly designed research producing information of very little value" (p. 36). Panda (1992) analysed the Indian distance education literature and concluded that "most of the studies are either descriptive status surveys or experimental studies with poor methodological footing" (p. 322). Saba (2000) criticises the lack of theoretical underpinnings: "Research questions are rarely posed within a theoretical framework or based on its fundamental concepts and constructs" (p. 2). He is supported by Perraton (2000): "An examination of existing research shows that it is often atheoretical and predominantly descriptive" (p. 1). Is this really the case?

Lee, Driscoll, and Nelson (2004) emphasise that "understanding trends and issues in terms of topics and methods is pivotal in the advancements of research on distance education" (p. 225). The structure of a research discipline forms the foundation for identifying gaps and priority areas

(Mishra, 1998, p. 281). Based on a validated classification of research areas in distance education through the systematic analysis of expert responses in a Delphi study (Zawacki-Richter, 2009), we conducted a literature review of previous distance education research published in five prominent distance education journals between 2000 and 2008 (N = 695 articles).

The aim of this paper is to address questions in the following three areas:

- *Issues in distance education research*: What are the main research areas in distance education and how have they changed between 2000 and 2008? What are the most common research areas and where are there gaps in distance education research?
- *Research methods*: Getting beyond the question of "any significant differences?" experts advocated more qualitative approaches in distance education research (Minnes, 1985; Saba, 2000). But can we observe a significant trend towards the application of more qualitative methods and mixed-methods designs (triangulation)? Is there an association between research methods and gender? And do distance education journals prefer to publish qualitative or quantitative studies?
- *Publication and authorship patterns*: Researchers are more and more often involved in complex international collaborative projects. Is there a significant trend towards more collaboration among researchers in distance education? Who are the leading contributors of research papers and where do they come from? Do distance education journals tend to publish papers from their country of origin?

Based on the review of research areas and trends, the results can be used to explore the body of knowledge in distance education and to identify priority areas for future research projects.

Sample and Methods

Selection of Journals and Articles

Five journals were reviewed for this study: *Open Learning* (OL), *Distance Education* (DE), the *American Journal of Distance Education* (AJDE), the *Journal of Distance Education* (JDE), and the *International Review of Research in Open and Distance Learning* (IRRODL). They were selected because of their reputations as the most prominent and recognized journals in the field of distance education. With the exception of IRRODL, which was released for the first time in 2000, the journals have been used as data sources in previous studies (cf. Berge & Mrozowski, 2001; Lee, Driscoll, & Nelson, 2004; Koble & Bunker, 1997; Mishra, 1997; Rourke & Szabo, 2002; Scriven, 1991). Furthermore, the five journals were selected because of their wide scope of distance education research in contrast to more specialized journals such as the *Online Journal of Distance Learning Administration* or the *International Journal of Distance Education Technologies*.

All articles published between 2000 and 2008 in the five journals were reviewed ($N = 695$). Berge & Mrozowski (2001) presented a large scale review with articles published between 1990 and 1999. Therefore, the year 2000 was chosen as the cut-off date for this study.

Twenty articles (2.9%) were published in French (in the *Journal of Distance Education*) and 675 articles (97.1%) were published in English.

Table 1

Data Sources

Journal	**No. of articles**	**Percent**	**Volumes**
OL	154	22.2	15-23
DE	156	22.4	21-29
AJDE	112	16.1	14-22
JDE	114	16.4	15-22
IRRODL	159	22.9	1-9
Total	**695**	**100.0**	

Classification of Research Areas

In order to prepare this review, an international Delphi study was carried out in 2008 to develop a classification system for research areas in distance education. The Delphi technique was selected to develop a consensus among a group of experts on common areas that are or should be covered in distance education research. The essential element in the Delphi process is anonymity of participants when giving their opinion. The Delphi method, then, alleviates problems that could be caused by domination of the group by a few prestigious or powerful individuals (Charlton, 2004). According to Isaac and Michael (1995), the Delphi method of group interaction avoids the following disadvantages of face-to-face discussions: the bandwagon tendency, the vulnerability to manipulation, and the reticence on the part of individuals to change their minds in front of others. The final expert panel comprised 25 individuals from 11 countries (Australia, Brazil, Canada, China, Fiji, Germany, Ireland, New Zealand, South Africa, UK, and USA). Based on a literature review and a qualitative analysis of the responses from the panellists, three broad meta-levels of distance education research were derived:

1. macro level: distance education systems and theories,
2. meso level: management, organization, and technology,
3. micro level: teaching and learning in distance education.

Within these three levels, the research issues that are considered important by the experts can be categorized into 15 research areas. They are briefly characterized below. A detailed description of the method and the results of this pilot study is published in Zawacki-Richter (2009).

Macro level: Distance education systems and theories.

1. *Access, equity, and ethics*: The democratization of access to distance education afforded by new media and by finding ways to deliver high-quality education to those who have limited resources and poor infrastructure; issues that refer to the (sustainable) provision of distance education in developing areas. What is the impact of distance education (e.g., via mobile learning) on narrowing the digital divide and what is the role of ICT (information and communication technologies) and/or OER (open educational resources) in terms of access to education?
2. *Globalization of education and cross-cultural aspects*: Aspects that refer to the global external environment and drivers, the development of the global distance education market, teaching and learning in mediated global environments, and the implications for professional development.
3. *Distance teaching systems and institutions*: Distance education delivery systems, the role of institutional partnerships in developing transnational programmes, and the impact of ICT on the convergence of conventional education and distance education institutions (hybrid or mixed-mode).
4. *Theories and models*: Theoretical frameworks for and foundations of distance education, e.g., the theoretical basis of instructional models, knowledge construction, interaction between learners, or the impact of social constructivism learning theories on distance education practice.
5. *Research methods in distance education and knowledge transfer*: Methodological considerations, the impact of distance education research and writing on practice, and the role of professional associations in improving practice. Literature reviews and works on the history of distance education are also subsumed within this area.

Meso level: Management, organization, and technology.

6. *Management and organization*: Strategies, administration, and organizational infrastructures and frameworks for the development, implementation, and sustainable delivery of distance education programmes. What is required for successful leadership in distance education? Distance education and policies relating to continuing education, lifelong learning, and the impact of online learning on institutional policies, as well as legal issues (copyright and intellectual property).
7. *Costs and benefits*: Aspects that refer to financial management, costing, pricing, and business models in distance education. Efficiency: What is the return on investment or impact of distance education programmes? What is the impact of ICT on the costing models and the scalability of distance education delivery? How can cost effective but meaningful learner support be provided?
8. *Educational technology:* New trends in educational technology for distance education (e.g., Web 2.0 applications or mobile learning) and the benefits and challenges of using OERs, media selection (e.g., synchronous vs. asynchronous media), technical infrastructure and equipment for online learning environments, and their opportunities for teaching and learning.

9. *Innovation and change:* Issues that refer to educational innovation with new media and measures to support and facilitate change in institutions (e.g., incentive systems for faculty, aspects referring to staff workloads, promotion, and tenure).
10. *Professional development and faculty support*: Professional development and faculty support services as a prerequisite for innovation and change. What are the competencies of online teachers and how can they be developed?
11. *Learner support services*: The infrastructure for and organisation of learner support systems (from information and counselling for prospective students about library services and technical support to career services and alumni networks).
12. *Quality assurance*: Issues that refer to accreditation and quality standards in distance education. The impact of quality assurance and high quality learner support on enrolments and drop-out/retention, as well as reputation and acceptance of distance education as a valid form of educational provision.

Micro level: Teaching and learning in distance education.

13. *Instructional design*: Issues that refer to the stages of the instructional design process for curriculum and course development. Special emphasis is placed on pedagogical approaches for tutoring online (scaffolding), the design of (culturally appropriate) study material, opportunities provided by new developments in educational technology for teaching and learning (e.g. Web 2.0 applications and mobile devices), as well as assessment practices in distance education.
14. *Interaction and communication in learning communities*: Closely related to instructional design considerations is course design that fosters (online) articulation, interaction, reflection, and collaboration throughout the learning and teaching process. Special areas include the development of online communities, gender differences, and cross-cultural aspects in online communication.
15. *Learner characteristics*: The aims and goals of adult learners, the socio-economic background of distance education students, their different learning styles, critical thinking dispositions, and special needs. How do students learn online (learner behavior patterns, learning styles) and what competencies are needed for distance learning (e.g., digital literacy)?

All 695 articles published between 2000 and 2008 in the five journals (OL, DE, AJDE, JDE, and IRRODL) were coded according to this classification scheme. Table 2 provides an overview of sample studies. They are representative of a certain research area and research method.

Classification of Research Methods

The majority of distance education research can be classified broadly as quantitative, qualitative, or of mixed design (triangulation), which employs both quantitative and qualitative approaches. For this review the research methods were classified as quantitative, qualitative, triangulation, or other (cf. Grant, Ward, & Rong, 1987).

Articles that used statistical analysis were classified as quantitative, from simple methods such as chi-square analysis to multivariate techniques. Qualitative studies were data-based articles that did not quantify data beyond frequency counts. Included in this category were case studies, interpretive ethnographies, grounded theory, and phenomenological studies. *Other* articles were usually descriptive, not data-based, theoretical papers.

Table 2

*Matrix of Research Areas and Methods in Distance Education (Selection of Sample Studies)**

Area**	Author(s)	Journal***	Year	Vol.	Issue	Pages	Method	Description
1	Rye & Zubaidah	OL	2008	23	2	95-102	Qualitative; case study	Study on access problems in a master's programme offered in a remote area of Indonesia.
2	Al-Harthi	IRRODL	2005	6	3	14 pp.	Qualitative; semi-structured interviews	Phenomenological research study on experiences of Arab Gulf students in the United States taking online courses.
3	Zhang & Shin	OL	2002	17	2	167-176	Descriptive; comparative	Comparison of three open and distance education models in mainland China, India, and Hong Kong.
4	Garrison et al.	AJDE	2001	15	1	7-23	Theoretical	A model of a community of inquiry that constitutes three elements essential to an educational experience: cognitive presence, social presence, and teaching presence.
5	Bernard et al.	DE	2004	25	2	175-198	Quantitative; meta-analysis	Suggestions for future quantitative research, especially with regard to meta-analysis of distance education vs. classroom comparison studies.
6	Jones	AJDE	2008	22	1	46-56	Triangulation; survey and qualitative analysis of interviews	Survey on technology usage and interviews with directors on issues and concerns regarding institutional planning and the introduction of online learning.
7	Jung	OL	2005	20	2	131-146	Quantitative; cost and cost effectiveness analysis	Cost effectiveness study of online teacher training.

8	Lee & Chan	OL	2007	22	3	201-218	Triangulation; survey and qualitative analysis of semi-structured interviews	Study on the effectiveness and use of podcasts in mobile learning.
9	Shea et al.	IRRODL	2005	6	2	27 pp.	Quantitative; factor and regression analysis	Article on potential barriers to the continued growth in adoption of online teaching in higher education.
10	Beyth-Maron et al.	IRRODL	2006	7	2	13 pp.	Quantitative; regression and path analysis	Study on identification, job satisfaction and work motivation among tutors at the Open University of Israel.
10	Mishra	OL	2005	20	2	147-159	Triangulation; ANOVA, qualitative analysis of expert responses	Investigation of roles and competencies of academic counsellors in distance education.
10	Williams	AJDE	2003	17	1	45-57	Qualitative, descriptive; Delphi study	Investigation of roles and competencies needed in distance education in higher education institutions and their importance rated by experts.
11	Wang	IRRODL	2005	6	3	18 pp.	Quantitative; survey	National survey conducted in China to examine learner and tutor support systems.
12	Giguère	JDE	2007	22	1	19-40	Quantitative; regression analysis	Regression analysis used to identify which of 15 institutional factors (independent variables) were most strongly associated with course completion.
13	Morgan et al.	OL	2006	21	2	167-176	Triangulation; survey design, focus	Guidelines for facilitating online reflective learning for health and social care

							group discussion, qual. analysis of online dialogue	professionals.
14	Lara et al.	AJDE	2001	15	3	50-67	Triangulation; qualitative and quantitative analysis of online dialogue	Analysis of synchronous and asynchronous online interaction patterns.
14	Jeong	AJDE	2006	20	4	195-210	Quantitative analysis of online dialogue	Message-response analysis in computer-mediated communication to investigate gender interaction patterns.
14	Moisey et al.	JDE	2008	22	2	15-42	Quantitative; correlational design	Investigation of the relationship between community cohesion (measured by Rovai's Classroom Community Scale), student participation in computer-mediated communication and other variables affecting community building in online courses.
15	Muilenburg & Berge	DE	2005	26	1	29-48	Quantitative; factor analysis	Exploratory factor analysis that determined the underlying constructs that comprise student barriers to online learning
15	Dearnley & Matthew	OL	2000	15	2	191-206	Qualitative; grounded theory	Exploration of student experiences in distance education.

* Full references for sample studies are provided in the appendix

** Research areas: 1=Access, equity and ethics; 2=Globalisation of education and cross-cultural aspects; 3=Distance teaching systems and institutions; 4=Theories and models; 5=Research methods in distance education and knowledge transfer; 6=Management and organisation; 7=Costs and benefits; 8=Educational technology; 9=Innovation and change; 10=Professional development and faculty support; 11=Learner support services; 12=Quality assurance; 13=Instructional design; 14=Interaction and communication in learning communities; 15=Learner characteristics

*** Journals: OL=Open Learning; DE=Distance Education; AJDE=American Journal of Distance Education; JDE=Journal of Distance Education; IRRODL=International Review of Research in Open and Distance Learning

Inter-Rater Reliability

Thirty articles were randomly selected to evaluate the coding decisions of the three coders (A, B and C) to determine inter-rater reliability using Cohen's kappa (κ) (Cohen, 1960), which is a coefficient for the degree of consistency among raters based on the number of codings in the coding scheme (Neumann, 2007, p. 326). Kappa values of .40 to .60 are characterized as fair, .60 to .75 as good, and over .75 as excellent (Fleiss, 1981; Bakeman & Gottman, 1997).

Coding consistency for the classification of research methods between rater A and B was κ = .855; between rater A and C, it was κ = .855; and between rater B and C, it was κ = .930 (median = .855). For the classification of research areas, coding consistency between rater A and B was κ = .672; between rater A and C, it was κ = .675; and between rater B and C, it was κ = .675 (median = .675). Therefore, inter-rater reliability can be considered as excellent for the coding of methods and as good for the coding of research areas.

The main source of coding discrepancies is the considerable overlap between some research areas so that a unambiguous classification of research areas was not easy in all cases. Some areas are investigated on different levels. Cross-sectional fields are those concerned with issues that refer to quality assurance and evaluation, educational technologies, and cross-cultural aspects (Zawacki-Richter. 2009). For example, cross-cultural aspects have to be considered in international co-operation in the global education market (macro level) and in the planning, implementation, and management of transnational programmes (meso level). Cross-cultural aspects also have implications for competencies required by distance educators (professional development and faculty support – meso level). Intercultural communication plays an important role in classes with mixed cohorts of students from all over the world (micro level).

Trend Analysis

In order to identify significant trends between the years 2000 to 2008 in the development of research areas, in the application of research methods, and with regard to cooperation among researchers (single vs. multiple-author papers), the frequencies of research areas, methods, and number of authors in the 695 articles under review were ranked for each year and correlated with the years. Significant rank correlations on the 5% confidence level are interpreted as significant linear positive or negative trends. Due to the small number of years (N = 9), Spearman's rho (ρ) was chosen as the non-parametric correlation coefficient.

Results and Discussion

Analysis of Research Areas and Trends in Distance Education Research

Table 3 reveals a strong imbalance of research areas covered in the publications: The micro-perspective (learning and teaching in distance education) is highly over-represented. Over 50% of

all papers deal with the top three issues, i.e., interaction and communication in learning communities (17.6%), instructional design (17.4%), and learner characteristics (16.3%).

Table 3

Ranking of Research Areas by Number of Articles by Research Area (N = 695)

Rank	Research Area	Level	F	%	Cum. %
1	Interaction and communication in learning communities	3	122	17.6	17.6
2	Instructional design	3	121	17.4	35.0
3	Learner characteristics	3	113	16.3	51.2
4	Distance teaching systems and institutions	1	62	8.9	60.1
5	Educational technology	2	48	6.9	67.1
6	Quality assurance	2	41	5.9	72.9
6	Professional development and faculty support	2	41	5.9	78.8
7	Access, equity and ethics	1	31	4.5	83.3
8	Theories and models	1	24	3.5	86.8
9	Learner support services	2	23	3.3	90.1
10	Management and organisation	2	18	2.6	92.7
11	Research methods in DE and knowledge transfer	1	13	1.9	94.5
11	Globalisation of education and cross-cultural aspects	1	13	1.9	96.4
11	Innovation and change	2	13	1.9	98.3
12	Costs and benefits	2	12	1.7	100.0
	Total		695	100.	

Level: 1=macro; 2=meso; 3=micro; F=frequency; Cum. %=cummulative %

No significant linear positive or negative trend of research issues can be reported for the period between 2000 and 2008. With only 13 articles in research area 5 (research methods in distance education), the number of articles increased slightly, but significantly, at a low level (Spearman's $\rho = .69$, $p < .05$). Research area 6 (management and organisation) is strongly correlated with area 7 (costs and benefits), $\rho = .88$, $p < .01$., which might indicate that these two categories could be merged.

Table 4 shows several noticeable peaks in certain research areas that were due to special issues on the topic, e.g., the special issue on "The Hybridzation of Higher Education: Cross National Perspectives" (area 3), edited by Peter S. Cookson in IRRODL (2002, Vol. 2, Issue 2), the special issue on "Challenges and Possibilities for Academics and Tutors at Open and Distance Learning Environments" (area 10), edited by Heather Kanuka in IRRODL (2006, Vol 7., Issue 2), the special issue on "Ethics in Open and Distance Learning" (area 1), edited by Anne Gaskell in Open Learning (2007, Vol. 22, Issue 2), and the special issue on "Technology, Policy, and the Right to Education" (area 1), edited by Barbara Spronk in IRRODL (2008, Vol. 9, Issue 1).

Table 4

Frequency of Articles by Research Area between 2000 and 2008 (N = 695)

R. area*	2000	2001	2002	2003	2004	2005	2006	2007	2008	Totals
1	2	1	2	0	3	5	0	7	11	31
2	1	2	1	0	1	4	1	2	1	13
3	1	13	15	1	3	9	3	8	9	62
4	6	1	5	2	0	1	1	2	6	24
5	1	1	1	1	2	2	1	2	2	13
6	2	3	3	1	4	3	0	0	2	18
7	2	2	3	0	3	2	0	0	0	12
8	6	4	4	3	2	8	4	10	7	48
9	4	1	0	1	0	3	2	1	1	13
10	2	2	6	4	1	5	14	5	2	41
11	2	3	0	6	5	3	2	2	0	23
12	5	1	5	3	4	7	5	6	5	41
13	14	11	15	12	10	8	22	14	15	121
14	7	12	14	17	25	13	8	15	11	122
15	17	12	13	11	13	8	19	6	14	113
Totals	72	69	87	62	76	81	82	80	86	695

*1=Access, equity and ethics; 2=Globalisation of education and cross-cultural aspects; 3=Distance teaching systems and institutions; 4=Theories and models; 5=Research methods in distance education and knowledge transfer; 6=Management and organisation; 7=Costs and benefits; 8=Educational technology; 9=Innovation and change; 10=Professional development and faculty support; 11=Learner support services; 12=Quality assurance; 13=Instructional design; 14=Interaction and communication in learning communities; 15=Learner characteristics

Analysis of Research Methods

Distance education, in particular, and the teaching and learning process, in general, are complex matters. Many variables are involved in instructional settings, not to mention other elements involved in distance education, such as social, organizational, technical, and global issues affecting the theory and practice in the field.

Getting beyond the question of "significant differences," experts make a plea for more qualitative approaches in distance education research (cf. Minnes, 1985; Saba 2000) to capture a deeper and richer range of data. Garrison and Shale (1994) make a case for mixed methods research: "Researchers are realizing that in practice the methodologies can be viewed as complementary ….Researchers who advocate combining quantitative and qualitative methods are thus on solid epistemological ground" (p. 25). The link between qualitative and quantitative research is therefore often termed *triangulation* (cf. Neumann, 2007, p. 149). This approach has the advantage that a complex research field such as distance education can be explored from different perspectives (or angles), utilizing different instruments and methods, and the data gathered can be used to mutually validate the results.

However, what is the current status of the practice of distance education research? Table 5 shows the frequency tabulation regarding the methods applied in published studies. Interestingly there seems to be a trend towards more empirical research. Only 38.1% of all articles are descriptive in nature ("other") and 12.9% followed a mixed-method design (triangulation). However, this trend is not significant for the investigated period between 2000 and 2008 in the five journals. In contrast to the results of this study, Berge & Mrozowski (2001) classified 75.9% of articles published in journals as descriptive (N = 727 articles; AJDE, DE, JDE, and OL between 1990 and 1999). In his review of 361 articles published between 1991 and 1996 in AJDE, DE, JDE, and the Indian Journal of Open Learning, Mishra (1997) reported the percentage of descriptive papers as 47.6.

Table 5 furthermore reveals that AJDE prefers quantitative studies: 63.4% of all articles published between 2000 and 2008 in AJDE followed a quantitative design. The journal that accepted by far the highest percentage of qualitative studies is DE (29.5%). The journal with the most papers that applied a mixed-method approach is JDE (28.1%). IRRODL (56.6%) and OL (48.1%) are the journals with the highest number of descriptive or theoretical papers ("other"). The association between journals and research methods is highly significant: $\chi^2 = 142.35$, $df = 12$, $p < .001$. However, the association is modest at Cramer's V of .26 ($p < .001$).

Table 5

Cross Tabulation of Methods and Journals (N = 695)

Method	**OL**	**DE**	**AJDE**	**JDE**	**IRRODL**	**Total**
Quantitative	33	42	71	27	29	202
% within Journal	21.4%	26.9%	63.4%	23.7%	18.2%	29.1%
Qualitative	23	46	12	27	30	138
% within Journal	14.9%	29.5%	10.7%	23.7%	18.9%	19.9%
Triangulation	24	11	13	32	10	90
% within Journal	15.6%	7.1%	11.6%	28.1%	6.3%	12.9%
Other	74	57	16	28	90	265
% within Journal	48.1%	36.5%	14.3%	24.6%	56.6%	38.1%
Total	154	156	112	114	159	695
% within Journal	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

No significant trend towards more quantitative or mixed research designs or fewer descriptive studies can be reported (quantitative methods: Spearman's $\rho = -.43$, $p = .250$; triangulation: $\rho = -.10$, $p = .796$; other: $\rho = .24$, $p = .542$). However, there is a significant positive trend towards more qualitative research ($\rho = .73$, $p < .05$).

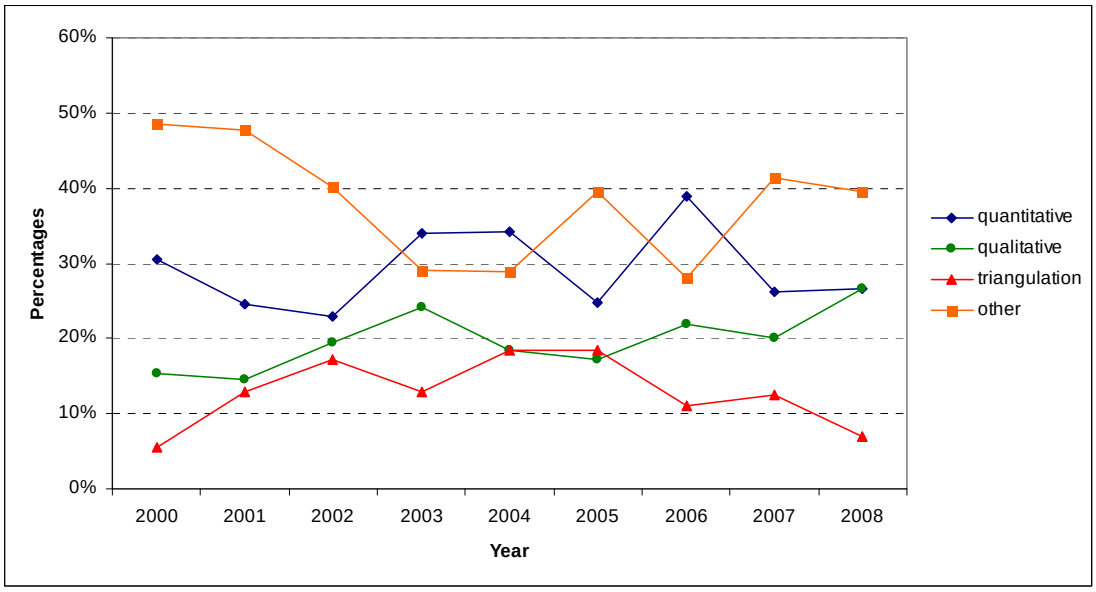

Figure 1. Frequencies regarding methodological approaches in studies published between 2000 and 2008.

Table 6

Frequency Tabulation of Methods used in Studies Published between 2000 and 2008

Year		Quanti-tative	Quali-tative	Triangu-lation	Other	Total
2000	Count	22	11	4	35	72
	% within year	30.6%	15.3%	5.6%	48.6%	100.0%
2001	Count	17	10	9	33	69
	% within year	24.6%	14.5%	13.0%	47.8%	100.0%
2002	Count	20	17	15	35	87
	% within year	23.0%	19.5%	17.2%	40.2%	100.0%
2003	Count	21	15	8	18	62
	% within year	33.9%	24.2%	12.9%	29.0%	100.0%
2004	Count	26	14	14	22	76
	% within year	34.2%	18.4%	18.4%	28.9%	100.0%
2005	Count	20	14	15	32	81
	% within year	24.7%	17.3%	18.5%	39.5%	100.0%
2006	Count	32	18	9	23	82
	% within year	39.0%	22.0%	11.0%	28.0%	100.0%
2007	Count	21	16	10	33	80
	% within year	26.3%	20.0%	12.5%	41.3%	100.0%
2008	Count	23	23	6	34	86
	% within year	26.7%	26.7%	7.0%	39.5%	100.0%
Total	Count	202	138	90	265	695
	% within year	29.1%	19.9%	12.9%	38.1%	100.0%

Research into issues on the macro level (distance education systems and theories) is very descriptive, e.g., research area 3 (distance teaching systems and institutions, 77.4%), or research area 1 (issues of access, equity and ethics, 74.2%). As could be expected, the highest percentage of theoretical papers was found under research area 4 on theories and models of distance education (79.2%). The highest frequency of qualitative approaches can be reported for research area 14 (interaction and communication in learning communities, 33.6%). A large number of quantitative studies are carried out in research area 12 (quality assurance, e.g., development and application of instruments for program evaluation, analysis of drop-out, completion/non-completion in distance learning programs, etc., 53.7%), and in research area 15 (learner characteristics, e.g., studies on learning styles, learner preferences, etc., 53.1%).

Table 7

Frequency Tabulation of Methods by Research Area (N = 695)

R. area*		Quantitative	Qualitative	Triangulation	Other	Total
1	Count	3	3	2	23	31
	% within R. area	9.7%	9.7%	6.5%	74.2%	100.0%
2	Count	1	4	0	8	13
	% within R. area	7.7%	30.8%	.0%	61.5%	100.0%
3	Count	8	4	2	48	62
	% within R. area	12.9%	6.5%	3.2%	77.4%	100.0%
4	Count	1	3	1	19	24
	% within R. area	4.2%	12.5%	4.2%	79.2%	100.0%
5	Count	5	1	0	7	13
	% within R. area	38.5%	7.7%	.0%	53.8%	100.0%
6	Count	4	1	2	11	18
	% within R. area	22.2%	5.6%	11.1%	61.1%	100.0%
7	Count	4	0	1	7	12
	% within R. area	33.3%	.0%	8.3%	58.3%	100.0%
8	Count	7	6	4	31	48
	% within R. area	14.6%	12.5%	8.3%	64.6%	100.0%
9	Count	5	3	1	4	13
	% within R. area	38.5%	23.1%	7.7%	30.8%	100.0%
10	Count	10	10	7	14	41
	% within R. area	24.4%	24.4%	17.1%	34.1%	100.0%
11	Count	7	6	2	8	23
	% within R. area	30.4%	26.1%	8.7%	34.8%	100.0%
12	Count	22	5	5	9	41
	% within R. area	53.7%	12.2%	12.2%	22.0%	100.0%
13	Count	31	26	21	43	121
	% within R. area	25.6%	21.5%	17.4%	35.5%	100.0%
14	Count	34	41	27	20	122
	% within R. area	27.9%	33.6%	22.1%	16.4%	100.0%
15	Count	60	25	15	13	113
	% within R. area	53.1%	22.1%	13.3%	11.5%	100.0%
Total	Count	202	138	90	265	695
	% of Total	29.1%	19.9%	12.9%	38.1%	100.0%

* 1=Access, equity and ethics; 2=Globalisation of education and cross-cultural aspects; 3=Distance teaching systems and institutions; 4=Theories and models; 5=Research methods in distance education and knowledge transfer; 6=Management and organisation; 7=Costs and benefits; 8=Educational technology; 9=Innovation and change; 10=Professional development and faculty support; 11=Learner support services; 12=Quality assurance; 13=Instructional design; 14=Interaction and communication in learning communities; 15=Learner characteristics

Authorship Patterns and Reference Characteristics

Collaboration.

With 15 research areas on three broad levels, as described in the Classification of Research Areas section, the complexity of the distance education discipline is enormous, and it continues to grow with the application of new and emerging information and communication technologies and their implications for educational systems and organizational change. Researchers are more and more involved in international collaborative projects. This phenomenon has accelerated during the last decade through the massive proliferation of computer-mediated communication and the development of new web applications which facilitate collaboration, social interaction, and negotiation of meaning (e.g., via social software or Web 2.0 applications). As an indicator of the extent of collaboration among researchers, the number of contributors per paper was analyzed.

Table 8

Frequency Tabulation Regarding the Number of Authors by Year (Percentages in Brackets)

Year	**Number of author(s)**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total (2 to 8)**
2000	35 (48.6)	25	8	2	1	0	1	0	37 (52.4)
2001	34 (49.3)	15	13	2	3	2	0	0	69 (50.7)
2002	42 (48.3)	21	16	4	2	1	0	1	87 (51.7)
2003	27 (43.6)	24	6	1	3	1	0	0	62 (56.5)
2004	38 (50.0)	22	10	6	0	0	0	0	76 (50.0)
2005	37 (45.7)	25	11	5	3	0	0	0	81 (54.3)
2006	29 (35.4)	31	12	6	3	1	0	0	82 (64.6)
2007	28 (35.0)	32	12	4	3	1	0	0	80 (65.0)
2008	37 (43.0)	26	16	4	3	0	0	0	49 (57.0)
Total	307 (44.2)	221	104	34	21	6	1	1	388 (55.8)

From 2000 to 2008, the percentage of single author articles decreased while the percentage of multiple author articles increased. There is a significant positive trend for multiple author articles

(Spearman's ρ = .70, $p < .05$) and a significant negative trend for single author articles (Spearman's ρ = -.73, $p < .05$).

This positive trend since 2000 towards collaboration in distance education research is supported by the fact that Mishra (1997) reported a much lower percentage of multiple author papers of 38.5% for the period between 1991 and 1996 ($N = 361$ articles).

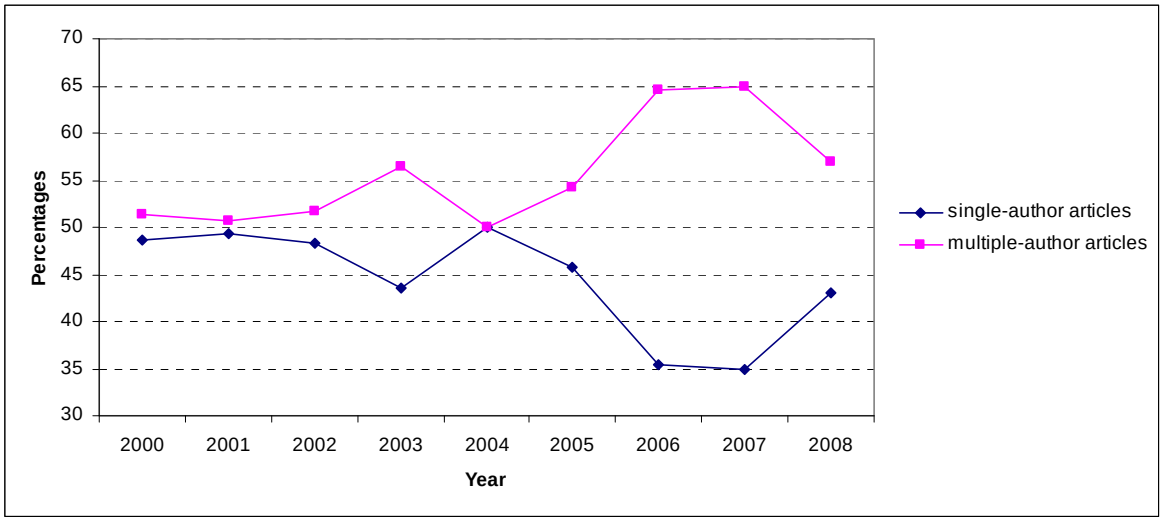

Figure 2. Articles contributed by one author and multiple authors between 2000 and 2008 (N = 695)

Leading contributors.

The total number of different authors who contributed to the 695 articles in this study was 1138. Table 9 lists the 48 authors who contributed to at least three articles. They are from Australia (5), Canada (17), China (5), Israel (2), Japan/South Korea (1), New Zealand (1), UK (8), and USA (9). Canada is very successful in distance education research, with 17 leading contributors coming from this country. Nine of these 17 researchers are affiliated with Athabasca University.

Table 9

Leading Contributors and Number of their Published Articles

Jeong, Allan C. (USA)	7	Zhang, Wei-Yuan (China)	4
Conrad, Dianne (Canada)	6	Abrami, Philip C. (Canada)	3
Fahy, Patrick J. (Canada)	6	Ally, Mohamed (Canada)	3
Latchem, Colin (Australia)	6	Anderson, Bill (New Zealand)	3
Stacey, Elizabeth (Australia)	6	Baumann, Uwe (UK)	3
Anderson, Terry (Canada)	5	Caspi, Avner (Israel)	3
Berge, Zane L. (USA)	5	Dennen, Vanessa P. (USA)	3
Gunawardena, Charlotte N. (USA)	5	Fung, Yvonne (China)	3
Kanuka, Heather (Canada)	5	Garrison, Randy (Canada)	3
Andrusyszyn, Mary-Anne (Canada)	4	Gorsky, Paul (Israel)	3
Bernard, Robert M. (Canada)	4	Kennepohl, Dietmar (Canada)	3
Bonk, Curtis J. (USA)	4	Lou, Yiping (USA)	3
Bourdages, Louise (Canada)	4	Mason, Robin (UK)	3
Bullen, Mark (Canada)	4	Moisey, Susan D. (Canada)	3
Cleveland-Innes, Martha (Canada)	4	Nunan, Ted (Australia)	3
Deschenes, A.-J. (Canada)	4	Rennie, Frank (UK)	3
Jung, Insung (South Korea/Japan)	4	Ros i Solé, Cristina (UK)	3
Kirkwood, Adrian (UK)	4	Rovai, Alfred P. (USA)	3
McGreal, Rory (Canada)	4	Shelley, Monica (UK)	3
Murphy, Elizabeth (Canada)	4	Shin, Namin (China)	3
Murphy, Karen L. (USA)	4	Simpson, Ormond (UK)	3
Ng, Kwok Chi (China)	4	Sims, Rod (Australia)	3
Smith, Peter J. (Australia)	4	Taplin, Margaret (China)	3
Wisher, Robert A. (USA)	4	Woodley, Alan (UK)	3

Male and female researchers.

The analysis in Table 10 depicts that 385 (55.4%) of the first authors were men and 310 (44.6%) were women. The results seem to confirm the stereotypical view that female researchers (59.4%) are more likely than males (40.6%) to choose qualitative methods or to combine quantitative and qualitative methods (females, 61.1%). There is a highly significant association between gender and research methods: $\chi^2 = 35.34$, $df = 3$, $p < .001$. However, the association is modest at Cramer's V of .23 ($p < .001$).

Table 10

Cross Tabulation of Gender (First Author) and Research Methods

			Male	**Female**	**Total**
Method	Quantitative	Count	119	83	202
		% within method	58.9%	41.1%	100.0%
	Qualitative	Count	56	82	138
		% within method	40.6%	59.4%	100.0%
	Triangulation	Count	35	55	90
		% within method	38.9%	61.1%	100.0%
	Other	Count	175	90	265
		% within method	66.0%	34.0%	100.0%
Total		Count	385	310	695
		% of total	55.4%	44.6%	100.0%

Country-wise distribution of articles.

For the analysis of the country-wise distribution of articles, the country of origin of the first author was taken into consideration (53 countries). Table 11 shows that the vast majority of articles (80.3%) come from only five countries: USA, Canada, UK, Australia, and China. Given the national bias of journals, it is no wonder that journals tend to publish more from their own country of origin. For example, the stated intent of AJDE is to explore "the great new field of study, research, and practice that is distance education in the Americas" (Moore, 1987, p. 1). This goal is truly met: AJDE in particular, and also JDE, have a strong North American focus: 80.4% of papers published in AJDE and 71.1% of papers published in JDE are contributed by US-American or Canadian authors respectively. Koble and Bunker (1997) found that 69.8% of authors in AJDE between 1987 and 1995 were from the USA and 20.9% were from Canada. Similar results are also reported in earlier studies by Calvert (1995) and Mishra (1997).

The most international journal is IRRODL with only 18.9% of authors from Canada, followed by DE with 20.5% of authors from Australia, and OL with 42.2% of authors from the UK. Papers published in IRRODL come from 34 different countries, followed by DE (25 countries), OL (24 countries), JDE (13 countries), and AJDE (only 7 countries).

Table 11

Cross Tabulation of Countries (First Author) and Journals

Country	**OL**	**DE**	**AJDE**	**JDE**	**IRR-ODL**	**Total**	**%**	**Cum. %**
1 USA	10	54	90*	14	41	209	30.1	30.1
2 Canada	12	12	16	81*	30*	155	22.3	52.4
3 UK	65*	16	2	1	15	99	14.2	66.6
4 Australia	13	32*	0	3	18	66	9.5	76.1
5 China	17	5	0	2	5	29	4.2	80.3
6 India	5	3	0	2	2	12	1.7	82.0
7 New Zealand	4	3	0	0	3	10	1.4	83.5
8 Israel	3	0	1	2	3	9	1.3	84.7
9 South Africa	5	2	0	0	1	8	1.2	85.9
10 Nigeria	2	0	0	0	4	6	0.9	86.8
11 Norway	1	0	0	0	4	5	0.7	87.5
12 Netherlands	1	3	0	0	1	5	0.7	88.2
13 South Korea	1	1	1	0	2	5	0.7	88.9
14 Belgium	0	1	0	3	0	4	0.6	89.5
15 Brazil	1	0	1	0	2	4	0.6	90.1
16 Germany	0	0	0	1	3	4	0.6	90.6
17 Japan	3	0	0	0	1	4	0.6	91.2
18 Philippines	0	2	0	0	2	4	0.6	91.8
19 Spain	0	0	0	0	4	4	0.6	92.4
20 Botswana	1	0	0	0	2	3	0.4	92.8
21 France	0	0	0	3	0	3	0.4	93.2
22 Mexico	1	2	0	0	0	3	0.4	93.7
23 Sweden	0	1	0	0	2	3	0.4	94.1
24 Taiwan	0	2	0	0	1	3	0.4	94.5
25 Tanzania	3	0	0	0	0	3	0.4	95.0
26 Cambodia	0	2	0	0	0	2	0.3	95.3
27 Greece	0	0	0	0	2	2	0.3	95.5
28 Italy	0	1	0	1	0	2	0.3	95.8
29 Malaysia	2	0	0	0	0	2	0.3	96.1
30 Singapore	0	2	0	0	0	2	0.3	96.4
31 Turkey	0	1	0	1	0	2	0.3	96.7
32 Argentina	0	1	0	0	0	1	0.1	96.8
33 Bhutan	0	1	0	0	0	1	0.1	97.0
34 Colombia	0	0	0	0	1	1	0.1	97.1
35 Costa Rica	1	0	0	0	0	1	0.1	97.3
36 Cyprus	0	1	0	0	0	1	0.1	97.4
37 Denmark	1	0	0	0	0	1	0.1	97.6
38 Fiji Islands	0	1	0	0	0	1	0.1	97.7

39 Iceland	0	0	0	0	1	1	0.1	97.8
40 Indonesia	0	0	0	0	1	1	0.1	98.0
41 Ireland	1	0	0	0	0	1	0.1	98.1
42 Korea	0	0	0	0	1	1	0.1	98.3
43 Mauritius	0	0	0	0	1	1	0.1	98.4
44 Mongolia	0	1	0	0	0	1	0.1	98.6
45 Oman	0	0	0	0	1	1	0.1	98.7
46 Portugal	0	0	0	0	1	1	0.1	98.8
47 Puerto Rico	0	0	1	0	0	1	0.1	99.0
48 Rwanda	0	0	0	0	1	1	0.1	99.1
49 Switzerland	0	1	0	0	0	1	0.1	99.4
50 Thailand	1	0	0	0	0	1	0.1	99.6
51 Ukraine	0	0	0	0	1	1	0.1	99.7
52 Venezuela	0	0	0	0	1	1	0.1	99.9
53 Zambia	0	0	0	0	1	1	0.1	100.0
	154	156	112	114	159	695	100	
No. of countries by journal	24	25	8	13	33			

*country of origin of the journal

Number of references.

In 1985 Michael G. Moore, the editor of AJDE, lamented the lack of references to previous research and theoretical frameworks: “I believe the convention of reporting previous research as preface to current research is too neglected today” (Moore, 1985, p. 37).

The incidence of unreferenced articles and the number of references per article is taken as an indicator of the scholarliness of a journal (cf. Cline, 1982, p. 210; Mishra, 1997). Articles providing fewer than 10 references imply that “scholarship does not exist but is irrelevant or exists relevantly but is unknown” (Price, 1970, p. 8). Taking this as a benchmark, as was to be expected, all journals under review are on a high academic level, with a mean of 29 references per article. During the period of 2000 to 2008, only one paper out of 695 was published without any references in AJDE (Osiakwan & Wright. 2001). The record holder is McGreal (2004) with 128 references in a paper in IRRODL on copyright issues.

However, this point should not be pushed too hard. We do not claim that papers with 20 references are more scholarly than those with only 15, or that all articles with 20 references are of similar scholarliness.

Table 12

Number of References per Article by Journal

No. of references	OL	DE	AJDE	JDE	IRRODL	Total
0-5	4	2	4	2	1	4
6-10	16	6	5	8	13	16
11-15	24	11	9	11	17	24
16-20	28	13	23	10	20	28
21-25	18	25	21	16	17	18
26-30	14	21	15	23	20	14
31-35	12	22	9	12	16	12
35-40	15	10	14	6	11	15
41-45	5	16	4	7	9	5
46-50	6	6	1	10	10	6
51-55	5	7	4	6	12	5
56-60	2	6	2	2	4	2
61-65	3	5	0	0	4	3
66-70	0	3	0	0	2	0
71-75	1	2	0	0	0	1
76-80	0	1[b]	0	0	0	0
81-85	0	0	0	1[d]	1	0
86-90	1[a]	0	0	0	1	1
91-95	0	0	1[c]	0	0	0
126-130	0	0	0	0	1[e]	0
Mean	26	33	27	29	31	29

[a] 89 references, [b] 80 references, [c] 92 references, [d] 83 references, [e] 128 references

Conclusions and Implications for Future Fesearch

This study examined (1) research areas in distance education, trends, priority areas, and gaps in distance education research; (2) research methods in distance education; and (3) authorship patterns. The results of this review convey certain implications for future research in distance education.

Major findings of this study may be summarized as follows:

- Research in distance education is dominated by studies that focus on interaction and communication patterns in computer-mediated communication, instructional design issues, learner characteristics, and educational technology.
- In terms of research methods, the only discernible trend was found for qualitative research methods, with a modest upward trend on a low percentage level. Maybe researchers in the field have taken note of those who advocate more qualitative studies to capture a deeper and richer range of data (cf. Minnes, 1985; Saba 2000).

- The AJDE clearly prefers to publish quantitative studies; whereas, DE accepted the highest number of qualitative studies, and JDE published the highest number of papers that followed a mixed method design.
- More than 80% of all articles were contributed by authors from only five countries: USA, Canada, UK, Australia, and China. The first authors of the 695 articles under review came from 54 different countries. Interestingly, the journals publish more from their own country of origin. The most international journal is IRRODL with only 18.9% of authors coming from Canada; whereas, AJDE has a strong North American bias with over 80% of authors from the USA and Canada.
- A significant trend was found towards more collaboration among researchers in distance education. In the period between 2000 and 2008, the proportion of single-author papers was 44.2% compared to 61.5% of 361 articles published between 1991 and 1996 that were reviewed by Mishra (1997).

So Quo Vadis?

According to the experts' opinion in the Delphi study (Zawacki-Richter, 2009), there is a great need for more research on the role of culture and cultural differences in global distance learning programmes. Furthermore, co-operation among institutions should receive much more attention, including the impact of cultural differences on leadership and culturally complex student support systems, and there is a need for comparative research on distance learning systems (macro level). A lot of work still needs to be done on the meso level: In particular, experts on the panel highlighted aspects referring to leadership in distance education and strategy, management of change and innovation, costs, organizational development and infrastructure for online student and faculty support, professional development, and quality assurance. The experts claimed that empirical evidence is lacking on the pedagogical opportunities that Web 2.0 applications, mobile devices, and synchronous tools afford for teaching, learning, and assessment.

This review of 695 articles published in five leading distance education research journals confirms the results of the pre-study. It reveals a strong imbalance between the three research levels. Distance education research is highly dominated by issues that refer to the micro perspective (teaching and learning in distance education), with over 50% of all articles focusing on interaction and communication in learning communities, instructional design, and learner characteristics. As anticipated according to the results of the pre-study, those areas that were said to require much more attention take the last three places (globalisation of education and cross-cultural aspects, innovation and change, and costs and benefits) in the ranking of research areas with regard to the frequency of articles (Table 3).

A possible interpretation for this imbalance is that the selection of research themes might follow practical considerations, especially with regard to the availability of data. Of course, the analysis of interaction patterns in computer-mediated communication is a very interesting topic and the text-based data of synchronous communication in online conferences is saved in databases of learning management systems and is therefore readily available. In contrast, it is not surprising

that educational institutions, as competitors in the global education market, are unwilling to freely share business models and data on their budgets and costs.

However, the dearth of articles dealing with issues especially on the meso level (management, organization, and technology) is disappointing. In order to guide practice, practitioners in the field should not rely on under-informed trial and error, but on sound research and empirical investigation on the effectiveness of managerial interventions for education innovation, diversity management, student and faculty support, quality assurance, course design, and intercultural communication.

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Appendix
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International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

Time Students Spend Reading Threaded Discussions in Online Graduate Courses Requiring Asynchronous Participation

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Abstract

The authors report the results of a study that provides bases for comparison between the time necessary to participate in courses delivered asynchronously online and courses delivered in a traditional classroom setting. Weekly discussion threads from 21 sections of six courses offered as part of online, degree-granting, accredited, graduate programs were examined. The purpose of this research is to determine whether students are spending more or less time participating in an online course than in a traditional classroom.

The discussion size (i.e., the number of words per discussion) was determined using the automatic word count function in MS Word. Once the word counts for each course section were determined, the average words per discussion were calculated. The authors used 180 words per minute to calculate the average reading time, based on the work of Ziefle (1998) and Carver (1985, 1990), in order to determine the average minutes per week a student spent reading the discussions.

The study indicates that a typical, graduate-level, online, asynchronous discussion requires about one hour a week of reading time, and the time commitment for participatory activity is similar to that of traditional, face-to-face courses, given that it takes under two hours to compose initial messages and responses to the discussion prompt.

Although these findings are informative, further research is recommended in the area of time spent on online course activities in terms of student hours earned to enable a direct focus on various student characteristics, such as English language competency and student level.

Keywords: Online learning; distance education; threaded discussion; asynchronous communication

A Study of Online Graduate Courses Requiring Asynchronous Participation

After more than ten years of teaching online courses for a variety of graduate programs as full time faculty and as adjunct instructors, the authors have noted a common response to online, asynchronous instruction. Students regularly express remarks such as, "I learned an amazing amount in this course: I spent more time working on this course than I ever did in a face-to-face class" or "This course was too time consuming; I wish the instructor would keep in mind that many of us are busy professionals who work full-time." These comments are added to the student satisfaction surveys administered at the end of a course or are delivered in face-to-face conversation (e.g., at conference meetings that students and instructors attend) or in private communication with the instructor.

Statements like "the course took a great deal of time" seem to be made by some as an admonishment to the instructor and by others as a testimonial that the online instruction is better than a course with similar content delivered in a traditional, face-to-face environment. Regardless of whether the comment is intended as criticism or praise, many students assert that courses offered asynchronously online are more time consuming than traditional, face-to-face courses. To determine how best to address this observation, the authors set out to discover whether online asynchronous courses are in fact more time consuming for students than traditional, synchronous courses.

The authors address the following questions:

- Can we determine how much time we require of our students in an online course delivered using asynchronous communication methods?
- In terms of class participation, do we design situations that require a time commitment similar to traditional, face-to-face classes?

Reading and writing assignments are an established component of most traditional courses, and the amount of time spent on these activities during a course is relatively easy to plan based on experience. However, when there is no specific meeting time established for a course, it becomes challenging to determine how much time students spend in participatory activities.

At the universities where the authors teach, student hours (a postsecondary unit of measure derived from the Carnegie Unit [Shedd, 2003]) and semesters are used as the measure of time for both online and face-to-face course participation. At these institutions one student hour is assumed to represent one hour a week of meeting time during a standard semester. The problem the authors face is that all of their courses are delivered asynchronously online, making it difficult to determine how much time students are spending in weekly, participatory activity. The students' participation is always constrained by the semester in that courses begin and end on specific dates. In the absence of synchronous meetings that set a finite amount of incremental (i.e., weekly) participation time, it is difficult to gauge whether asynchronous student

participation (in the case of the authors' classes, threaded discussion) is significantly more or less time consuming than participation in synchronous courses.

The objective of this research is to determine bases for comparison between the time needed to participate in distance, asynchronous courses (delivered using Internet-based course management systems, such as Blackboard or eCollege) and the time needed to participate in traditional, classroom courses.

A Review of the Literature and Current State of Distance Instruction

Postsecondary institutions are offering an increasing number of distance learning opportunities. Traditional "brick and mortar" universities currently offer courses and entire graduate programs online (Lee & Nguyen, 2007). There are also a number of accredited virtual institutions; that is to say, all students in these institutions complete their work at a distance, and the institutions do not maintain any traditional campuses or classrooms. Walden University and Capella University are examples of this type of virtual institution. Programs based in part or in whole on a distance learning delivery model are particularly attractive to students with jobs, families, or both (Schrire, 2006; Bourne, 1998). Furthermore, instruction delivered in this manner is a viable method of supporting lifelong learning (Thompson, 1998).

A great many of these online courses are delivered asynchronously, using course management software (CMS), alternatively referred to as learning management software (LMS). A great deal of thought has gone into how best to make use of the CMS/LMS to offer a learning experience at a distance that is similar to that of a traditional classroom; the bulk of this effort has gone into addressing the technological challenges of the learning experience (e.g., developing appropriate software and addressing connectivity and hardware requirements) and developing a feeling of community among learners (Anderson, 2006). What has not been adequately addressed to date is whether students learning at a distance are receiving a similar experience in terms of time spent on the course activities.

Whether delivered in a traditional setting or delivered at a distance, the authors have observed that courses offered for graduate credit tend to consist of a combination of assigned readings, assigned papers and projects, quizzes and tests, and some form of weekly participatory activity. In a traditional course, this weekly participatory activity is the class meeting in which the instructor presents information and answers questions and may organize and facilitate small group activity or discussion (Brown & Green, 2007).

Distance courses that employ synchronous communication, such as video conferencing or teleconferencing, can be compared to traditional classroom instruction relatively easily in terms of the time spent by students in course participation: Courses that employ synchronous communication methods can require similar amounts of time spent with the instructor and with classmates. The most obvious example of this would be a three-credit course delivered using videoconferencing in which the students meet via videoconferencing equipment for three hours each week during a semester. Courses delivered using asynchronous communications, however,

are not able to make such a direct comparison in terms of the time students and instructors spend interacting with each other.

Courses delivered asynchronously most often use a CMS/LMS such as Blackboard or eCollege. Along with the traditional weekly readings and required assignments, students "attend" class through weekly seminars that are in essence a series of messages based on a prompt determined by the instructor and organized in a section of the CMS/LMS most often referred to as the discussion area. This activity is known as a *threaded discussion* where the participants are able to see all the messages that are posted, organized by author, topic, or date/time, and they can respond to specific threads within the larger discussion. Bourne (1998) suggests that this type of asynchronous discussion activity accounts for 40% of the overall course experience.

Threaded discussion has been identified as a useful tool in facilitating student metacognitive awareness and development of self-regulatory processes and strategies (Vonderwell, Liang, & Alderman, 2007). Although threaded discussion is a limited medium in that it relies entirely on the generation and interpretation of text (Dennen, 2007), it is possible to generate a sense of social presence in a way that does not require any synchronous communication (Dennen, 2007; Bender, 2003).

The threaded discussion aspect of CMS/LMS platforms supports many-to-many communication (Gunawardena & McIsaac, 2004). Typically, the discussion begins with a pre-determined prompt. The requirement is for students to individually respond to the initial prompt as well as to respond to at least one but usually two or more student responses.

There have been reports published dealing with how much time faculty spend on developing and maintaining courses offered at a distance (Bourne, 1998; Cavanaugh, 2006), on the amount and type of learning that asynchronous discussion can facilitate (Wu & Starr, 2004), and on the interaction patterns among course participants (Hara, Bonk, & Angeli, 2000). Additionally, research has been conducted that analyzes the content of asynchronous discussions (e.g., Gerber, Scott, Clements, & Saram, 2005; Mara, Moore, & Klimczak, 2004; Rourke & Anderson, 2004). This research has focused primarily on instructor influence in determining the type and amount of student discourse that takes place in asynchronous discussions (Gerber, Scott, Clements, & Sarama, 2005) and the protocols for analyzing student-to-student and instructor-to-student discourse in asynchronous discussions (Marra, Moore, & Klimczak, 2004; Rourke & Anderson, 2004).

Despite this available research, there has been little or no recent examination of the time students spend participating in asynchronous courses. Harasim (1987) examines the amount of time students spent participating in an early version of an asynchronous environment, but that study measures the time students spent at the computer, not reading the text generated by the discussion. Vonderwell and Sajit (2005) examine challenges related to the time students spend in weekly course participation in online learning situations, and the phenomenon of "information overload," using a qualitative text-analysis. However, there is currently little or no quantitative data about text generated in weekly online course participation available. By examining

quantitative data on the amount of time students spend participating in an online learning environment, researchers and instructional designers may better determine how best to provide a distance learning-based educational experience that is at least similar to that of a traditional classroom-based experience in terms of student hours.

Method

This study is limited to a specific type of online instruction. All of the data collected for this study are from courses that use an LMS/CMS, such as Blackboard or eCollege, to organize and present the course content. Furthermore, each course uses the LMS/CMS discussion feature to provide regularly scheduled threaded discussions in which the course participants share ideas with each other. These threaded discussions are designed to perform the same function as the in-class activities conducted in traditional, face-to-face courses; in essence, they replace live, weekly class meetings. Traditional classroom activities are bounded by a specific time frame imposed by the course's predetermined formal meeting times, but threaded discussion is not. Although the threaded discussion assignments for all courses examined had specific beginning and end dates that encompassed either one or two weeks, participants were welcome to participate at any time between the beginning and end dates, and there were no set meeting times and no time limits placed on participation during the discussion period.

All of the courses use a combination of required textbook reading, required readings presented via the Web, written assignments, and regular participation in threaded discussions. The discussions are preceded by a discussion prompt that includes a description of the topic, a set of questions that each student must address, and parameters for receiving full credit for the discussion assignment (e.g., a student must post at least 4 messages on at least 2 different days of the discussion). The instructor participates in each discussion. In all courses, each of the discussions is worth 3% to 5% of the overall course grade.

Courses Selected for the Data Set

The selection of courses and course sections for the data set was based on their similarity of content and delivery. The authors examined the weekly discussion threads from courses offered as part of degree-granting, accredited, graduate programs in which all coursework is completed online. The courses are from four different institutions. The courses were taught individually by both authors, each of whom teaches for the university at which he is employed full-time and for degree granting programs that make use of adjunct faculty on a part-time, as-needed basis. Each of the courses was taught between fall 2005 and summer 2007.

All of the courses used for the data set are part of graduate programs of study in instructional technology and/or curriculum studies; they are all part of completely online programs of study; and they are all graduate level (6000-8000 level). The courses are foundational in nature (e.g., foundations of instructional design, foundations of curriculum study). All course participants hold at least an undergraduate degree, and most are full-time, professional educators. Table 1 describes

the differences among the courses in terms of the degree granted, institution type, discussion prompt type, course schedule, average class size, and LMS/CMS system used.

Using the preceding criteria for selection provided a total of 21 sections of six similar courses to examine as part of the data set.

Table 1

Description of Courses Used to Create the Data Set

Course designation	Degree granted	Institution type	Instructor designation	Discussion prompt type	Course schedule	Average class size	LMS/CMS used
A	Master's	For-profit, private university	1	Written by instructional design team	Two 8-week courses taught back to back	14	eCollege
B	Master's	For-profit, private university	2	Written by instructional design team	Two 8-week courses taught back to back	16	eCollege
C	Master's	Non-profit, public university	1	Written by course instructor	16 week semester	24	Blackboard
D	Master's	Non-profit, public university	1	Written by course instructor	16 week semester	19	Blackboard
E	Master's	Non-profit, public university	2	Written by course instructor	16 week semester	16	Proprietary university CMS
F	PhD	For-profit, private university	1	Written by course instructor	12 week quarter	16	eCollege

Data Examined

The authors examined five discussion threads from each of the 21 course sections for a total of 105 individual discussion threads (see Table 2). Each of the discussions was held over a one-week or a two-week period. The authors focused solely on the quantity of the discourse that took place in the asynchronous discussions rather than on the actual discourse content; consequently, no quantitative content analysis techniques (e.g., Gerber, Scott, Clements, & Saram 2005; Mara, Moore, & Klimczak, 2004; Rourke & Anderson, 2004) were used to analyze the discourse. The authors used basic descriptive statistics to measure and analyze the discourse in order to determine the time it takes the average person to read the discussion text.

Discussion Prompts

Although discussion topics and prompts vary in terms of content, all of the discussions examined for this study have the following in common: discussion participation counted toward the student's overall course grade; students were required to respond to the prompt and to classmates' responses on multiple days during the course of the discussion; students were advised that discussion responses must be substantive to count toward a participation grade (e.g., agreeing with another's post or a simple encouragement such as "very good" would not count toward a participation grade); students were advised that the instructor would participate in the discussion by monitoring the discussion daily and by responding when it was deemed appropriate (both instructors feel it is important to participate in the discussion by posting messages that deal with administrative details of the discussion, including keeping students focused on the discussion topic as well as adding content information).

To create the data set, five discussions were selected from each course. Five discussions were selected because it was the minimum common number of discussions each course had that focused on course content as opposed to social aspects of the course (e.g., "please introduce yourself") or course evaluation (e.g., "please comment on whether you found the course engaging").

The prompts used in the discussions that comprise the data set were written either by the instructors themselves or by a team of instructional designers who prepared the course without input from the instructors. Examples of the briefest and longest discussion prompts from the data set are provided below.

The briefest discussion prompt: A one-week discussion from program B

> Report to the group the instructional goals and objectives you have developed for your instructional Web site project. Explain how the goals and objectives are influenced by the needs, task and learner analyses you conducted last week. Respond to at two classmates' postings with constructive feedback on their goals

and objectives. You should post to this discussion a minimum of two days each week.

The longest discussion prompt: A two-week discussion from program C

In this discussion we explore the possibilities of learning online. We know learning online can work (that's why we're here!), but does it work equally well for all types of instruction? A question we need to consider is, under what circumstances is online learning an ideal situation and when does it present challenges? To begin to answer this question we must recognize two important variables: 1. the population of learners; and 2. the content of the instruction.

We will be using Bloom's Taxonomy of the three learning domains as a point of reference (please review the recommended Website on Bloom's Taxonomy mentioned in the Module 4 assignments area).

In this discussion we need to develop answers for three questions:

1. What are the advantages and challenges to cognitive learning in an online setting?
2. What are the advantages and challenges to affective learning in an online setting?
3. What are the advantages and challenges to psychomotor learning in an online setting?

As we develop the answers to these questions we will need to consider whether these advantages and challenges are different for different groups of learners. Your work on your critical analysis paper will no doubt provide you with insights into a specific population of learners - please share with the class what you have discovered about the group you are studying and how they might approach the three learning domains.

Also, see what you can include from the textbook in this discussion. Which of the instructional models/strategies that you are reading about seem most appropriate for various populations of learners and various types of instructional content?

During this discussion, you are required to post at least 3 original messages and respond to at least 3 of your classmates' posted

messages. You must post your first message to this discussion by Thursday, February 15.

Results

Five discussions from each of the courses were identified as focused on course content and intended to require a similar amount of time on task per week. These discussions were focused on subject matter (not introductions or end-of-course reflections) and occurred between the second and penultimate week of the course.

The authors extracted the data from the six courses by accessing the completed discussions, copying the text from these discussions, and pasting them into Microsoft Word documents. Once the data was saved into Microsoft Word files, the discussion size (i.e., the number of words per discussion) could be determined. Discussion size is determined by the automatic word count function in Microsoft Word. The word counts include the header information (author, time posted, title of post) accounting for 20 to 30 words of information per post. Twenty-one sections of six different courses were analyzed (see Table 2).

Table 2

Discussion Word Counts Identified by Course and Section

Course & section	Number of Students	Discussion 1	Discussion 2	Discussion 3	Discussion 4	Discussion 5	Average weekly word count
A 1	17	15,315	15,644	11,485	8,209	12,963	12,723
A 2	16	14,217	19,786	12,208	10,496	17,600	14,861
A 3	16	12,913	15,046	11,708	7,881	13,518	12,213
A 4	12	13,608	11,938	10,165	6,571	11,969	10,850
A 5	12	9,908	13,768	9,274	6,791	12,265	10,401
A 6	11	10,503	11,388	9,237	10,251	11,689	10,614
B 1	15	14,300	13,200	12,450	14,955	10,900	13161
B 2	16	15,324	16,230	13,234	15,200	11,240	14246
C 1	27	29,064	23,579	14,174	11,032	11,045	8,889
C 2	21	37,926	15,768	21,166	12,370	11,894	9,912
D 1	12	40,394	29,452	20,450	20,404	13,934	12,463
D2	26	47,648	27,970	26,481	21,632	14,164	13,790
E 1	12	7725	9613	8976	7890	5995	8040
E 2	20	13279	11540	13450	12350	7718	11667
E3	15	10485	9125	8566	11005	6790	9194
E4	16	9076	9880	8540	6149	2362	7201
F 1	18	16,622	13,519	18,689	15,500	15,130	15,892

F 2	14	12,269	10,231	16,264	9,135	10,668	11,713
F 3	14	11,162	12,052	12,631	10,711	9,895	11,290
F 4	16	10,589	7,711	12,949	9,778	9,687	10,143
F 5	20	11,770	13,280	15,203	12,173	10,915	12,668

Once the word counts for each course section were determined, the average number of words per discussion was calculated for each course (see Table 3). To determine the average minutes per week a student spent on reading the discussions, the authors used 180 words per minute to calculate the average reading time of an average discussion. This number is based on the work of Ziefle (1998) and Carver (1985, 1990). Ziefle indicated that individuals scanning text on a monitor do so at an average of 180 words per minute as compared to 200 words per minute scanning the same text on paper. Carver indicated that the typical silent reading rate per minute for college students is between 256 and 333. The authors used Ziefle's scanning rate for text on a monitor since all courses were presented online. Furthermore, the authors assume the lower-number scanning rate (as opposed to Carver's silent reading rate for college students) because the discussion messages required responses; the assumption is that messages requiring a response would elicit more careful reading.

The average time spent for a week's threaded discussion in all six courses was 64.39 minutes.

Table 3

Average Words per Discussion

Program designation	Number of sections	Average words per discussion	Average minutes per week required to read all messages posted
A	6	11,994	66.35
B	2	13,703	76.13
C	2	9,401	52.23
D	2	13,126	72.92
E	4	9,026	50.14
F	5	12,341	68.56

Discussion

In trying to determine the amount of time students will spend in participatory activity in an online, asynchronous course, this study limits itself to the quantifiable aspects of completed threaded discussions. Although the authors determine that in the case of multiple graduate courses that address similar content one may predict that discussions will require approximately one hour's reading time each week, no determination is made regarding the amount of time required to compose initial messages or responses within the discussion. The time spent composing initial posts and responses to classmates' messages cannot be adequately measured given the data

collected for this study. The data collected from this study can only address the time spent reading the text of the discussion. However, the fact that in 21 sections of six courses the range of average times stays between 50 and 76 minutes of reading time each week suggests a certain consistency that may be helpful to course developers.

Assuming it takes fewer than two hours to construct initial messages and responses to classmates, asynchronous threaded discussion used in this manner accounts for less than the three hours 'classroom time' that is part of a traditional three student-hour course. However, assuming that no campus-based, face-to-face course remains completely on-task for a full three hours each week (one must assume time for administrative activity at the beginning and end of a class session, as well as break times and divergent discussion during the class), it may be posited that asynchronous threaded discussion of the type studied here provides a reasonably similar experience in terms of time spent participating in classroom activity.

This study is limited to two instructors' use of threaded discussion in a variety of online courses that are part of programs of study in instructional technology. It would, therefore, be imprudent to generalize these findings beyond online graduate courses similar to those observed.

The research method employed might be used with larger and more diverse samples (e.g., undergraduate courses, a greater range of course content at the graduate and undergraduate level, varying instructors) to obtain results that could be generalized to the larger population of the online post-secondary courses. Furthermore, greater consideration of the role reading level plays in determining reading time may be necessary.

Conclusions

The authors set out to answer the following questions:

- Can we determine how much time we require of our students in an online course delivered using asynchronous communication methods?
- In terms of class participation, do we design situations that require a time commitment similar to traditional, face-to-face classes?

It seems reasonable to assume the following given an asynchronous, threaded discussion prompt similar to those used in the online courses examined and with a class size between 11 and 27:

- The average student will spend approximately one hour each week reading the text of the discussion.
- Assuming it takes less than two hours to compose initial messages and responses to the discussion prompt, the time commitment for participatory activity is similar to that of traditional, face-to-face courses.

The results of this study suggest that threaded discussion activities used in online learning may be compared to more traditional, synchronous meetings in terms of the time necessary for weekly

participation. Furthermore, this comparison is favorable: The two situations are on a par with each other. Although these findings are informative, further research is recommended in this area given that more and more institutions are developing and offering college-credit courses online. Increased consideration devoted to the topic of time spent on online course activities in terms of student hours earned would allow a more direct focus on various student characteristics, such as non-native English speakers and undergraduate- versus graduate-level. Examining these characteristics, and how they might influence time spent on asynchronous discussions, could provide additional insights that benefit developers and instructors of online courses.

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International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

Online and Blended Communities of Inquiry: Exploring the Developmental and Perceptional Differences

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Abstract

This paper discusses findings of a mixed method approach to a study of the development of a community of inquiry in an online and a blended learning environment. A graduate course delivered online and in a blended format was the context of the study. Data were gathered from the Community of Inquiry Survey, transcript analysis of online discussions, and interviews with students and the course instructor. Using multiple qualitative and quantitative data sources, the goal was to explore the developmental differences of the three presences (social, teaching, and cognitive) in the community of inquiry framework and students' perceptions of a community of inquiry. The results indicated that in both the online and blended course a community of inquiry developed and students could sense each presence. However, the findings revealed developmental differences in social and cognitive presence between the two course formats with higher perceptions in the blended course.

Keywords: Community of inquiry; online learning; blended learning; social presence, teaching presence; cognitive presence

Instructional Design of Online and Blended Learning

The increased level of adoption of online and blended learning is forcing educators to put more emphasis on instructional design. Online learning is a method of learning delivered by using asynchronous and synchronous communication technologies; blended learning is the integration of face-to-face and online learning. The definitions sound simple, but in practice it is far from simple to create an online and blended learning environment from an instructional design

perspective. The quality of these learning environments depends on the design of, and students' engagement in, the learning environment (Duffy & Kirkley, 2004). Poorly designed learning environments often result in unsuccessful or unsatisfactory educational experiences.

There is a growing emphasis on building learning communities in order to increase student participation and to foster learning in online and blended learning environments (e.g., Rovai, 2002; Palloff & Pratt, 2005; Barab, Kling, & Gray, 2004; Conrad, 2005; Colachico, 2007). A community is defined as "a general sense of connection, belonging and comfort that develops over time among members of a group who share purpose and commitment to a common goal" (Conrad, 2005, p.1). It is argued that creating and sustaining a learning community is valuable to enhance student satisfaction and learning through community involvement (Palloff & Pratt, 2005). Empirical research also confirms the relationship between a sense of community and students' satisfaction and learning (e.g., Rovai, 2002; Ertmer & Stepich, 2004; Shea, 2006; Shea, Li, & Pickett, 2006; Liu, Magjuka, Bonk, & Lee, 2007). However, it is not an easy process to create an effective learning community unless it is planned and opportunities for interaction are built specifically into the online or blended course (Colachico, 2007).

To develop effective learning communities, the community of inquiry (CoI) framework, developed by Garrison, Anderson, and Archer (2000), has generated considerable interest and has been widely adopted and studied by researchers (Garrison & Arbaugh, 2007; Arbaugh, 2008, Arbaugh, Cleveland-Innes, Diaz et al., 2008). The CoI framework, with its emphasis on critical thinking and collaboration, provides a well-structured model and a set of guidelines to create effective learning communities in online and blended learning environments (Garrison & Anderson, 2003; Garrison & Vaughan, 2008).

Community of Inquiry Framework

The CoI framework is comprised of three interdependent and dynamic structural elements: social presence, cognitive presence, and teaching presence. As shown in Figure 1, the framework assumes that learning occurs within the community through the interaction of these three core elements. The underlying foundational perspective of the framework is a collaborative constructivist view of teaching and learning (Garrison & Anderson, 2003). Collaborative constructivism is in essence the recognition of the interplay between individual meaning and socially redeeming knowledge; hence, a community of inquiry is a personal and public search for meaning and understanding (Cleveland-Innes, Garrison, & Kinsel, 2007). A recent study conducted by Shea and Bidjerano (2009) concluded that the epistemic engagement approach, which foregrounds the role of learners as collaborative knowledge builders, is more fully articulated and extended through a community of inquiry.

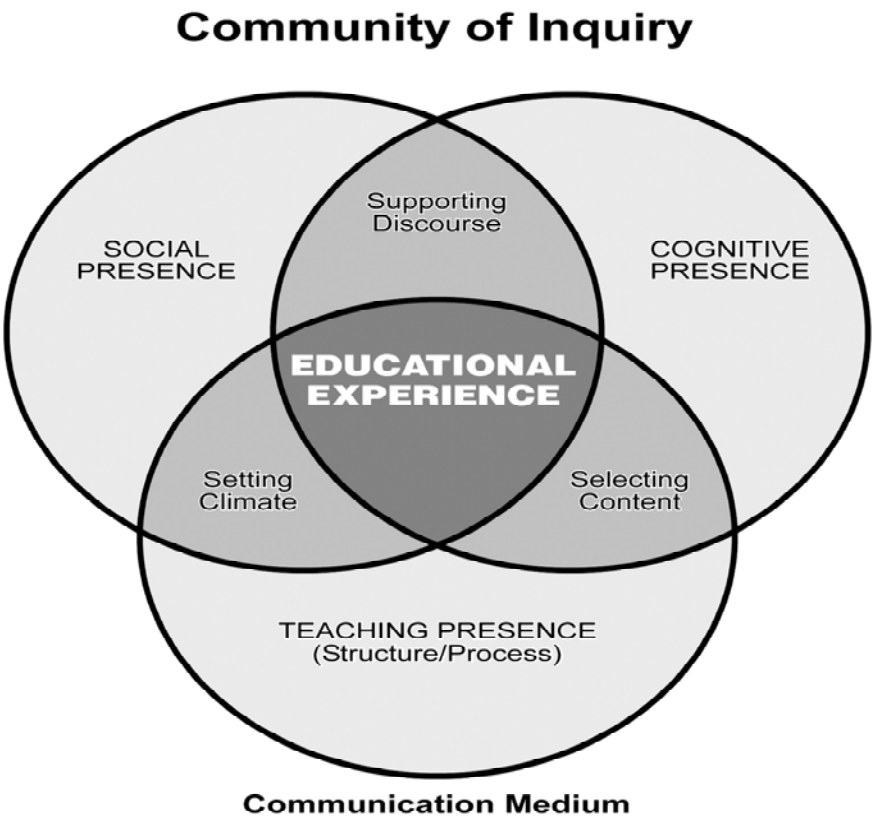

*Figure 1***.** Community of inquiry framework.

Social presence has been defined recently by Garrison (2009) as "the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities" (p. 352). Social presence is an important antecedent to collaboration and critical discourse because it facilitates achieving cognitive objectives by instigating, sustaining, and supporting critical thinking in a community of learners (Garrison & Anderson, 2003). There are three categories of social presence: affective expression, open communication, and group cohesion. Affective responses are the expression of emotions, humor, and self-disclosure, which support interpersonal relationships. Open and purposeful communication occurs through recognition, encouragment of reflective participation, and interaction. Cohesion and group identification are achieved by addressing participants by name, using salutations, and using inclusive pronouns, such as *we* and *our* (Garrison & Anderson, 2003).

Garrison, Anderson, and Archer (2001) define cognitive presence as "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (p. 11). Cognitive presence is operationally defined through the practical inquiry model, which consists of four phases: triggering event, exploration, integration, and resolution. The first phase is the initiation of the inquiry process through a problem or dilemma. The exploration phase is the process of understanding the nature of a problem then searching for relevant information and possible explanations. The integration phase

involves a focused and structured construction of meaning. The final phase is the resolution of a problem by constructing a meaningful framework or by discovering specific solutions. Indicators for each of these categories have been developed to aide in coding for cognitive presence (Garrison & Anderson, 2003).

Teaching presence is defined as "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson, Rourke, Garrison, & Archer, 2001, p. 5). Teaching presence has a regulatory and mediating role, which brings "all the elements of a community of inquiry together in a balanced and functional relationship congruent with the intended outcomes and the needs and capabilities of the learners" (Garrison & Anderson, 2003, p. 29). There are three categories of teaching presence: design and organization, facilitating discourse, and direct instruction. Design and organization is the macro-level structure of the learning experience. Facilitating discourse is critical to maintaining students' interest, motivation, and engagement. The third category, direct instruction, is associated with more specific content issues, such as diagnosing misconceptions, injecting knowledge from diverse sources, or summarizing the discussion (Garrison & Anderson, 2003). By using the term *teaching* instead of *teacher*, the possibility of distributing the responsibilities and roles of a teacher among participants is emphasized.

Many research studies have confirmed the three elements of the community of inquiry framework (e.g., Arbaugh, 2007, 2008; Kanuka, Rourke, & Laflamme, 2007; McKlin, Harmon, Evans, & Jones, 2001; Meyer, 2003, 2004; Shea, Pickett, & Pelz, 2003; Shea, 2006; Swan & Shih, 2005). However, to date, there are few studies that examine the three elements of the framework simultaneously, either qualitatively or quantitatively (Arbaugh, 2007; Garrison & Arbaugh, 2007). This study examined all three elements of the framework – social, teaching, and cognitive presence – concurrently in two different learning environments (i.e., in an online and a blended course).

The CoI framework is a viable theory both for understanding the dynamics of learning in online and blended learning contexts and for developing effective learning communities. However, there might be external factors affecting the development of each presence, which, in turn, affect the learning experience. Recently, there is growing research examining such external factors as the effect of time (Akyol & Garrison, 2008), the effect of course duration (Akyol, Vaughan, & Garrison, in press), and the effect of immediacy-enhancing technologies or rich Internet applications (Ice, Curtis, Phillips, & Wells, 2007). This study aimed to expand the current knowledge base by examining the impact of course design on the development of CoI elements as well as by illuminating the differences between online and blended learning environments. Knowing how course design might affect social, teaching, and cognitive presence concurrently might help instructors and instructional designers develop appropriate interventions to foster the development of each presence.

Methodology

The purpose of this study was to examine the development of a community of inquiry in online and blended learning contexts. More specifically, the aim was to illuminate social, teaching, and cognitive presence differences between online and blended learning contexts. The study applied a mixed methodology approach, which provides a depth and breadth that is not possible using either quantitative or qualitative data exclusively (Creswell, 2003). The context of the study was a graduate course on the topic of blended learning, delivered online in the fall term and in a blended format in the winter term, using asynchronous and synchronous communication technologies (i.e., Blackboard and Elluminate) at a large campus-based research university. At the time of the study, the instructor had offered the course three times in different formats (i.e., face-to-face or online), but each time the course was designed around a community of inquiry approach. In order to articulate a theoretical framework for course redesign, students were introduced to various frameworks including the CoI framework. This situation created an advantage when interviewing the students as they were familiar with the CoI framework and, therefore, better able to understand the interview questions and to provide coherent responses.

Both courses applied a community of inquiry approach. That is, learning activities, strategies, and assessment techniques were developed to reflect social, cognitive, and teaching presence. Hence, the course was exactly the same in both environments in terms of learning activities, strategies, and assessment techniques. The major assignments were article critiques and peer reviews, weekly online discussions (nine weeks of discussion in each course), and prototype course redesign projects. In the first online discussion, the instructor modeled how to facilitate the discussion in an effective way. In order to distribute teaching presence among students and teacher, students were responsible for facilitating and directing the online discussions in each of the remaining weeks.

Participants

The participants of the study were graduate students enrolled in the course in the fall and winter semesters. The total number of students was 16 in the online course and 12 in the blended course. The demographic data showed that all students were mature in age; in both courses, they were mostly over 30. All students were enrolled in the MA Education program, delivered online. Eight students in the blended course were also enrolled in the MA Education program; four were in different programs or had different status. With regard to their computer skills, fourteen students indicated that they had intermediate computer skills while thirteen had advanced computer skills. Most of the students (12 in the online course, 7 in the blended course) had previous online/blended learning experience, and some of them (8 in the online course) had taken all of their previous courses in online/blended environments.

Data Collection and Analysis

Three sources of data were used in this research: transcript analysis, interviews, and the CoI Survey. There were nine weeks of discussion covering the same topics in each course. In order to explore students' cognitive presence, social presence, and teaching presence, the messages that the course instructor or the guest speakers posted were excluded from the analysis. The total number of messages that students posted was 564 in the online course and 439 in the blended course. The unit of analysis was each single message. Transcript analysis was applied to all messages posted by students based on category indicators defined in the CoI framework (Garrison & Anderson, 2003). The first author and a research assistant analyzed the transcripts by applying a negotiated coding approach (Garrison, Cleveland-Inness, Koole, & Kappelman, 2006). The researchers coded two discussion transcripts of a previous online course to gain experience and familiarity with the process. In this research, inter-rater reliability was calculated using Holsti's coefficient of reliability (1969), which was .75 for the training session. This provided an estimate of reliability between the coders before the adoption and advantage of a negotiated coding approach. In the negotiated approach, the researchers coded transcripts and then actively discussed their respective codes to arrive at a final assessment of the code. Negotiation provided a means of ongoing training, coding scheme refinement, and controls for simple errors, thereby increasing reliability.

This study included semi-structured interviews with students and unstructured interviews with the course instructor. Eleven voluntary students from the online course and nine voluntary students from the blended course were interviewed at the end of each term in order to gather detailed information about their perceptions of the community of inquiry. The questions focused on how the students sensed and perceived the development of social, teaching, and cognitive presence in the course. Most of the students lived in different cities and were busy, so they preferred to be interviewed during synchronous online meetings. Elluminate was used for this purpose because the students were familiar with it. The other four students (one from the online course and three from the blended course) were interviewed face-to-face. Also, an unstructured interview was conducted with the course instructor three weeks after the blended course ended. During the interview, instructor perceptions of each presence in each course and the themes that emerged from the student interviews were covered. The main emphasis in the interviews was to explore the similarities and differences between the online and blended communities of inquiry. With informed consent, the interviews were recorded and later transcribed. The transcripts of the interviews were analyzed, applying a qualitative content analysis strategy.

The CoI Survey was administered at the end of the class to explore students' perception levels of the CoI presences. The CoI Survey used in this study was developed and validated based on previous studies (Arbaugh et al., 2008). Cronbach's Alpha was 0.94 for teaching presence, 0.91 for social presence, and 0.95 for cognitive presence. The survey included teaching presence perception (13 items), social presence perception (9 items), and cognitive presence perception (12 items). Apart from one student in the online course, all students in both courses completed the survey.

Results

Development of a Community of Inquiry

Using the frequency values of each presence, which emerged from the transcript analysis, a scatter plot was created to illustrate how the community of inquiry as a whole developed in each course. As seen in Figure 2, each element of the CoI developed similarly in both courses. However, detailed comparisons using the frequency values of the categories of each presence indicated differences between the two courses in the development of each presence.

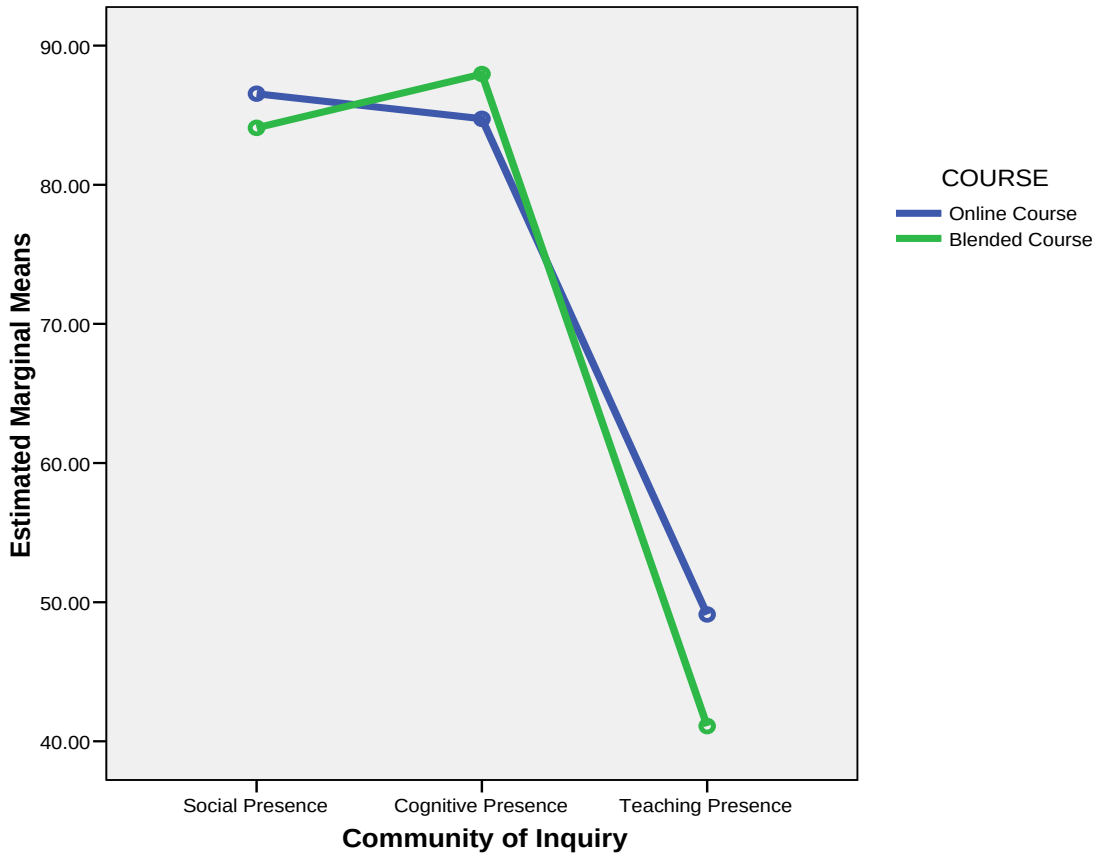

Figure 2. Development of social, cognitive and teaching presence in online and blended course.

Social presence.

Transcript analysis of online discussions indicated more social presence indicators in the messages posted by online course students, compared to the blended course students (Table 1). In both courses, the majority of the messages were coded as open communication (48% in online course and 41% in blended course). As seen in Table 1, the main differences between the two courses are the following: (i) affective expression was found more in the online course compared

to the blended course, and (ii) group cohesion indicators were more frequent in the blended course.

Table 1

Comparison of Coding Results for Social Presence between Courses

Social presence	**First 3 weeks of discussion**		**Second 3 weeks of discussion**		**Last 3 weeks of discussion**		**TOTAL**	
	Online	*Blended*	*Online*	*Blended*	*Online*	*Blended*	*Online*	*Blended*
Affective expression	34 %	17 %	39 %	14 %	25 %	6 %	33 %	12 %
Open communication	58 %	36 %	43 %	49 %	43 %	38 %	48 %	41 %
Group cohesion	7 %	23 %	16 %	22 %	20 %	28 %	14 %	24 %
No category detected	0 %	25 %	4 %	16 %	12 %	29 %	5 %	23 %

Further analysis was conducted in order to explore whether these differences were statistically significant. An independent samples t-test was applied with the categories of social presence (affective expression, open communication, and group cohesion) as the dependent variables and the course as the independent variable. The test was significant for the affective expression category ($t(26) = 3.757$, $p = .001$) and group cohesion category ($t(26) = -3.83$, $p = .001$) but not significant for the open communication category ($p = .645$). Due to the small sample size, Mann-Whitney U test was also conducted to compare the differences. The results of the test were consistent with the independent samples t-test results, yielding significant differences for affective communication ($p = .002$) and group cohesion ($p = .003$) categories between the online and blended courses.

Teaching presence.

As seen in Table 2, virtually none of the messages in both courses were coded as the design and organization category of teaching presence. On the other hand, online course discussions included more facilitating discourse and direct instruction indicators compared to the blended course discussions. However, these differences were not statistically significant. Neither the independent samples t-test nor the Mann-Whitney U test revealed significant differences between the courses for teaching presence categories.

Table 2

Comparison of Coding Results for Teaching Presence between Courses

Teaching presence	**First 3 weeks of discussion**		**Second 3 weeks of discussion**		**Last 3 weeks of discussion**		**TOTAL**	
	Online	*Blended*	*Online*	*Blended*	*Online*	*Blended*	*Online*	*Blended*
Design and organization	1 %	0 %	1 %	0 %	0 %	0 %	1 %	0 %
Facilitating discourse	28 %	18 %	23 %	23 %	25 %	23 %	25 %	21 %
Direct instruction	19 %	19 %	33 %	24 %	38 %	21 %	30 %	21 %
No category detected	53 %	63 %	44 %	53 %	38 %	56 %	45 %	57 %

Cognitive presence.

As the distribution of percentages for each category of cognitive presence shows in Table 3, the integration phase was the most frequently coded category of messages posted by students in both courses. Also, integration was found more frequently on the discussion board in the blended course; whereas, exploration was found less frequently on the discussion board in the blended course. The triggering event and resolution phases were low in both courses.

Table 3

Comparison of Coding Results for Cognitive Presence within Three Time Periods

Cognitive presence	**First 3 weeks of discussion**		**Second 3 weeks of discussion**		**Last 3 weeks of discussion**		**TOTAL**	
	Online	*Blended*	*Online*	*Blended*	*Online*	*Blended*	*Online*	*Blended*
Triggering event	15 %	2 %	7 %	5 %	8 %	5 %	10 %	4 %
Exploration	18 %	16 %	30 %	16 %	27 %	10 %	25 %	14 %
Integration	47 %	55 %	45 %	43 %	52 %	57 %	48 %	52 %
Resolution	7 %	6 %	10 %	8 %	6 %	4 %	7 %	6 %
No category detected	14 %	21 %	9 %	28 %	8 %	23 %	10 %	24 %

Both the independent samples t-test and Mann-Whitney U test were conducted in order to explore whether there were any statistical differences between the online and blended courses in terms of cognitive presence posting patterns. The results of the independent samples t-test revealed that the exploration ($t(26) = 3.125$, $p = .004$) and integration ($t(25) = -3.136$, $p =. 004$) categories were significantly different across the courses. The integration phase was found to be significantly

higher in the blended course; whereas, the exploration phase was found to be significantly higher in the online course. Mann-Whitney U test results were consistent with the independent t-test results for the categories of exploration (p = .003) and integration (p = .009). However, the Mann-Whitney U test also indicated significant differences for the triggering event category (p = .039).

Students' Perceptions of CoI Presences

In this section, students' perceptions of social presence, cognitive presence, and teaching presence are presented first by using the CoI Survey and then the interview results. The results of the interview with the course instructor are also presented to provide additional information. The descriptive analysis of survey data shows that students have high perceptions of each presence in both courses (see Table 4). However, the students in the blended course have slightly higher perceptions of all the presences compared to the students in the online course. In order to explore whether the perception differences were statistically significant according to the course design (i.e., online or blended), independent samples t-test and Mann-Whitney U test were conducted. Both test results were consistent, indicating a significant difference only for teaching presence ($t(25) = -2.131$, p = .043).

Table 4

Students' Perceptions of CoI Elements in both Courses

	Online course			**Blended course**		
	N	**Mean**	**Std. Deviation**	**N**	**Mean**	**Std. Deviation**
Social presence	15	3.94	.55	12	4.30	.47
Teaching presence	15	4.15	.51	12	4.51	.33
Cognitive presence	15	4.07	.56	12	4.31	.37

The analysis of interviews revealed that students' perceptions of social presence varied in both courses. Although most students expressed that social presence developed in the course, in the online course there were four students who indicated that social presence was high for some of their classmates and low for others. In the blended course, most of the students indicated their satisfaction with the level of social presence. Generally, the students in both courses expressed that social presence created a comfortable environment to share ideas, to express views, and to collaborate. One student from the blended course said the following:

> Social presence increases your comfort level when you really speak out and talk. You are more inclined to be sort of honest, straightforward and honestly who you are rather than trying to think about what other people might be thinking of you. You are

> more comfortable and so being more comfortable you definitely want to share more ideas and express viewpoints.

Some students (eight from the online course and three from the blended course) suggested a relationship between class size and social presence. According to the students, social presence was better in small groups. For the students in the online course, the class size was too big for the effective development of social presence. Consistent with this, the students in the blended course were pleased with the class size. They indicated that the small class size decreased the amount of time necessary for the development of social presence. The instructor indicated that generally he could not see a big difference in terms of social presence; however, he did perceive different forms of social presence in each course. He stated that as most of the students in the blended course were new in the graduate program, they were more willing to build social networks and more keen to make friends than some students in the online course who were finishing their degree.

Almost all students in both courses indicated that they perceived cognitive presence to be strong. Three students stated that cognitive presence increased their awareness of their thinking process and helped them to sense progression. According to the instructor, there was also a very high level of cognitive presence in each course. The instructor stated that he was impressed with the level of online discussions and the quality of final papers in both courses. Students' comments about cognitive presence noted the importance of resources and learning activities in order to develop deep approaches to learning in both courses. They found assignments and the final project relevant, challenging, sufficient, and reflective. The instructor also emphasized the role of learning activities. He said "if you do not have the activities that are directed to push students intentionally through four phases of inquiry model, learning does not happen." Related to the phases of cognitive presence, most of the students in both courses believed that they were able to reach the higher levels, but most of them stated that the resolution phase is achieved individually through their final project. In this regard, one student from the online course said "within the course the students were pretty close to resolution phase but the resolution phase definitely will be cemented when they actually implement course redesign projects." Two students in the blended course also indicated that the triggering and exploration phases occurred during face-to-face sessions; whereas, higher levels took place on the discussion board as they had more time to think about the issues. Students in the online class also identified some factors affecting their cognitive presence in the course, such as time needed for discussions.

Students in both courses generally indicated that they found teaching presence high and valuable. However, the students in the blended course seemed to be more aware of their contribution to teaching presence because they shared this responsibility with the course instructor. One student in the blended course stated there was more teacher presence at the beginning but then it quickly evolved into a group teaching presence. He said, "I thought the teaching presence was excellent; it scaffolded nicely, grew and shared by everyone... having that sort of teaching presence impacts the satisfaction tremendously." Similarly, another student said, "I think all of us contributed to the teaching presence, our bringing expertise and insights from our world, so it promotes learning for everyone." With regard to the instructor, the students appreciated frequent communication,

immediate feedback, availability, good balance between course resources and activities, good facilitation, clarity of assignments and evaluation, correcting misunderstanding, and modeling the use of tools.

Although the students interviewed were generally satisfied with the teaching presence, most of the students from the online course (eight students) and four students from the blended course indicated that they could not see much teaching presence on the discussion board. For the students in the online course, the absence of teaching presence in the weekly discussions resulted in a need for more direct instruction from the instructor; however, this was not the case for the students in the blended course as they had a chance to meet the course instructor every week.

Finally, students' final grades and their participation were also high in both courses. Their final grades were similar: On a 100 point scale, the mean of students' grades were 94.22 in the online course and 98.83 in the blended course. There was no significant difference between the courses in final grades. The attendance rates of the students in the discussions were also high: 92 percent for the online course and 98 percent for the blended course.

Discussion

The results from the three sources of data (online discussions, survey, and interview data) indicated that each element of a community of inquiry developed successfully in both courses – as designed. However, there were developmental differences between the two courses in each presence and their respective categories. In terms of social presence, the transcript analysis revealed differences in the affective communication and group cohesion categories. There was a higher level of affective communication, mostly found as self disclosure, in the online course. This might be due to the need to get to know each other and to set the climate in an online course; whereas, the face-to-face component of the blended course might have decreased the need for affective communication in the online component. The other difference was in the group cohesion category, which was found to be higher in the blended course than in the online course. In the online course, the progression of group cohesion in online discussions throughout the course showed that students started with a low sense of group identity, but their sense of belonging to a group increased steadily over time. Their use of vocatives, inclusive pronouns such as "we," "our," and "us," increased through to the end of the course. Consistent with these results, the analysis of the CoI Survey revealed higher perceptions of social presence in the blended course compared to the online course. Overall these differences suggest that face-to-face interaction might have significant advantages for the development of social presence in the early stages of establishing group identity and trust (Garrison & Vaughan, 2008; So & Brush, 2008). Conrad (2005) also found that students valued face-to-face meetings for better connection and that they reported complementary relationships between face-to-face and online communications.

Students in both courses valued social presence. They reported in the interviews that social presence created a comfortable environment to share ideas, to express views, and to collaborate. Therefore, it is critical to ensure an optimal level of social presence, which is a means to greater cognitive presence (Garrison & Anderson, 2003). Finally, apart from the course design, class size

was identified as an important factor by the students in both courses. This is consistent with Driver's (2002) finding that small group size creates higher levels of social presence.

The transcript analysis of online discussions did not reveal a significant difference between the two courses in terms of specific teaching presence categories. However, it was found that the students in the blended course had higher perceptions of teaching presence than the students in the online course. This finding could be anticipated since the students in the blended course had opportunities to interact with the course instructor in face-to-face meetings. The design of both courses provided opportunities for students to share teaching presence by allowing them to lead and facilitate weekly discussions. All the students in the blended course and most of the students in the online course valued this opportunity, indicating that it provided a new way to participate, made the discourse richer with different backgrounds and experiences, and helped them to learn better. The students in the study of Rourke and Anderson (2002) also found peer-led discussions more responsive, more interesting, and more structured compared to instructor-led discussions.

The students in both courses had very positive feelings about the course instructor. However, for students in the online course, there was a need for more direct instruction by the course instructor. Previous studies have also found that students assume teaching presence responsibilities (especially in terms of direct instruction), which are mainly the role of the instructor (Rourke & Anderson, 2002; Shea et al., 2006). Anderson et al. (2001) and Arbaugh and Hwang (2006) emphasize that the direct instruction category should be implemented by the instructor rather than the students as this category needs subject matter expertise in order to diagnose misconceptions. Perhaps due to the fact that the main medium to interact with the instructor was the online discussion board, they felt more instructional guidance compared to the students in the blended course. It has been found that students need more visible teaching presence of the instructor at the beginning of a course to ease the adjustment process (Cleveland-Innes et al., 2007). Therefore, it is suggested here that a strong and active presence on the part of the instructor – one in which the instructor actively guides the discourse – should take place in the early stages for both a sense of student connectedness and learning (Pawan, Paulus, Yalcin, & Chang, 2003; Shea, 2006; Ling, 2007).

In both learning environments, the students' level of cognitive presence, as revealed in online discussions, was found to be high, and they perceived cognitive presence to be strong. Contrary to most previous studies (e.g., Garrison et al., 2001; McKlin et al., 2001; Meyer, 2003; Pawan et al., 2003; Vaughan & Garrison, 2005; Kanuka et al., 2007; Stein et al., 2007), the integration phase was found to be the most active in both online and blended environments. However, the integration phase was found to be significantly higher in the blended course compared to the online course; whereas, the exploration phase was found to be significantly higher in the online course than in the blended course. The explanation for these differences could be that students in the blended course started discussions in face-to-face meetings (i.e., the triggering event and exploration mostly occurred in the face-to-face meetings). In the blended course, online discussion could be more reflective, more rigorous, and easier in terms of tracking ideas. At the same time, some activities associated with exploration, such as brainstorming, might work best face-to-face (Meyer, 2003). Similarly, the students in a study by Vaughan and Garrison (2005)

indicated that the face-to-face component was the preferred venue for the triggering event and exploration.

Consistent with previous research, the resolution phase was found to have the least activity (McKlin et al., 2001; Meyer, 2003; Pawan et al., 2003; Meyer, 2004; Vaughan & Garrison, 2005, Stein et al., 2007; Kanuka et al., 2007). However, these findings are explainable in the context of the research reported here and the instructional design of both courses. The explanation offered is that resolution thoughts were directed to the student's individual course redesign project. This was confirmed through the interviews when students stated that they reached resolution by applying solutions to their course redesign projects that were developed in the integration phase. They also identified time as a barrier in online discussions to reaching resolution. Therefore, it may be that the length of the course is not sufficient for students to implement their projects and to share the application results with the other students.

The literature also indicates time, the design of learning activities, and the medium as important factors in reaching higher levels of inquiry (Garrison et al., 2001; McKlin et al., 2002; Meyer, 2003, 2004; Vaughan & Garrison, 2005; Kanuka et al., 2007; Stein et al., 2007).

The design of learning activities has a significant impact on how students approach learning (Garrison & Cleveland-Innes, 2005). In this study, students in both courses stressed the role of learning activities in the development of cognitive presence and, in turn, their learning. They described learning activities as challenging, collaborative, and engaging. This study affirms structured collaborative activities for deeper and meaningful learning as suggested previously (Garrison & Cleveland-Innes, 2005; Schrire, 2006). Moreover, a recent study indicated that epistemic engagement in which the students become collaborative knowledge builders is well articulated and extended through the CoI framework (Shea & Bidjerano, 2009).

Conclusion

The main emphasis of the CoI framework is to create an effective learning community that enhances and supports deep approaches to learning. This research explored how a community of inquiry develops in an online and blended learning environment. It is very important to note that both courses were designed using the CoI framework and were equally successful in the development of social, cognitive, and teaching presence. However, due to the small sample size and other variables (e.g., student characteristics, nature of instructional goals, instructor background, learning resources), extreme caution must be exerted in generalizing these findings. Future research studies with larger sample sizes could be undertaken to further examine such external factors. In this research, the information about the face-to-face component of the blended course could only be obtained through interviews. Future research could also investigate the face-to-face component more comprehensively by analyzing face-to-face discussions and interactions. That said, however, taking into consideration such contextual differences and contingencies, the CoI framework shows promise as a tool for designing effective online and blended environments for effective teaching and learning.

One of the significant contributions of this research is the examination of a community of inquiry in a blended learning environment. The results here also suggest that the blended course has distinct advantages over the online course. An online or blended learning approach will most likely be determined through contextual contingencies, such as the ability or the willingness of participants to meet face-to-face. This study discovered clear strengths of blended learning design, which are as follows: (i) reduces the time needed to develop group cohesion, (ii) promotes reaching higher levels of inquiry by enabling more time for the integration and resolution phases, and (iii) satisfies more students by providing multiple forms of communication. Overall, these findings provide support for the assertion of Garrison and Kanuka (2004) that the blended learning environment is particularly effective in supporting a community of inquiry.

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International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

A Review of Adventure Learning

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Abstract

Adventure learning (AL) is an approach for the design of digitally-enhanced teaching and learning environments driven by a framework of guidelines grounded on experiential and inquiry-based education. The purpose of this paper is to review the adventure learning literature and to describe the status quo of the practice by identifying the current knowledge, misconceptions, and future opportunities in adventure learning. Specifically, the authors present an integrative analysis of the adventure learning literature, identify knowledge gaps, present future research directions, and discuss research methods and approaches that may improve the AL approach.

The authors engaged in a systematic search strategy to identify adventure learning studies then applied a set of criteria to decide whether to include or exclude each study. Results from the systematic review were combined, analyzed, and critiqued inductively using the constant comparative method and weaved together using the qualitative metasynthesis approach.

Results indicate the appeal and promise of the adventure learning approach. Nevertheless, the authors recommend further investigation of the approach. Along with studies that investigate learning outcomes, aspects of the AL approach that are engaging, and the nature of expert-learner collaboration, future adventure learning projects that focus on higher education and are (a) small and (b) diverse can yield significant knowledge into adventure learning. Research and design in this area will benefit by taking an activity theory and design-based research perspective.

Background to the Study

Researchers and practitioners have often sought to engage learners in authentic and experiential learning in an attempt to connect the activities that occur in the classroom with learners' lives beyond the classroom walls. Herrington, Oliver, and Reeves (2006) argue that successful distance education depends on relevant and authentic tasks. One creative and promising way to engage learners in such activities, therefore, has been through the development of educational programs

that revolve around expeditions and adventures grounded on the use of technology to reinforce the experience and connect learners, educators, and experts (Buettner & Mason, 1996; Buettner, 1997).

Given the potentially powerful and lasting impact that such programs have exhibited (Hattie et al., 1997), the interest from the educational community (Schutz, 2008), and the relative confusion that exists in the current literature with regards to how powerful outcomes are achieved in adventure-based education (Hattie et al., 1997; McKenzie, 2000), this paper presents the current knowledge and gaps in our understanding of the *adventure learning approach* to designing technology-enhanced educational experiences. Our goal is to examine the research on adventure learning so as to delineate findings and recommendations for future research.

We begin by explaining adventure learning and contrasting it to different forms of adventure-based expeditions. Next, we present our method of inquiry and analysis and delve into a discussion of (a) what is currently known and (b) what is not known about this topic. We then discuss future research approaches for adventure learning and conclude with our vision for the future use and implementation of this approach.

Adventure Learning

Numerous online learning programs focus on adventure and outdoors expeditions. Examples include GoNorth! (http://www.polarhusky.com/), the Jason Project (http://www.jason.org), The World of Wonders (http://www.questconnect.org/world_of_wonders.htm), Blue Zones (http://www.bluezones.com/education), Expedschools (http://www.expedschools.org/), and eField Trips (http://www.efieldtrips.org/). A complicating factor in our discussion of such endeavors is the terminology used to describe them as the literature includes references to adventure learning (Doering, 2006), virtual/electronic field trips (Jacobson, Militello, & Baveye, 2009), adventure-education (Hattie et al., 1997), outdoor education (Rickinson et al., 2004), and online expeditions (Rasmussen & Northrup, 1999). While these approaches have adventure as a central theme, their similarities and differences vary greatly. For instance, some of these activities are projects (e.g., Expedschools) as opposed to models of educational design (e.g., adventure learning). Furthermore, some approaches may involve only virtual projects (e.g., eField Trips), only outdoors activities (Rickinson et al., 2004), or a combination of the two (e.g., GoNorth!). The extent to which these projects/activities are grounded on theory and empirical research is an important distinguishing factor. Due to these differences, in this paper we focus on reviewing the adventure learning approach because, to the best of our knowledge, it is the only one that is grounded on theory, practice, and research with continuous development and refinement.

Adventure learning (AL) is defined as an approach to the design of online and hybrid education that provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative learning environments (Doering 2006, 2007). Jonassen (1991) defined authentic activities as appropriately complex tasks with real-world relevance and utility. Importantly, Jonassen further argues that such tasks should also allow learner flexibility in terms of difficulty and involvement. The approach is based on the theoretical foundations of

experiential (Kolb, 1984) and inquiry-based (Dewey, 1938) learning. More specifically, the approach assumes that students learn by immersing themselves in participatory experiences grounded in inquiry.

To date, five educational interventions have been based on the adventure learning approach: Arctic Transect 2004 and GoNorth! 2006-2009. These projects have been based on the same narrative: Each year a team of explorers and educators traverses an Arctic region of the world on a dog-sledding expedition, engaging teachers, students, and parents from around the world in a distance learning adventure. The expeditions are based on freely available problem- and inquiry-based curricula that focus on a specific issue, a region of travel, and the local people, and are enhanced by electronic media sent from the trail (e.g., video, audio, imagery). These artifacts are available in an online learning environment that documents the adventure while enhancing the curriculum (Doering, 2007).

Participants engage in the experience via numerous mediating artifacts, including weekly trail reports that present the expedition and adventure, a dog blog that presents the expedition through the eyes of one of the participating dogs, and collaboration zones where participants can interact in real-time and asynchronously with experts and each other. Other features of the learning environment include web-based video games relating to the curriculum, opportunities for learners to send virtual notes to the explorers, and an opportunity for one teacher per year to participate in the expedition as an explorer. Such practices are referred to as *situative* and *participation-oriented* (Greeno, 1998), where the focus is on the systems and activities through which learners interact with others. Scardamalia and Berieter (in press) capture the development of this environment in their description of 'learning communities' as communities where knowledge is shared, socially constructed, and collaboratively supported.

Method

A structured and systematic methodology was used to review and analyze the adventure learning literature. We first engaged in a systematic search strategy to identify relevant studies. Once such studies were located, we applied a set of criteria to decide whether to include or exclude each individual study. The results from the systematic review were combined, analyzed, and critiqued inductively using the constant comparative method and weaved together using the qualitative metasynthesis approach. Each of these steps is described in detail below.

Search Strategy

To retrieve the papers informing this study we engaged in a structured search strategy, with six main resources serving as sources of information:

- University of Manchester library catalogue;
- University of Manchester collection of electronic journals;

- electronic databases (i.e., the British Education Index, the Scopus database, and the ERIC collection);
- Google Scholar;
- the authors' personal bibliography on the topic; and
- cited work from the identified manuscripts.

Even though these resources overlapped at times, findings varied considerably; for instance, the library catalogue did not provide any significant results in the area of AL, while the majority of the identified papers were retrieved from online databases. The process used to retrieve papers from online resources was systematic. Resources were searched using the *and* and *or* operators on combinations of the following keywords: adventure learning, adventure-based, expedition-based, expedition, adventure, outdoors, virtual field trip, field trip, hybrid, online, learning, teaching, education, and distance education.

Inclusion/Exclusion Criteria

As our interest is specifically on adventure learning as an approach to education, we decided to *include* all manuscripts that (a) focused on AL as a method of teaching/learning/design, (b) were guided by a formalized AL framework, and (c) utilized technology in delivering AL at a distance. Manuscripts that did not satisfy the inclusion criteria were *excluded*. These criteria lead to the exclusion of studies that focused on variants of outdoors education, virtual field trips, and expedition-based academics.

Research Method

The synopsis of the articles included in this review adopts an evaluative and integrative approach with regards to their conclusions and warrants. The articles' methodology is discussed, and the authors' assumptions, claims, findings, and methods are evaluated. To engage in these tasks, we collected in two tables relevant information pertaining to the identified research studies (see Appendix). These tables facilitated the systematic analysis of the articles included in the review.

The analysis process started when it was agreed that further searches on the topic of interest failed to yield any additional manuscripts. At that point, we had collected 10 manuscripts dealing with the topic of adventure learning. Both authors then independently read the articles and met eleven times to discuss them. During our initial meetings we developed the skeletons for the tables (presented in the Appendix) to assist in gleaning all pertinent information from the papers. At each subsequent meeting we discussed the papers, added information to the tables, and added/removed columns from the tables according to new understandings that arose from our discussions. To analyze the collected data, we used the constant comparative method (Glaser & Strauss, 1967), arriving at salient categories and data patterns. Specifically, understandings from each paper were collected and analyzed individually to note emerging patterns and to gain a broad understanding of the issues surrounding adventure learning. Next, identified categories across papers were analyzed in search of common themes and meanings. Finally, the patterns

were compiled and analyzed in order to confirm and disconfirm the themes across all papers. Analysis across and between the papers continued until no more patterns could be identified. The identified patterns were then composed using the qualitative metasynthesis approach (Finfgeld, 2003; Sandelowski & Barroso, 2007) so as to derive a refined view of AL. In the words of Finfgeld (2003, pp. 894), the aim was to develop a "new and integrative interpretation of findings that is more substantive than those resulting from individual investigations." We decided to structure our paper in three sections that would allow the reader to easily approach the topic of interest; specifically, we discuss the following:

- current knowledge on adventure learning,
- knowledge gaps in the adventure learning literature, and
- ways to expand our knowledge and understanding of AL.

Existing Understandings of AL

Prior to discussing the findings of the AL research, it is valuable to describe the type of research that has been conducted. At the time of writing, the adventure learning literature consists of six empirical (Table 1) and five theoretical manuscripts. Two of the empirical papers focus on teachers implementing the AL approach and integrating it in existing practices; one focuses on the students using geospatial data in the context of an AL project; two focus on the experiences of both teachers and students while engaging with the AL approach; and one focuses on the experiences of an explorer participating in the expedition team that delivered the AL program. All empirical manuscripts have been conducted with private and public K-12 schools in the United States, while one manuscript also included a community college. Most of the research conducted is qualitative in nature and uses the constant comparative approach to analyze the collected data. One manuscript uses the phenomenological approach to analyze participant experiences, while a second one analyzes survey data using factor analysis, correlational analysis, and structural equation modeling to identify factors influencing student and teacher motivation. Data for these studies have been collected using surveys, teacher and student interviews, student focus groups, and classroom observations.

Table 1

Adventure Learning Research Studies

Study reference	**Project**	**Methodology**			**Participants***		**Setting***
		Type	Data	Method of analysis	Teachers	Students	
Doering & Veletsianos (2007)	GoNorth! Arctic National Wildlife Refuge (ANWR) (2006).	Qualitative research	Focus groups interviews with students	Constant comparative method		*N* = 65 Caucasian middle-school students (girls = 45 boys = 20)	Two classrooms in the Midwest and one in the Northwest regions of the US
Doering & Veletsianos (2008a)	GoNorth! ANWR 2006 GoNorth! Chukotka 2007 GoNorth! Fennoscandia 2008	Mixed methods	Teacher surveys, student surveys, student focus groups, teacher interviews	Constant comparative method	*N* = 24 teachers	*N* = 86 students	22 public schools 1 private elementary school 1 community college (HE institution)
Doering & Veletsianos (2008b)	GoNorth! ANWR 2006	Multiple case studies	Classroom observations, focus groups with students, personal interviews with teachers	Constant comparative method	*N* = 5 teachers	*N* = 123 students	3 public elementary schools 3rd, 4th, 5th grade classrooms
Doering et al. (in press)	Polarhusky Arctic Transect 2004	Mixed methods	Teacher interviews Post-implementation survey	Constant comparative method Factor analysis correlational	*N* = 21 teacher interviews *N* = 228 teachers completed		4 special education teachers 1 gifted education teacher

				analyses structural equation model	the survey	5 elementary teachers 7 junior high teachers 1 high school teacher 2 teachers who combined grade levels 1 multi-district curriculum co-ordinator
Doering (2007)	Polarhusky Arctic Transect 2004	Mixed methods	Teacher interviews Survey	Constant comparative method	*N* = 21 teacher interviews *N* = 228 AL users survey	Same as above
Miller, Veletsianos, & Doering, (2008)	Polarhusky Arctic Transect 2004	Phenomeno-logical inquiry	Phenomeno-logical interviews	Hermeneutic phenomenolo-gical analysis	*N* = 1 educator/ explorer Male	A dogsled expedition across Nunavut, Canada

* The extent of detail on participating individuals, classes, and schools varies across the papers.

Our initial analysis included collating all definitions of adventure learning to check for consistency and meaning behind any changes to AL as evidenced by evolving definitions. Doering (2006, p. 200) defined adventure learning (AL) as "a *hybrid* online educational *environment* that provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative online learning environments" (emphasis added). Doering and Veletsianos (2007) note that AL is a "hybrid distance education approach" while the Learning Technologies Collaborative (in press) describe AL as "a hybrid online learning framework" (p. 2) and as an "emerging theory" of online learning (p. 1). The inconsistent terminology in the literature leaves room for interpretation with regards to AL being an environment, approach, framework, or theory. A number of reasons explain why alternative terms have been used to define AL. First, AL is flexible and adaptable, allowing instructors and designers to integrate AL in varied ways in their learning environments (Doering 2006; Doering & Veletsianos, 2008b). Second, AL is a relatively new development in the field, which means that it is naturally evolving, leading researchers to work towards defining its boundaries. The use

of varied terms however creates ambiguity. Our understanding of the literature and work in this area, leads us to deem adventure learning as an *approach* for designing teaching and learning environments, whether those are online or hybrid, or used in face-to-face or distance education contexts[1]. In parallel, an adventure learning framework/model guides the creation of such learning environments.

The evolving nature of AL is supported by the fact that there exist two iterations of the adventure learning approach in the literature. The first iteration (Doering, 2006) situates adventure learning in seven interrelated principles:

- a research- and inquiry-based curriculum;
- opportunities for collaboration and interaction between participating students, teachers, experts, and content;
- use of the Internet for delivering the curriculum and the learning environment;
- timely delivery of media and text from the field to enhance the curriculum;
- synchronized learning opportunities;
- pedagogical guidelines for the implementation of the curriculum and the online learning environment; and
- adventure-based education.

The Learning Technologies Collaborative (in press) adds two principles to arrive at the second iteration of the adventure learning approach (Figure 1):

- identification of a specific issue and location of exploration, and
- delineation of an authentic narrative situating the learning experience.

Figure 1. The second iteration of the adventure learning model: AL 2.0 (from The Learning Technologies Collaborative, in press).

[1] To date, all AL implementations have been in the context of distance education.

To date, the AL projects and curricula described in the literature have been relatively large in size, scope, duration, and funding. Additionally, the projects have occurred in remote and extreme regions of the world and have focused on interdisciplinary socio-scientific issues of global concern (e.g., climate change). Nevertheless, the literature posits that adventure learning may apply to any location, learning experience, and content area (The Learning Technologies Collaborative, in press). Indeed, the second iteration of the AL approach is accompanied by a reformulation of the AL model into a practical guide for instructors to design their own AL projects, indicating a move towards smaller scale projects.

Doering (2006) writes that the utmost value of the AL environment is achieved when the appropriate pedagogy is defined and aligned with the curriculum and online learning environment, while teachers understand the curriculum, its relationship with the online learning environment, and their reinforcing relationship. Pedagogy (Doering & Veletsianos, 2008b), curriculum (Doering, 2007), and the inherent value of technology (Doering, Miller, & Veletsianos, 2008) appear prominently throughout the adventure learning literature. These themes parallel another innovation in the educational technology literature termed TPACK, or technology, pedagogy, and content knowledge (Mishra & Koehler, 2006), derived from Shulman's (1986, 1987) conceptualization of teacher knowledge. Specifically, the TPACK framework of teacher knowledge states that to effectively teach with technology, teachers should have knowledge of the dynamic relationship between technology, pedagogy, content area, and context. Both in the AL and the TPACK literature, deep understandings of these four items, but above all their interrelationships, are fundamental to the development and fostering of effective and powerful learning experiences and environments.

In recognition of the importance of pedagogy, adventure learning studies examined how teachers choose to integrate AL in their classrooms. Specifically, Doering and Veletsianos (2008b) identified four integration models that have been used: curriculum-based, activities-based, standards-based, and media-based approaches. Teachers who integrated AL in a curriculum-based model used the AL curriculum and calendar as they were written; teachers who adopted an activities-based model glanced at the curriculum to choose curricular activities and encouraged student-led activities; teachers who used the program in a standards-based fashion sought to meet the state standards requirements; and media-based integrators used the program and media for technology's sake. While it is commonly assumed that instructors will integrate innovations in the classrooms in a standard and uniform way, contextual factors and the complex nature of teaching and learning prevent homogeneous technology assimilation. The underpinning assumption in Doering and Veletsianos' (2008b) study was that AL integration would vary according to teachers' teaching style, pedagogical beliefs, and preferences; teachers whose teaching philosophy aligned with constructivism, for example, used AL in an activities-based fashion; whereas, others focused on the technology's "wow factor" implementing AL in a media-based manner. This research supports Doering's (2007) argument that the AL curriculum supports teachers' preferred approach to teaching, but casts doubt on the claim that more constructivist teaching occurs when AL programs are integrated in teaching. Notably, Doering et al. (in press) discovered that teachers who espoused constructivist pedagogical beliefs implemented the AL

program more intensely in their classrooms when compared to teachers who reported traditional pedagogical beliefs.

It appears that the flexibility built into the curriculum and learning environment allows AL to be used in unanticipated ways; it is therefore likely that use will align with teachers' pedagogical beliefs. While the AL approach may be grounded on constructivist notions of inquiry-based learning, teachers can repurpose the adventure learning approach according to their own needs and beliefs. Furthermore, the teachers who use AL the most appear to be those who already share the philosophical underpinnings of the AL approach. For example, AL curricula have incorporated three levels of activities, *experience*, *explore*, and *expand*, reflecting Jonassen's (1991) call for authentic experiences that encompass varying levels of difficulty and involvement. While experience activities introduce learners to basic concepts, and explore/expand activities require learners to pose their own questions and to solve their own problems, teachers may choose to focus on experience activities or to use the environment's media to provide quiet time for the children. Whether instructors are willing to adopt different teaching techniques and approaches to accommodate AL in their teaching still remains to be investigated and is a point to which we return in the next section of this paper.

Another focal point in the literature concerns the extent to which AL engages students. Doering (2006) argues that AL captivates and motivates students because it brings authenticity into the classroom. Investigations of the student experience with relation to motivation and engagement appear in Doering (2007), Doering and Veletsianos (2008a, 2008b), and Doering et al. (in press). Overall, the literature highlights student engagement and excitement to participate in AL-supported and AL-initiated learning tasks, collaboration, interaction, philanthropy, and community outreach. Specifically, results from the four research studies noted above indicate that (a) constructivist teachers reported higher student motivation, (b) collaboration and interaction between students, teachers, and explorers engaged learners in the tasks, (c) authentic data and connections provided motivation for students to engage in inquiry, and (d) students' motivation was driven by various facets of the online learning environment. Across all research studies, it appears that the features of the learning environment that engage the students are the

- weekly trail reports (weekly educator/explorer entries to the learning environment),
- dogs (polarhusky dogs that pull the dog sleds on the expeditions),
- send-a-note options (students are given the ability to send notes to the explorers),
- expert chats (participants are given the opportunity to chat in real-time with invited topic experts and explorers), and
- collaboration zones (locations within the learning environment where participants across the globe can contribute and collaborate).

Crucial to the effective implementation of AL is an understanding of the affordances for delivering a successful AL project. Affordances were defined by Gibson (1979) and refined by Norman (1988) as "perceived possibilities for action." Specifically, affordances are suggestions for action that are *perceived* by a user. Kirschner, Strijbos, Kreijns, and Beers (2004) delineated

three types of affordances (pedagogical, social, and technological), and Doering, Miller, and Veletsianos (2008) examined and applied this lens to adventure learning projects (Figure 2).

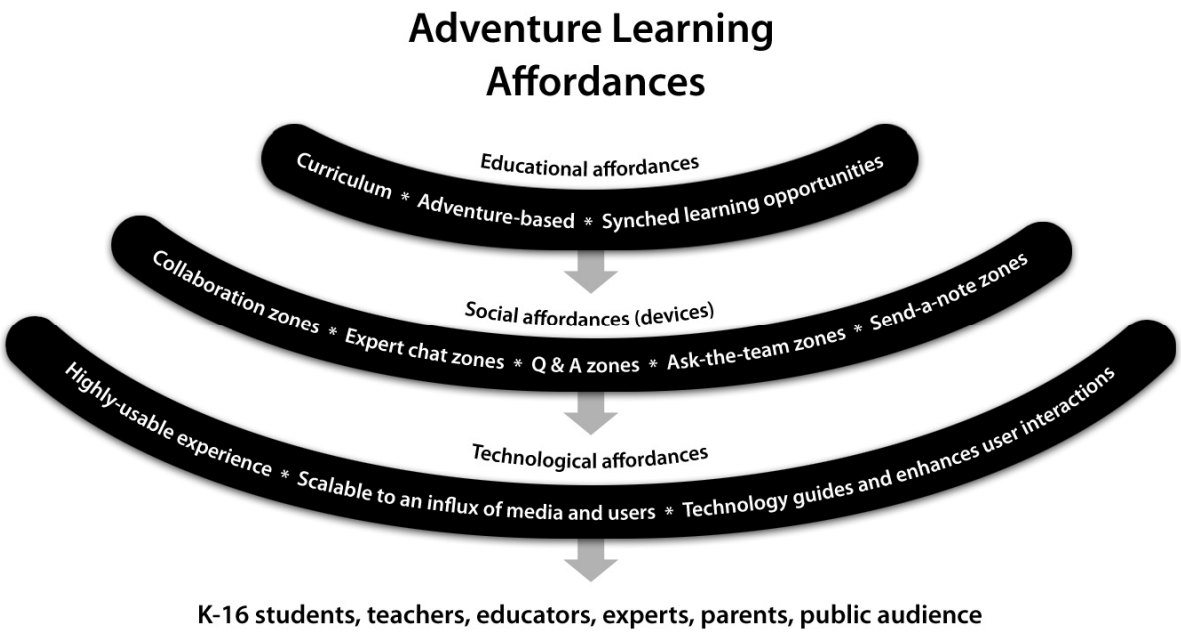

Figure 2. Adventure learning affordances (Doering, Miller, & Veletsianos, 2008).

Importantly, pedagogical, social, and technological affordances work in tandem to foster AL experiences. The implicit assumption behind this work is that educational interventions focusing solely on technological (or social or pedagogical) affordances are ineffective. This assumption echoes years of debate and research in the field regarding the relative focus that researchers should place on technology vis-à-vis pedagogy (Clark, 1994; Kirschner, Sweller, & Clark, 2006; Kozma, 1994) and the extent to which our focus should be directed on a single variable in the teaching and learning process (Tennyson, 1994). In the same way that learning is mediated by cognitive, social, *and* affective processes (Jones & Issroff, 2005), AL environments offer a combination of education-related possibilities for action. Doering, Miller, and Veletsianos (2008) argue that the educational affordances of AL rely on the fact that the curriculum constitutes the heart of AL. The second educational affordance, *adventure based*, draws learners and teachers into an unfolding storyline, while the third educational affordance, *synched learning opportunities*, draws connections between curricular goals, media artifacts, collaboration, and real-life events. Social affordances provide (synchronous and asynchronous) opportunities for collaboration and interaction between the expedition team, experts, students, teachers, and classrooms. Last, the technological affordances of an AL environment ensure usability and scalability while featuring technological innovations that heighten the user experience.

While Doering, Miller, and Veletsianos (2008) present a conceptual evaluation of the affordances responsible for successful adventure learning experiences and environments, Doering and Veletsianos (2008a) apply and research five indicators of "good" instruction to adventure learning

projects derived from Wilson et al. (2008), who argue that learning experiences should be evaluated according to effectiveness, efficiency, learner engagement, socially just outcomes, and transformational impact. Doering and Veletsianos apply these indicators to three years of adventure learning programs and provide evidence for AL experiences attending to all five indicators. Nevertheless, while the authors provide compelling evidence that the adventure learning programs and experiences evaluated are engaging, socially just, and, to a large extent, transformative, the evaluation of the learning effectiveness of the program relies on student- and teacher-reported data. We return to this issue in the next section of the paper.

Knowledge Gaps in the AL literature

The adventure learning approach to education has received wide attention as more than 3 million students and thousands of teachers worldwide have participated in the GoNorth! programs (Doering, 2007). While interest in the approach has been evident and examples of innovative and meaningful student work have been well documented (e.g., Doering & Veletsianos, 2008a), learning outcomes in relation to curricular objectives have not been explicitly assessed. In the cases where attempts were made at evaluating learning, the evaluation depended upon teacher- and self-reported data (e.g., Doering & Veletsianos, 2008a). The AL literature would benefit greatly from future studies evaluating learning outcomes. It is important to note that such evaluations should use assessment strategies that align with the constructivist philosophy and inquiry-based nature of adventure learning. In other words, (a) research so far has not systematically evaluated the learning outcomes of adventure learning projects, and (b) we suggest that traditional assessment techniques (e.g., multiple choice exams) would not be appropriate ways to evaluate the effectiveness of the AL approach.

Additionally, while prior research identified a number of appealing features that were embedded in adventure learning projects (e.g., chats with experts), we see a need for research that specifically focuses on examining these engaging features of the AL approach. The hypothesis that AL can be applied in multiple contexts (The Learning Technologies Collaborative, in press) heightens the importance of gaining understanding of these facets of AL. Exploring the experiences associated with various aspects of adventure learning environments will allow designers and researchers to understand what and how various items contribute to the learning experience. By identifying the granules responsible for powerful AL experiences and researching their contributions and implications, researchers will be able to further enhance educational practice. More specifically, researchers are advised to investigate what current research has indicated are engaging aspects of the adventure learning experience. It should be noted that it may be difficult, if not impossible, to disaggregate these aspects of adventure learning; for this reason, researchers need to devise strategies that investigate these aspects of adventure learning in situ (Brown, 1992), using research approaches devised specifically for understanding real-life situations that cannot be investigated out of context (see next section).

The adventure learning literature has highlighted the flexibility and adaptability of the approach, noting that although AL is grounded on notions of inquiry and experiential learning the designed

interventions allow instructors sufficient freedom to select the components most compatible with their own pedagogy (Doering, 2007). Indeed, as already seen, Doering and Veletsianos (2008b) note different pedagogical models implemented by teachers who chose to integrate AL in their classroom. Nevertheless, we lack knowledge of *which instructors*, in *which situations* choose to implement such interventions in their classrooms. It is possible, for example, that AL is implemented in instances where the local situations and contexts are welcoming of such an innovation. For instance, as indicated by Doering et al. (in press), the teachers who choose to use the AL programs in an innovative fashion may be those teachers whose pedagogical and philosophical beliefs align with the AL approach. Another issue that influences adoption is legislation (e.g., if performance and funding is subject to external exams, teachers and schools may "teach to the test" rather than deviate from it). As discussed by Doering and Veletsianos (2008b), use of the AL program diminished around the time of state and federal mandated exams and testing. In other words, although some teachers may be interested and willing to use such innovations, the incompatibility of this approach with curricula that are standardized and deterministic precludes teachers from implementing AL. Interestingly, and adding another layer of complexity to the points raised above, the AL literature has also noted that some teachers have implemented AL projects in ways that they deemed enabled their students to score higher on the standardized tests (Doering and Veletsianos, 2008b). The literature however does not present a clear picture of how AL was implemented for this purpose and how AL was adapted to fit state and federal mandates.

While current AL literature notes the value that students and teachers find in collaborative activities (e.g., Doering & Veletsianos 2008a, 2008b), the nature and influence of learner participation, interaction, and collaboration with others, in the context of adventure learning, has not yet been thoroughly investigated, even though work on these issues in different contexts (e.g., Scardamalia & Bereiter, in press; Stahl, Koschmann, & Suthers, 2006) might be valuable in guiding future research efforts. For example, it would be worthwhile to investigate

- how students collaborate to solve common problems;
- how global interaction and collaboration influence learners' perspectives of their being in the world;
- the experience of remote cultures of the world that participate in global AL projects,
- the nature of cross-cultural collaboration and its impact on identity, engagement, and cross-cultural understanding (Veletsianos & Eliadou, 2009); and
- the nature of the relationship between learners and experts (with valuable insights from related literature such as the work of Kozma and Russell, 2005).

Furthermore, since learners are also empowered to act as experts in topics in which they are intensely vested (e.g., Inuit children involved in whaling), it would be worthwhile to investigate these students' experiences. What is the impact and meaning of this experience for participants? How does treating learners as valuable and equal contributors in educative endeavors influence their view of education? Is there any identifiable impact on their future educational career? How do they react to future classroom experiences that are "traditional"?

Finally, AL has only been implemented as a distance education approach in the K-12 environment in the context of large-scale projects focusing on socio-scientific issues of global concern. While these projects demonstrate the possibilities afforded by AL, the opportunities, limits, and viability of AL in other contexts need to be investigated. This can be done by designing and researching projects that

- are smaller in size and scope,
- explore other content areas, and
- focus on higher education.

Adventure Learning Projects that are Small in Size and Scope

Doering (2006, pp. 213) claims that "the adventure of AL education does not have to be an extreme Arctic location. The education provided by individuals sharing content from their local environment …will assist students by providing authentic content that makes the unknown real." In the second iteration of the AL approach, the Learning Technologies Collaborative (in press) outlines how mini AL projects can be designed and delivered by individual teachers. The design, development, and use of smaller projects will be a critical factor in the diffusion of this innovation across education. Smaller projects will also highlight further intricacies that need to be accounted for when implementing AL programs.

Adventure Learning Projects that Focus on Diverse Content Areas

By exploring additional content areas in which AL can be implemented, the viability of AL for education can be further evaluated. So far, it has been stated that AL is an approach to education that spans content areas, but research on the issue is lacking. An exploration of additional content areas will assist in answering a question that current research has left unanswered: Is AL an approach to education in general or is it an approach to social studies/science in particular? For instance, let's assume that a mathematics teacher wants to teach the properties of geometrical shapes and visits a building site with his/her students to do so. At the building site, students can take photos and videos, interview the carpenters, and document how mathematics is applicable outside of their classroom walls (Learning Technologies Collaborative, in press). While these activities align with the AL approach, the learning objectives of mathematics also need to be at the heart of the experience: "The development of curricula and online environments must situate the learning in an authentic environment knowing that the experiences are first and foremost for educational purposes, not the thrill of adventure" (Doering, 2006, pp. 201). Thus, when the teacher visits a building site and designs AL-based activities to teach geometry, the activities should align with the learning objectives and theories of mathematics education. For instance, in relation to geometry, Piaget's and Van Hiele's ideas are the most well known (Jones, 2002). Van Hiele's (1986) model, for example, suggests that learners advance through levels of thought. At the first level, students identify shapes and figures according to concrete examples. At the second level, students identify shapes according to properties. At the third, students identify relationships

between classes of figures. Thus, domain-specific models of learning such as Van Hiele's theory of geometrical thinking are invaluable in the design of AL experiences.

Adventure Learning Projects that Focus on Higher Education

Experiential, authentic, participatory, and engaging education isn't only lacking in the K-12 environment, it is also a problem that faces higher education institutions. For this reason, and given the promising outcomes associated with AL, higher education experiences designed in an adventure learning approach would be worthwhile to explore. To date, no investigations have described work in this area, even though we see limitless possibilities for action. For example, what would an undergraduate business, applied arts, or organic chemistry course look like if it was designed using AL principles? What locations could students in these courses visit, what problems and activities could they engage with, and how would learner-expert collaboration look? AL offers valuable opportunities for higher education, where connecting learners with real-life and relevant explorations may be the links missing to make higher education experiential, authentic, and engaging.

Bridging the AL Knowledge Gaps

We have so far discussed the state of knowledge in the adventure learning literature while also noting the knowledge gaps that exist in the literature. We have also attempted to pose lines of development and research that will be beneficial in pushing the field forward. In this section we identify two fruitful approaches to further evaluate and improve adventure learning.

As an educational intervention in teaching and learning, AL departs from the traditional mode of education in that it involves clear connections with authentic and experiential practices, innovative uses of technology, learner-expert collaboration, exciting storylines, and programs of study that focus on connecting individuals with the world outside of the classroom walls. To truly understand such multi-faceted programs we see a need for design-based research aimed at developing an empirically grounded theory through combined study of both the process of learning and the means that support that process (van den Akker et al., 2006). Design researchers work closely with their informants in a close relationship aimed at enhancing both theory and practice (Design-Based Research Collective, 2003) in what becomes a longitudinal cycle of research-informed theory and practice and of practice-informed theory and research. Connecting design-based research with the issue of learning outcomes identified in the previous section of this paper, Walker (2006) notes that design researchers have developed a range of techniques for generating good indicators of learning, such as close ethnographic observation and standard learning tasks with scoring rubrics. Rather than testing knowledge and comprehension, AL-based assessments should investigate learners' expertise in inquiry and synthesis and their development of solutions that tackle real-world issues. Beyond learning outcomes, design-based research can shed light not only on the cognitive and affective domains but also on the conative domain, on the learner's striving, desire, and determination to truly engage with the content area (cf. Reeves, 2006). Finally, design research also aligns with the implicit assumption behind AL 2.0 (The

Learning Technologies Collaborative, in press), namely that practitioners have valuable design insights that improve practice and theory. Empowering the practitioner to develop his or her own AL project also necessitates a willingness to collaborate with the practitioner in enhancing the adventure learning approach by contributing design knowledge to what works and what doesn't work in different contexts (Reeves, Herrington, & Oliver, 2004).

Future investigations could adopt an activity theory perspective to investigate the subjects, mediating artifacts, rules, outcomes, and divisions of labour within the communities participating in AL projects (Figure 3). For instance, the teachers and students who interact with the AL experts form a community that has its own division of labour, tools, and rules: In the GoNorth! Projects, the students expect the expedition team to upload a weekly update every Monday morning. Another example relates to the students following certain rules when they pose their questions to the experts; for example, all questions are moderated by a facilitator before being submitted to the expert who is participating in the day's session. Therefore, students know that some of their questions will be chosen to be answered and other questions will remain unanswered. The tools that students use to interact with others (e.g., collaborative maps) are mediating tools coordinating their activity (Kaptelin & Nardi, 2006). Students', teachers', and designers' goals also vary widely and may misalign. An investigation of the features of AL from an activity theory point of view will shed additional light on the way communities and activities in adventure learning endeavours are formed and enacted.

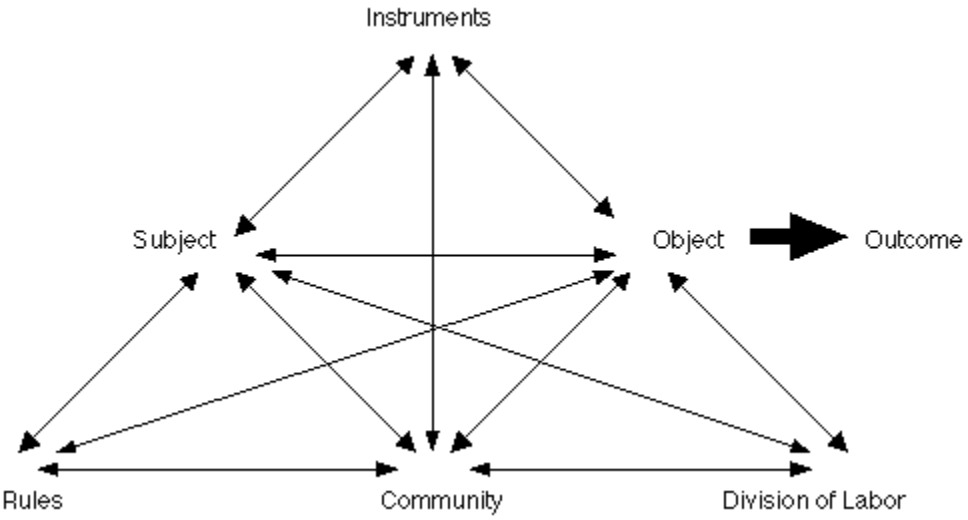

*Figure 3***.** Components of an activity system (from Engeström, 1987).

Conclusion

In this paper, we presented the state of knowledge on the adventure learning approach, identified current knowledge deficiencies, and discussed future research and development directions. While the AL approach demonstrates great potential for enhancing educational practice with the use of technology, we identified ample opportunities for research and development, along with possible research/development venues. Research and design in this area will benefit by (a) taking a design-

based research perspective such that immersion in context and close collaboration between researchers and practitioners enhances both theory and practice, and (b) subscribing to an activity theory lens to further understand the granulations surrounding the diverse forms of activities and (overlapping) activity systems that are in place.

The adventure learning approach to education is grounded in innovative practice, a strong theoretical base, and positive research results, and, as such, represents a powerful development in the field. While adventure learning research, along with research on closely related developments and theoretical foundations upon which AL is based (e.g., Greeno, 1998; Herrington, Oliver, & Reeves, 2006; Scardamalia & Bereiter, in press; Stahl, Koschmann, & Suthers, 2006), is very promising, we see a need for additional investigations into the intricacies of this approach. Further research on the issues identified within this paper will be beneficial in assisting with the evolution, refinement, and maturation of the adventure learning approach. A deeper understanding of the approach and its implications is imperative in furthering adventure learning practice and experiences, and this paper takes an initial step in that direction.

Acknowledgements

The authors would like to thank Professor Julian Williams and Jennifer Jones (http://bit.ly/JenniferDJones) for feedback on a draft of this paper. The University of Manchester's School of Education Research Support Fund financially supported this research. This support should not be taken to represent the views and opinions expressed in this paper.

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Appendix

Table 1

Adventure Learning Research Papers Template

Reference	Project name	Methodology and methods • type of study • data sources • method of analysis	Participants • Sample size • Gender • Sample group (teachers, students)	Setting • grade(s) • type of school	Findings	Proposed future research	Identified shortcomings & problems

Table 2

Adventure Learning Theoretical Papers Template

Reference	Project name	Main points	Implications & recommendations for research and practice	Identified shortcomings & problems

International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

Evaluation of the Undergraduate Physics Programme at Indira Gandhi National Open University: A Case Study

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Vijayshri
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National University of Lesotho, Southern Africa

Abstract

The undergraduate science programme was launched at the Indira Gandhi National Open University (IGNOU) in 1991-92 with an enrolment of 1,210 students. The programme was well received, and enrolments increased over the years. However, the success rates have not kept pace with enrolment.

In this paper, the authors report the results of an evaluation of the undergraduate physics programme at IGNOU. The evaluation, the first of its type for this programme, adapted the major tenets of the CIPP model. The findings are based on the responses from a randomly chosen sample of 509 learners across India. The methods employed for the study include records, document, and database analysis, surveys, and case studies.

Although the University has enhanced access to higher science education, the attrition rate is high (73%), and the success rate is low. The authors recommend that the University review and reorient its strategies for providing good quality, learner-centred higher education in science subjects. The programme should address the concerns of the learners about the effectiveness of the student support systems, the difficulty level, and the learner-friendliness of study materials with the goal of achieving long-term sustainability while maintaining parity with the conventional system. The need for improving the presentation of the courses and simplifying the mathematical details is emphasised.

Keywords: Physics; open learning; science education

Undergraduate Physics Programme at Indira Gandhi National Open University

The undergraduate science programme aimed at providing higher science education through the distance mode at the national level was launched by the Indira Gandhi National Open University (IGNOU) in December 1991 with an enrolment of 1,210 students. The annual enrolment reached 9,973 in 2003 before stabilising at about 6,000 in 2006. The programme design is based on a flexible credit system and is characterised by a three-tier course structure: compulsory foundation courses (24 credits), elective courses to provide for core areas of study in a discipline (56 to 64 credits), and application-oriented courses (8 to 16 credits) to provide rudimentary skills that help to improve the employment prospects of the graduates. Learners who earn 48 credits in elective courses in any one discipline are awarded the B.Sc. degree in that subject (Vijayshri et al., 1998, p. 109).

The programme is flexible and open as far as the course options, the place, and the pace of learning are concerned. It is offered in five science disciplines (physics, chemistry, mathematics, life sciences or botany, and zoology), and students must opt for a minimum of 25% of total elective credits earned in disciplines with experimental components from laboratory courses. The instructional methodology comprises multiple-media self-instructional packages, with print as the mainstay. The assessment has two components: continuous and term-end. IGNOU provides support services to its B.Sc. students through a total of 1,653 study centres (SCs), out of which 150 (SCs) are activated for the B.Sc. programme. (SCs have been activated in reputed institutions [colleges and university departments] of higher learning to ensure that appropriate academic and other support is provided to the students.) The laboratory training and academic counselling for courses in the B.Sc. programme are carried out at all 150 SCs.

The programme has been well received as demonstrated by the increasing enrolments over the years, and it has been welcomed by those who missed the opportunity for higher science education. However, over the years, students, academic counsellors, and physics experts have expressed concerns to two of the authors about the quality of the curriculum transaction, including the laboratory, the effectiveness of the student support system, and the performance and satisfaction of the learners. Another motivation for the study was the decision taken by the Board of Management of IGNOU in 2002 to revise all programmes so that the shelf life of a programme is not more than seven years. To address these issues, it was considered essential to undertake a systematic evaluation of the physics programme, which is offered as a part of the bachelor's degree programme in science at IGNOU. In the present study, the major tenets of the CIPP model have been adapted.

Programme Evaluation

In distance education, programme evaluation encompasses the evaluation of programme objectives, course content, instructional design, support services, assessment practices, student achievements, and use/impact of technology (IGNOU, 2006) so as to improve the quality of

teaching-learning, to enhance the relevance of the programme, to assess how the programme is perceived by its stakeholders and meets their expectations, and to provide regular feedback on the factors that affect outcomes. There exists substantial literature on the theory and methods of programme evaluation (Kellaghan & Stufflebeam, 2003, p. 1-79), which delineates the objectives, approaches, and methods for evaluating a programme (Mishra, 2008, p. 34-46). In the present study, we have adapted the major tenets of the CIPP model (Stufflebeam, 1983, p. 117). The CIPP evaluation model promotes the view that the purpose of evaluation is programme improvement. The process involves four stages of evaluation: *context*, *input*, *process*, and *product*.

A few studies on evaluation of programmes offered in the distance mode are available in the public domain. The PhD programme in Education at the University of the Philippines (UP) Open University has been evaluated using the CIPP model (Quimbo, 2002, p. 196). The study revealed that improvement in significant input and process variables made a positive impact on learner performance. The CIPP model was also used to monitor and develop an evaluation framework for technology-based community learning centres in India (Calder & Patel, 2002, p. 214).

Kapoor (2004) evaluated the Mental Health Nursing Care course – a competency-based course – offered in the B.Sc. Nursing programme at IGNOU and used a model akin to the CIPP evaluation model. The study revealed that the self-learning materials (SLMs) and laboratory experience for this course were interesting and useful but access to electronic media facilities at the study centres was poor, even though tele-conferencing had been made mandatory.

In a recent study, Fozdar et al. (2006) reported a variety of factors (personal, academic, and financial) that were responsible for the dropout of B.Sc. students at IGNOU. The study reported in this paper is comprehensive and the first of its kind on the evaluation of the B.Sc. Physics programme offered by IGNOU. Our evaluation model is essentially summative in intent and structure (Panda, 1991, p. 168). Figure 1 shows the conceptual framework developed for this study based on the theoretical and empirical evidence. Although many aspects of programme evaluation have been included in Figure 1, in the study reported here we have included only the objective set provided below.

Research Objectives

The present study is limited to evaluating the programme for the following:

- access, equity, and relevance to learner needs and expectations;
- success rates of enrolled sampled students; and
- evaluation of the quality, presentation, and usefulness of self-instructional study materials.

Findings pertaining to programme evaluation of other aspects listed in Figure 1, for example the quality of the student support services and the efficacy of the administrative and managerial system, will be reported in forthcoming papers.

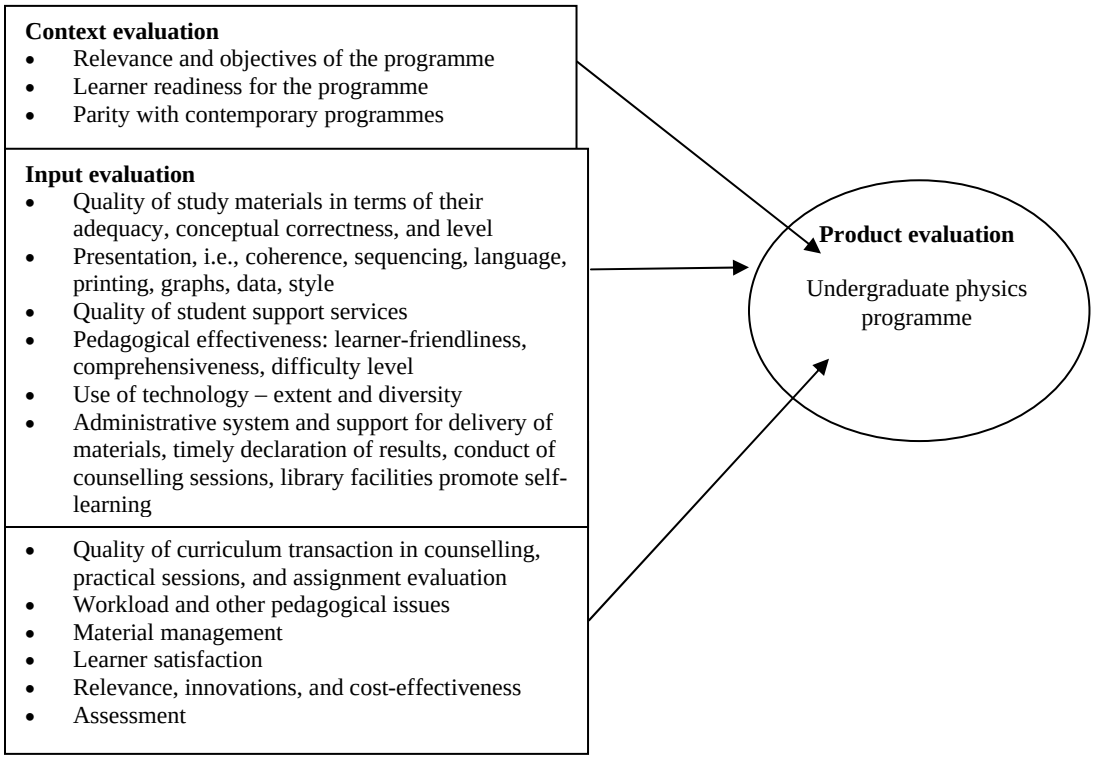

*Figure 1***.** Conceptual framework for evaluation of undergraduate physics programme of IGNOU.

The research design formulated vis-à-vis the objectives of programme evaluation encompasses studying the feedback of primary sources (learners, counsellors, programme designers and developers) on various aspects of the programme, collection of institutional data, and responses of various stakeholders. This study was initially formulated and designed in 2005 following the decision of the University in 2002 that every programme launched more than a decade ago should be reviewed. The period of the study was taken to be from the year 2001 to 2005 because the programme had stabilised by then, and the first batch of learners had completed the maximum period (eight years then but six years now) for completion of the programme.

Research Methods

The following methods were adopted to carry out this study:

- *Records, document, and database analysis*: Institutional data, documents, and records were used to source information on the philosophy, guiding principles and practices for design, development, and offer of the B.Sc. programme and data on various aspects of the programme, namely learner enrolment, learner characteristics (employment status, social status, gender, etc.), and success rates.

- *Surveys*: Questionnaires, interviews, observation, and focus group discussion were used to probe the variables and trends emerging from the analysis of institutional records and

personal interactions of the researchers with various stakeholders. Feedback was obtained through questionnaires (structured, semi-structured, and open-ended) and interviews using multiple channels of communication on aspects such as course curriculum, course content, learning experiences, performance, and outcomes.

- *Case studies*: Case studies of select B.Sc. Physics students were undertaken to bring out the experiences of the learners and to develop a deeper understanding of the issues involved.

Population and Sample

The population for the study initiated in 2005 was distributed over the 146 study centres that were activated by IGNOU for its B.Sc. programme. The prime consideration of the researchers was to select a sample representative of the system and to ensure that the selected centres represented an all-India picture. A survey of the institutional enrolment data of learners for the years 2001 to 2005 revealed that 45-50% of learners enrolled in the B.Sc. programme from the Northern region, 25-30% from the Eastern region, 15-20% from the Southern region, and 5-10% from the Western region.

In this study, questionnaires were administered to about 800 learners and responses were received from 509 students (64%). (One of the researchers personally visited 16 study centres in different parts of the country.) The maximum number of sampled students was from academic session 2005 (224, 43%), followed by academic session 2004 (125, 25%) and academic session 2003 (115, 23%). Only 45 learners in the sample (9%) were enrolled in 2001 and 2002. This indicates that most respondents were in the first, second, and third year of the programme and had the most recent experiences of the programme. Therefore, this sample can be taken as authentic in so far as providing feedback about various aspects of the programme is concerned. The sample size also meets the requirement of 99% confidence level and 5% confidence interval for the average number of students enrolling during the period 1997-2005.

The learner population was sampled at different stages of the study. The objectives of the study suggested that a sample needed to be determined for those who wished to major in physics and pursue higher education and for those who were interested in upward mobility of their career in science laboratories (school/college/university/R&D). A sub-set of 199 learners (39%) who were pursuing the B.Sc. in Physics, out of the total sample of 509, was identified, and information on major trends emerging from the analysis of responses was verified in tele-interviews and face-to-face interactions. The institutional data was obtained from the Student Registration & Evaluation Division (SR&ED) of IGNOU.

Enrolment Pattern in Physics Courses

The enrolment data in various physics courses for the period 2000 to 2006 and its comparison

with the total enrolment data (sourced from institutional records) revealed that

- on an average, about 42% of the total number of learners enrol in the three 1st level courses spread over eight credits;
- enrolment decreases as the level of the courses increases; 37% of learners enrol in five 2nd level courses spread over 16 credits and about 21% of students enrol for 3rd level courses worth 24 credits, out of 32 credits worth of courses available; and
- enrolment in specialised courses is low.

This behaviour suggests that 3rd level physics courses are usually selected by those learners who are interested in pursuing a related master's degree or a career in physics.

Analysis of Institutional Data for Success Rates of Learners

The success rates, retention rates, and performances of learners are important indicators of the acceptability and sustainability of a programme. To discover these for learners opting for physics electives (listed in Table 1) or opting to pursue a major, the institutional data was scrutinised. It revealed the following:

- 63,478 learners enrolled in the 1st year of the B.Sc. programme up to the 2007 admission year. Of these, 28,935 learners (46%) enrolled in the 2nd year and 17,289 (27%) enrolled in the 3rd year. Thus, the retention rate in the B.Sc. programme is about 27% and the attrition rate is about 73%. This indicates that IGNOU has created opportunities for learning higher science at a distance, but there is a need to devise effective strategies to enhance the programme completion rate.
- Until the 19th convocation held in 2008, only 3,000 learners had earned the B.Sc. degree, which means that only about 5% of the total enrolled learners and 17% of those who enrolled in the 3rd year were able to complete the programme successfully. Of these, 1,443 learners had earned the general B.Sc. and 1,557 had earned a major in specific science disciplines (botany, chemistry, life sciences, mathematics, physics, and zoology); 346 earned the B.Sc. in Physics. Obviously, this dispels the fear that science cannot be learnt at a distance. But the low success rate of learners has implications for the University as far as reviewing its strategies for programme design, development, and implementation are concerned.
- Of the successful physics learners, 82% took 3 to 6 years, 9% spent the minimum period of 3 years, about 33% took 4 years, and 28% spent 5 years. This means that learners begin to lose motivation after about 7 to 8 years.

In Table 1, we have listed year-wise pass percentage in physics electives PHE-01 to PHE-14 (offered until 2005) through the years 2000 to 2005 based on the institutional records. The numbers in brackets indicate the credit weight of each course. The corresponding values of

average pass percentage, standard deviations, and t-values are also given. We discovered the following:

- The success rates of learners opting for physics electives vary from about 28% to 53% in theory courses and 65% to 98% for practical courses.
- Learner performance at all three levels shows statistically significant differences in laboratory courses vis-à-vis theory courses, being far better in the former, possibly due to F2F interaction with teachers in the laboratories. The difference in mean pass percentages is statistically significant in the laboratory courses at different levels, with student performance improving as the level of the course gets higher. This finding correlates well with the enrolment pattern, which shows that the higher level physics courses are opted for by students pursuing a physics major degree.
- The difference in mean pass percentages in theory courses is statistically not significant at any level, except PHE-06 vis-à-vis other theory courses at the second level and PHE-11 vis-à-vis other theory courses at the third level. It is clear that learners perceived these courses as difficult, although no radical changes in the contents were suggested either by the experts or by the counsellors of these courses. This reflects a gap between the perceptions of the learners and of the providers, and there is a need for improvement in the course presentation, in the review of term-end examination (TEE) question papers, and in the quality of academic support.
- There is no statistically significant difference in the performance of learners in pre-requisite courses at any level (PHE-10 and PHE-07; PHE-14 and PHE-04/PHE-05; PHE02 and PHE-09

Table 1

Year-Wise Pass Percentage in Physics Electives in the Period 2000-05

Course Year	**PHE -01 (2)**	**PHE -02 (2)**	**PHE -03L (4)**	**PHE-04 (2)**	**PHE-05 (2)**	**PHE-06 (4)**	**PHE-07 (4)**	**PHE-08L (4)**	**PHE-09 (4)**	**PHE-10 (4)**	**PHE-11 (4)**	**PHE-12L (4)**	**PHE-13 (4)**	**PHE -14 (4)**
2000	34	24	-	-	51	19	36	-	13	50	10	-	-	-
2001	32	27	53	47	32	14	49	64	26	37	12	-	-	-
2002	55	45	60	48	50	26	57	59	45	61	44	100	-	66
2003	26	26	47	25	48	24	54	66	37	49	16	94.2	30	57
2004	18	22	69	43	44	21	45	72	39	30	20	98.3	36	46
2005	29.2	25.2	98.6	48.8	33	34	29.2	98	48	38.2	53	98.4	59.3	43
Mean	32.4	28.2	65.5	42.4	43	23	45.0	71.8	34.7	44.2	25.8	97.7	41.8	53
Std Dev	12.4	8.40	20.23	9.96	8.49	6.81	10.69	15.37	13.06	11.21	18.12	2.47	15.48	10.55
t-value	2.571	2.571	2.776	2.776	2.571	2.571	2.571	2.776	2.571	2.571	2.571	3.182	4.303	3.182

PHE-01: Elementary Mechanics; PHE-02: Oscillations and Waves; PHE-03L, 8L and 12L Physics Laboratory-I, II and III; PHE-04, PHE-05 and PHE-14: Mathematical Methods in Physics – I, II and III; PHE-06: Thermodynamics and Statistical Mechanics; PHE-07: Electric and Magnetic Phenomena; PHE-09: Optics; PHE-10: Electronics and Electrical Circuits; PHE-11: Modern Physics; PHE-13: Physics of Solid

The one-way ANOVA test, which can be thought of as an extension of unpaired student t-test, was carried out for analysis of variance for two sets of theory and lab courses. The calculated *p* and *F* values for the lab courses are respectively 0.02 and 5.31. The value of *F* is greater than the theoretical value of 3.98 indicating that the average pass percentages in lab courses are statistically significant. But in the case of the Mathematical Methods in Physics courses, *p* and *F* values are respectively 0.223 and 1.71 (< 3.89), indicating that in this case average pass percentages are statistically not significant.

Analysis of the Feedback Data and Major Findings

We now present the findings of our study in respect of the profile of respondents, learners' feedback on course materials, and their validation by counsellors and programme developers. The results have been presented chiefly through computation of percentages.

Respondents' Profile

The basic characteristics of 509 sampled learners revealed that the sampled population was predominantly urban (89%) and belonged to the non-Scheduled Caste/Scheduled Tribe category. (These have long been marginalised sections of Indian society, deprived economically, socially, and educationally.) A significant majority (84%) was over 21 years, male (70%), and lived far (25-50 km) from the study centres (68%); a learner might take 2-3 hours commuting each way, depending on the geographical location and availability of transport. The population of employed

and not employed learners was nearly equal, and English as the medium of instruction was not perceived as a barrier.

To explore the reasons for the low success rates, learner responses on the time they devoted to their studies and on their study habits were examined. The findings are given below.

Study Time and Study Habits

In view of their societal, familial, and personal commitments, distance learners invariably experience acute shortages of time. And a frequently asked question concerns the number of hours they must study everyday or in a week to successfully complete a programme in the minimum time without compromising the quality of learning. This has implications for course design, development, and student workload. Our analysis showed that 51% of learners (252) put in more than 6 hours per week; however, half of the students spend, on an average, less than one hour per day.

Unfortunately, no document advises learners that spending 2-3 hours on an average everyday is necessary for successful completion of the programme in the minimum specified duration of three years. Although in all physics electives, the learner is advised about the estimated time s/he is expected to spend on each unit, block, and course, it is suggested that the programme developers/faculty members should also advise learners about the average time they must spend everyday to successfully complete the programme in minimum time. It is therefore desirable to include a detailed guide in the learners' programme materials on 'how to study on their own at a distance' and reinforce this advice in counselling/orientation sessions through electronic media as well as through F2F counselling at the study centres.

In response to the specific question on how they study the print materials (e.g., a new block/unit), 361 learners (74%) reported that they began to read the unit from the beginning, and only 24 learners (5%) read the block introduction and the study guide to the block. Fifty-five learners (11%) began from the structure, 22 (4.5%) read the course objectives, and 14 (3%) gave comments such as lack of time, consulting other reference books, highlighting main points. This shows that the majority of sampled learners were serious about their studies, and they should be advised about the importance of the objectives in every unit as the yardstick against which they are tested and against which they should measure their learning achievements.

Learners' Feedback on Course Materials

Quality of print materials

Printed self-instructional materials form the backbone of instruction in IGNOU. Other media (A/V and web-based) are used as supplements only. Therefore, evaluating various aspects related to teaching-learning through the course materials was a major concern of the researchers. The data analysis revealed that 99% of responding learners appreciated the courses and the majority of

learners rated the courses as *good* (293, 66%), although the teacher only communicated with them *sometimes* (403, 82%) (in text), and the study material was partially *self-instructional* (316, 65%). Considering the breadth of course material, three out of four learners (374, 75%) opined that the material was adequate; whereas, 64 learners (13%) thought otherwise. In addition, 60 students (12%) found the material lengthy. But learners who did not find the courses adequate gave no suggestions on the topics to be included or deleted.

A majority of respondents (413 out of 496) reportedly needed help to learn the courses. The major reasons cited were *high content density*, *difficulty in following the mathematical treatment*, *paucity of good diagrams*, and *lack of sufficient number of examples and exercises for practice*. From these findings one may conclude that the learning materials do not fully substitute for the teacher, and it is prudent to revise them by addressing the concerns of learners.

Relevance of course content.

A significant majority of respondents (400, 83%) perceived the course content as relevant, while 16 learners (3%) opined that the materials were not relevant, and 65 learners (13%) were undecided.

Presentation of print materials.

The analysis of the data on sequencing and presentation of printed study materials revealed the following:

- 87% of respondents (381 out of 438) preferred a statement of the objectives at the beginning; whereas, 12% of learners (54) opined that they be shifted to the end of the unit. However, no argument was given in support of either choice.
- 91% of respondents (443 out of 489) perceived the summary as useful.
- 82% of learners (405 out of 492) expressed satisfaction on language comprehensibility. However, 67% of learners (333) would like more illustrations, which has important pedagogical implications as a figure can effectively communicate intricate patterns/behaviours.
- 84% of responding learners (413 out of 492) found the learning materials to be of a high academic standard.

Formative self-assessment.

The in-text self-assessment questions (SAQs) and terminal exercises (TQs) in the course materials are intended to clarify concepts further and to provide opportunities for self-learners to assess their understanding of the content. In our sampled population, 140 learners did not respond to the question on whether they attempted the self-check questions/exercises/activities included in their study materials. Of 369 learners, 347 (94%) reported that they attempted SAQs and TQs. This suggests that about 30% of learners in the sample were not self-evaluating. A large number

of students (415, 86%), in spite of advice to the contrary, checked the SAQ answers sometimes before attempting them. However, SAQs were found most helpful in clarifying difficult concepts by 484 out of 496 respondents (97.6%) (Table 2). And only a few learners re-wrote answers if they were not satisfied with their responses.

Table 2

Usefulness of In-Text Questions to Understand Content

Response	**Respondents***
Very helpful	144 (29)
Reasonably helpful	340 (69)
Not helpful at all	12 (2)
Total	**496 (100)**

*No response = 13

Table 3

Ways Learners Found Self-Assessment Questions Helpful

Response	**Respondents***
Help to clarify concepts	146 (43)
Help solve assignments and pace learning	55 (16)
Provide useful feedback on the understanding of subject	40 (12)
Help prepare for TEE well	101 (29)
Total	**342 (100)**

*No response = 1

Although few learners responded to the question about their preferred type of SAQ (objective type: multiple choice, fill in the blanks, matching, true/false; short answer type: sequencing, numerical; and long answer type: derivation, application), from personal interactions with the students, the researchers have formed the view that multiple choice questions in the objective type, numerical in the short answer type, and applications in the long answer type should help learners to gain mastery over the subject.

In Table 3, we have listed the responses to the open-ended question about the ways in which learners found the SAQs helpful. In a nutshell, SAQs and TQs play an important role in facilitating learning. The implications of these findings for course developers are that the number of in-text questions should be increased, and they should be diverse; the problems should correlate learning with real-life situations; and the questions should be sequenced in order of difficulty and of learning objectives.

Difficulty level of learning materials.

The learners were asked to rate the difficulty level of concepts, mathematical derivations, examples and exercises, assignments, etc. on a four-point scale.

Table 4

Learner Rating of Difficulty Level of Materials

Aspects	Easy	Slightly difficult	Difficult	Very difficult	Total
Explanation of concepts	157 (32)	250 (51)	78 (16)	4 (1)	**489 (100)**
Correlating knowledge with surroundings	121 (27)	252 (55)	77 (17)	3 (1)	**452 (100)**
Mathematical derivations	125 (26)	162 (34)	169 (35)	24 (5)	**480 (100)**
Examples and self-check exercises (SAQs – TQs)	300 (64)	130 (28)	34 (7)	6 (1)	**470 (100)**
Assignments	99 (20)	166 (34)	184 (38)	37 (8)	**486 (100)**
Presentation of concepts	196 (42)	205 (44)	55 (12)	10 (2)	**466 (100)**

The data given in Table 4 suggests that more than 80% of responding learners consider the following as easy or slightly difficult: explanations/presentation of concepts, correlation of knowledge with immediate surroundings, quality of examples, and self-check questions (SAQs and TQs). However, 40-45% of responding learners find mathematical derivations and assignments difficult or very difficult. This could be the major reason for the lack of satisfaction of learners with materials. It would be worthwhile to provide complete derivations without skipping in-between steps.

Learner feedback on course materials obtained through questionnaires and interviews informs us that the level of materials should be moderated, and their presentation should be in tune with learner capabilities, expectations, and interests. It is prudent to improve the presentation by reiterating important definitions and highlighting them in boxes, for example, and by incorporating more illustrations, bar charts, tables, and solved and unsolved examples. Mathematical steps in the text should be explained in detail and continuous assessment through assignments should be in consonance with course contents. These findings may serve as general guidelines for developing revised versions of the courses. In the ultimate analysis, the revised version of each course should address course-specific learner feedback.

Learners in IGNOU come from varying backgrounds and constitute a heterogeneous group in competences, skills, and learning styles. But it seems that programme designers and developers

have pitched the physics courses at a level higher than that expected by an average learner due to the over-riding concern for parity with conventional universities. This means that all physics courses should be moderated by simplifying language, by including more examples, diagrams, and pictures, and by solving intermediate mathematical steps. Modifications may also include regional requirements, practices, and variations. These findings have significant implications for learner performance and retention, programme revision, implementation, and sustainability. These provide crucial input for distance educators in their efforts to promote effective and active self-learning and to bridge the gap between the perceptions of programme designers/developers and learners.

Analysis of Responses of Learners Pursuing the B.Sc. Degree in Physics

In the sample of 509 learners, 199 learners were pursuing the B.Sc. Physics degree. While this sub-group, in general, exhibited behaviour very similar to that of the sampled population, a few distinguishing features emerged. These are outlined below:

- The percentage of majoring respondents who intended to pursue research as a career rose to 41% (from 21% in the total sample).
- A greater proportion of majoring respondents, who attended counselling sessions every week, perceived mathematical derivations, examples, and exercises as easy.
- While 77 learners needed guidance in only the theory courses, 106 learners needed guidance in both theory and laboratory courses.

The credit completion status of 193 responding major learners at the time of the study is given in Table 5. For comparison, we have also included the status of 295 non-majoring and 488 of the sampled population. A closer examination of the status of 42 majoring learners who had completed 76-100% of credits revealed that 30 learners had completed the B.Sc. in Physics and 12 were about to complete all courses. Moreover, the percentage of learners earning more than 25% but less than 50% of the credits was more for the majoring group. So we can conclude that the completion rate of the learners intending to earn the B.Sc. in Physics within the stipulated time period of 3-6 years is better than that of non-majoring students.

Table 5

Credit Completion Status of Different Groups of Learners

Group **% credits completed**	**Majoring sub-group*** ***N* = 193**	**Non-majoring sub-group** ***N* = 295**	**Entire sample**[$]
< 25	59 (30.6)	89 (30)	148 (30)
26 – 50	61 (31.6)	65 (22)	126 (26)
51 – 75	31 (16)	39 (13)	70 (14)
76 – 100	42 (21.8)	102 (35)	144 (30)

* 1 dropped and 5 changed electives; [$] 5 dropped and 20 changed electives

Laboratory Instruction

In imparting instruction in science at a distance, practical training is construed as the major impediment by conventional peers. To provide an interactive, creative, and stimulating experience, the physics curriculum in IGNOU places greater emphasis on day-to-day work in the lab, which is accorded 70% of the final grade. The detailed findings have been presented elsewhere (Mishra et al., 2008). It may suffice to say that contrary to the expectations of the purists among academia, learners preferred to earn the maximum possible credits in practical/lab-based courses. But the basic considerations of learners seem to be full-time F2F guidance, a high success rate, and better grades. About 90% of distance learners opined that lab sessions were well planned and structured, lively and stimulating, and helped them to learn a lot of good physics; further, they looked upon practical sessions as an enjoyable experience. But some of these findings were not confirmed by the faculty. Moreover, there seems to be no correlation in the grades of learners in practical and theory courses (Khare et al., 2004).

Case Studies

To validate the patterns and characteristics emerging from the analysis of the responses of the majoring cohort, a research tool was administered on five learners in the form of case studies. Their written responses received by email were followed up by telephone interviews. Among the reasons they gave for joining IGNOU were a lack of time for full-time studies and the opportunity to pursue other courses simultaneously. The researchers encouraged them to give their frank assessment of the quality of course materials and of how the B.Sc. Physics degree helped them to shape their careers. They were also asked to suggest ways to improve systemic efficiency and to promote learner performance.

The programme-specific strengths identified by the respondents included flexibility in the choice of subjects and in the pace of learning, quality of learning materials, and equal opportunity to study science at the tertiary level. But limited use of ICTs in the teaching of physics and non-inclusion of project work and computer courses in the curriculum were identified as the major deficiencies.

Feedback from Counsellors and Programme Developers

Fifty-four counsellors were shortlisted to provide feedback: 34 sent their responses by post (group I), and 20 were interviewed in person (group II). The majority of respondents were male (45) and possessed a PhD degree; some of them were university professors/former heads of department/principals of colleges. All of them had good exposure to the courses being counselled, and many were counselling more than one course. The spread of their institutions ranged from leading institutions in cosmopolitan cities to lesser known colleges in towns. We can safely assume that their responses represent a rich pool of diverse practices, comparative positioning of courses, and learning environment/habits/styles of IGNOU learners enrolled in this programme.

To know how counsellors perceived physics materials, specific questions were raised about curriculum design, content presentation, difficulty level, and possible improvements. Twenty-one group I (91%) and 19 group II respondents (95%) found the content coverage to be appropriate, and, in their view, the curriculum did not warrant major changes. However, both groups recommended the inclusion of more examples (65%) and SAQs/TQs /unsolved exercises (74%), and that in-between mathematical steps should be worked out in detail to make materials more learner-friendly (94%). This validated learner feedback on different courses. Academic counsellors would like students to be trained in problem-solving skills that enable them to correlate their learning to their lives/surroundings. They also suggested that question banks should be developed for each course, and questions of different types, such as multiple choice questions in the objective type, numerical in the short answer type, and applications in the long answer type, should be included to help learners acquire mastery over the subject.

A significant majority of respondents in both groups (86%) found the format and style of presentation adequate and unanimously recommended that these be retained as such. However, their opinion on the need to give more explanations of concepts that were difficult to visualise or comprehend was sharply divided; although, the majority (60%) viewed them to be adequate. About 76% of responding counsellors consulted IGNOU materials while preparing their own classroom lectures. It was encouraging to discover that 84% of responding counsellors would like to procure these materials for their library so that their full-time students may use them. This is an indication of the national acceptability of the quality of the physics materials, and it may be regarded as a spin-off effect of IGNOU's efforts to meet a felt need for good text materials at an affordable cost. This should help bridge the gap in the quality of higher education provided by different universities and colleges in India.

Eighty-three percent of learners reported that owing to higher standards, a self-learner needed outside help. This perception was confirmed by the majority of counsellors. When a question was raised about the books/reference materials consulted by the learners, it was astonishing to learn from the counsellors' feedback that a significant number of learners looked for 'physics made easy' types of guidebooks. This has implications for the course developers to produce more learner-friendly study materials.

The majority of group I respondents (61.8%) rated the materials as very good. They found the language lucid and its comprehensibility high. As such, most of the figures were considered good; however, in their view, coloured or 3-D diagrams would improve quality further. Some very useful suggestions on deletion/reorganisation/inclusion of content were also made.

Separate tools were administered on programme designers/developers/experts. The programme designers and developers, including the in-house faculty, are subject experts, and they guide the process of material design/development by maintaining a fine balance between established and emerging bodies of knowledge. As a result, it is expected that learners are trained in the latest trends and practices in addition to the essentials. In these investigations, the researchers solicited responses from 35 experts.

Their feedback revealed that

- the undergraduate physics curriculum was relevant, up-to-date, and at par with the best universities in the country;
- courses had been pitched appropriately but due to limitations on the number of pages in printed blocks, the content density might appear high;
- learners should be provided separate booklets to put greater emphasis on problem solving; and
- IGNOU should start a M.Sc. in Physics programme with options for applied as well as theoretical fields.

It may be pointed out here that IGNOU's Physics faculty has undertaken detailed revision of learning materials on the basis of the feedback obtained from different stakeholders. In this process, the course contents have also been revised with additions and deletions, where appropriate, to avoid repetitions and to update the curriculum. The revised study materials for the first-level courses are to be sent to learners for the January 2010 session, and their impact on learner performance shall be assessed in due course of time.

Conclusions and Recommendations

The learners in the sampled population were predominantly urban, adult males, who lived far from the study centres. Their seriousness about studying the courses is beyond doubt, though they need to be guided clearly about how best to study the courses. Since enrolment in the programme grew with time, one can say that the University has succeeded in providing access to higher science education to a diverse learner population across the country. However, a high attrition rate (73%) and a low success rate have significant implications for the students, the programme developers, and the University. Though course materials have been rated to be of high quality, relevant, useful, and on par with the best in the country, the need to improve the presentation of the courses and to simplify the mathematical details is also emphasised by all concerned.

The authors recommend that course developers include more and varied in-text questions. Also, the problems should correlate learning with real-life situations, and the questions should be sequenced in order of difficulty and of learning objectives. The level of available materials must be moderated, and important definitions should be reiterated and highlighted in separate text boxes. As well, more illustrations, tables, and solved and unsolved examples are needed, and all in-between mathematical steps should be worked out. Finally, question banks with answers should be developed and provided to learners to facilitate their preparation for term-end examinations and to improve their satisfaction levels.

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International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

The First Doctoral Program in Distance Education in North America

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Athabasca University's Doctoral Program in Distance Education

The Doctor of Education (EdD) in Distance Education program at Athabasca University in Alberta, Canada was proposed in 2003. The program underwent a two-stage Alberta government review process and was approved in February 2007. This professional doctoral program is the first program of its kind in North America, combining advanced knowledge with research by connecting the university, the profession, and the workplace. The primary goal of the program is to provide doctoral students with rigorous and complete preparation to assume senior responsibilities for planning, teaching, directing, designing, implementing, evaluating, researching, and managing distance education programs (Athabasca University, Centre for Distance Education, 2008a). Based on a cohort model, the program begins with a five-day, face-to-face orientation workshop, followed by six online courses (18 course credits), a candidacy examination, and a dissertation defense. Courses include a variety of asynchronous and synchronous activities using technology-mediated conferencing.

The EdD (Distance Education) program at Athabasca University officially began in August 2008. Fifteen students were admitted into the first cohort of this program (13 students accepted admission). The following article will outline the historical development, program design, and innovative features of this new program. Further, the author will provide insights into students' initial reactions and early experiences during the first year of this program from the perspective of a student in the program.

Athabasca University

Athabasca University (AU) was established on June 25, 1970. AU was originally conceived as a traditional campus-based educational institution; however, in 1972, after a change in government, it changed direction to become an open, distance university. On April 12, 1978, AU achieved self-governing status and became fully accredited by the Government of Alberta as the province's fourth public university. In 2006, AU became the first Canadian public university to receive accreditation in the United States through the Middle States Commission on Higher Education (MSCHE) (Athabasca University, 2009). The university's philosophy is based on the key

principles of excellence, openness, flexibility, and innovation (Athabasca University, 2009). It is committed to excellence in research, teaching, and scholarship.

Athabasca University currently offers over 700 courses in nearly 90 undergraduate and graduate degree, diploma, and certificate programs. The university focuses on providing flexibility of access and effective student support. Today, AU is one of the world's fastest growing online and distance education institutions, serving over 37,000 students worldwide. It has an annual operating budget of $118 million, employs over 1,200 faculty and staff members on four Alberta campuses, and generates more than $3 million annually in research activities (Athabasca University, 2009).

Prior to the commencement of the Doctor of Education in Distance Education program, AU offered eight graduate degree programs, all at the master's level:

1. Master of Arts – Integrated Studies,
2. Master of Business Administration,
3. Master of Business Administration in Project Management,
4. Master of Counselling (a part of the Campus Alberta Applied Psychology Partnership),
5. Master of Distance Education,
6. Master of Health Studies,
7. Master of Nursing,
8. Master of Science – Information Systems. (Athabasca University, 2007, p. 13)

Doctor of Education in Distance Education at AU

The Doctor of Education (EdD) in Distance Education at Athabasca University is a professional doctoral degree (Athabasca University, Centre for Distance Education, 2008a). Professional degrees are currently available in disciplines such as education, health, law, psychology, management, the creative arts, and science (Neumann, 2005). The intended audience for this degree is practitioners and those with career experience in distance education.

The doctoral program, though relatively new in most professional fields, has a well-defined set of objectives and competencies:

1. understanding of and proficiency with professionally relevant knowledge and practice,
2. advanced research and communication skills, and
3. opportunity for advanced practice and socialization within a professional community. (Athabasca University, Centre for Distance Education, 2008a)

The professional doctoral degree fuses research and advanced knowledge by connecting the university, the profession, and the workplace (Neumann, 2005). To the professional workplace, the university brings experience and enables the linking of theory with practice, teaching, and research (Athabasca University, Centre for Distance Education, 2003). It is through the

sponsorship of advanced professional study that the university increases its ability to provide resources, support, motivation, and credentialing for knowledge generation, research, and teaching in the field of study. In addition, the professional doctoral program also benefits from greater integration within the professional community (Athabasca University, Centre for Distance Education, 2003).

This transition to the professional workplace is aligned with Athabasca University's tradition of expansion of opportunity and openness for students (Athabasca University, Centre for Distance Education, 2003). It leads to skill development that is valued in the professional community and acts as a "visible indicator of Athabasca University's contribution to innovative forms of higher education and community service" (Athabasca University, Centre for Distance Education, 2003). Accordingly, the research component of the doctoral degree will lead to the discovery of new knowledge and the dissemination and implementation of such in the professional community (Athabasca University, Centre for Distance Education, 2003).

Development, design, and features.

In 2003, the Centre for Distance Education (CDE) at Athabasca University put forth a proposal for its first doctoral program in Distance Education. This program proposed to deliver the first online (non-residential) distance education doctorate in North America, offering a high-quality, alternative delivery program to graduates of AU's successful master's program in Distance Education (MDE) in addition to graduates of other master's programs (Alberta Advanced Education and Technology, 2008). The first convocation of MDE graduates was held in 1998. Since that time, MDE students, and others, have expressed a growing interest in pursuing a doctoral program in distance education (Advanced Education and Technology, 2008).

The objectives put forth for the doctoral program include the following:

1. to deliver a distance-accessible program which meets and exceeds current standards for doctoral programming for the advanced education of scholars and researchers in distance education;
2. to serve students seeking a doctorate in distance education who do not have access to an appropriate graduate program, or who prefer to pursue their graduate studies at a distance;
3. to provide a continuation to the current MDE program by providing doctoral studies to suitable graduates of the program; and
4. to meet the needs of a wide range of practitioners, scholars, and researchers in distance education, as the field evolves and expands. (Athabasca University, 2003, p. 13)

The target population for AU's doctoral program in Distance Education is individuals who have completed a graduate degree and who are involved currently in distance education. The online nature of the program facilitates access to students in non-urban areas, individuals with disabilities, students who are employed and who wish to study while continuing to work, and other potential students for whom the pursuit of a doctoral degree through a traditional

educational institution would be difficult or impossible (Athabasca University, Centre for Distance Education, 2008e).

Potential students include the following:

- individuals in mid-career in distance education occupations, or in adult education and continuing education fields, as well as those responsible for policy development and implementation of distance, virtual, or alternative educational programs;
- those who wish to augment readiness for promotion or further growth in their careers, or to prepare for career change;
- individuals who are unable or unwilling to interrupt their careers to undertake a full-time, campus-based doctoral program, or who prefer the distance learning conditions of the online program;
- professionals with advanced degrees in various disciplines (e.g., university and college academics, teachers, instructors), who wish to specialize in aspects of distance education research and scholarship;
- senior-level staff in corporate, military, and industry training environments;
- instructional design specialists, senior-level managers and program planners, and others in areas related to the development of complex instructional systems. (This is an area where the proliferation of advanced educational technologies has resulted in the need for new learning systems design, development, management, evaluation, and research.);
- those employed in other areas related to the development of alternative or virtual learning systems, with mediated interaction among participants. (Athabasca University, Centre for Distance Education, 2008e)

Admission to the program is highly selective, with an intake target (exceeded in both of the first two intakes) of 12 students annually (Athabasca University, Centre for Distance Education, 2003). At year 4-5, the program will reach a steady state of approximately 40 students based on a projected student attrition of 33% over the course of the program. The program may be completed within seven years; however, most students are expected to complete it within four to five years (Athabasca University, Centre for Distance Education, 2003).

Core learning outcomes include the following:

1. development of analytic, evaluative, and procedural competencies in distance education as a field of study and practice, including historical and contemporary models and trends, and seminal research;
2. integration of the theoretical and practical application of available and prospective distance education delivery methods, their characteristics, economies and diseconomies, indications and contra-indications in practice, and their management, planning, and assessment requirements;
3. development of a theoretical framework regarding the use of technology-mediated instructional methods for the practical application of these methods in distance-delivered courses;

4. development of analytic, evaluative, and procedural competencies in research design, practice, and dissemination, including oral presentation and writing skills;
5. application of various systems approaches to problem identification, analysis, and resolution, including management of complex operations and program development and coordination skills;
6. development of a theoretical framework and practical skills in the use of assessment strategies and evaluation methodologies in distance education;
7. application of teaching and learning principles within the context of a variety of distance education modalities, both as a learner and as an educator;
8. development of a theoretical framework regarding leadership models and change theories within the context of distance education organizations. (Athabasca University, Centre for Distance Education, 2007)

The doctoral program uses a cohort-based model. After students are admitted each year, they progress as a group through each phase of the program. This type of delivery format promotes collaborative learning and the development of a scholarly learning community. Secondarily, the cohort-based model may assist with program management and potentially may have administrative cost-savings benefits (Athabasca University, Centre for Distance Education, 2007). Initially, a five-day, face-to-face orientation workshop is conducted at AU for students and faculty to meet, to collaborate, and to be involved in program planning, community-building, and technological training activities. The program components consist of six online courses (18 course credits), a candidacy examination, and the completion of a dissertation and a dissertation defence.

The six program courses are described below:

1. Advanced Topics and Issues in Distance Education (3 credits) – current activity and thinking in the field of distance education; issues and topics, including relevant research;
2. Advanced Research in Education (3 credits) – distance education qualitative and quantitative research and evaluation studies; characteristics of good research and research methodology in distance education;
3. Teaching and Learning in Distance Education (3 credits) – advanced topics on teaching methods, research on teaching, and the development and delivery of distance courses;
4. Leadership and Project Management in Distance Education (3 credits) – leadership theories and practices and their application to the management and governance of distance education; management of change frameworks in distance education;
5. Research Seminar I (3 credits) – a supportive environment to engage in active discourse about dissertation research, including proposal writing, advanced research methods, and analyses;
6. Research Seminar II (3 credits) – active research and dissertation writing; opportunities to engage in scholarly discourse about dissertation research; exchange of ideas, discussion of experiences, and examination of the means for communicating the results of investigations. (Athabasca University, Centre for Distance Education, 2009b)

The design for these courses includes a variety of delivery modes such as print, online, and face-to-face, comprising synchronous and asynchronous interaction, individual and collaborative learning, and various forms of technology-mediated conferencing (Athabasca University, Centre for Distance Education, 2003).

To meet the demands of this new program, 11 core CDE faculty members interact with students on study proposals, monitor student achievement, advise on dissertation-related work, consult with colleagues in dissertation committees within and outside AU, and maintain their own programs of research (Athabasca University, Centre for Distance Education, 2003). Involvement of the DE scholarly community is planned with colleagues from other distance institutions participating in the dissertation research and defense process. The AU Library's current holdings of core distance education books and journals are excellent, as are its service capabilities for doctoral students (Athabasca University, Centre for Distance Education, 2003).

A Program Advisory Board consists of internationally recognized distance educators, professional representatives, and potential employers of graduates (with suitable academic qualifications). This board provides advice on decisions about program content, delivery, and assessment to assure program quality and integrity (Athabasca University, Centre for Distance Education, 2003). Ongoing formative assessment is the responsibility of the CDE program director, in consultation with the Program Advisory Board (Athabasca University, Centre for Distance Education, 2003). External program review will occur after the second year and then at the 5th and 10th years. The program review will assess objectives relative to the program learning outcomes. This review includes a formal survey and analysis of outcomes in doctoral student work (Advanced Education and Technology, 2008).

The doctoral program has undergone a two-stage Alberta government review process that included a system coordination review of the proposed program to determine the need for the program and how it fits with other programs currently offered within Alberta's post-secondary system and an organizational and program quality review. The program was approved in February 2007 under Alberta's *Post-Secondary Learning Act* and the *Approval of Programs of Study Regulation* (Alberta Government, 2007).

First Cohort of the Doctor of Education in Distance Education at AU

In August 2008, the doctoral program in Distance Education at Athabasca University officially began. Admitted into this program were 15 students; however, one student declined and another student deferred commencement to the 2009 cohort. The gender distribution of the 13 remaining doctoral students consists of eight women and five men. According to Dr. P. Fahy, professor in the Centre for Distance Education at Athabasca University, the median age of the cohort is 53 years, while the mean age is 49 years (personal communication, January 8, 2009).

Dr. M. Ally, director of the Centre for Distance Education at Athabasca University, reports that this cohort of students has a variety of master's degrees including Distance Education (MDE), Education (MEd), Arts (MA), Science (MSc), and Arts – Integrated Studies (MAIS) (personal

communication, September 20, 2008). All of the students are Canadian citizens, residing in five (out of 10) Canadian provinces from British Columbia to Newfoundland. The students are currently employed in the following areas:

1. four in health care education,
2. four as instructional/course/web designers,
3. three as instructors in colleges or universities, and
4. two in K-12 education

All of the students in this cohort are continuing their respective employment in addition to pursuing their doctoral studies in distance education with AU.

Doctoral Students' Initial Reactions and Early Experiences

As a graduate of Athabasca University's MDE program, I met the final approval of the Doctor of Education in Distance Education program in February 2007 with enthusiasm and a sense that the long wait for a doctoral program that provided rigorous preparation for leadership and advanced responsibilities specifically in the field of distance education was over.

The application process for the first cohort of the program opened in November 2007. Selection was based "on the applicant's previous academic record, research track record, ability to participate in scholarly studies and conduct research independently at a distance" (Athabasca University, Centre for Distance Education, 2009a). During the application process, the CDE staff was very supportive and timely in responding to queries. Notification of acceptance into the program was sent to the successful applicants in February 2008.

In May 2008, course packages were mailed by postal service to students. Students appreciated not having to pre-order them. These packages included printed course readings and a textbook, so students were able to start their course readings before the commencement of the first course. Additionally, access to the open source Moodle learning management system (LMS) was provided, so students were able to login to the course website and post their introductions in the welcome forum. Following the dissemination of the course packages and access provisions for the Moodle LMS, the faculty member facilitating the first doctoral course contacted each student by telephone. This phone call was the students' preliminary introduction to faculty and provided an opportunity to discuss expectations and requirements for the first course and doctoral program. From the students' perspective, these initial endeavors were well received and illustrated the support and organization of the faculty and Athabasca University.

Although the program officially began in August 2008 with the face-to-face orientation week, a synchronous welcome session was held for students, using Elluminate® (Internet-based video/audio conferencing tool), at the beginning of June 2008. Students were introduced to faculty, provided with an overview of the upcoming orientation in August, and given an opportunity to pose questions. In addition, the initial assignment for the first doctoral course, EDDE801: Advanced Topics and Issues in Distance Education, was discussed.

The first course assignment for EDDE801 required collaborative presentations at the mandatory August orientation "emphasizing both social and interpersonal growth among group members based on the work done together and the treatment of the assigned content" (Athabasca University, Centre for Distance Education, 2008b). Students were assigned to subgroups of three to four members and were required to select a topic for presentation based on the assigned course readings. During the three-month interval, from the welcome session in June 2008 until the in-person orientation week in August 2008, students collaboratively planned their respective presentations. This collaboration occurred at a distance, either asynchronously or synchronously, using e-mail, telephone, Elluminate®, and Skype®, an Internet-based video/audio conferencing tool. Initial trepidation was felt by most students due to their unfamiliarity with each other and their concerns related to previously committed activities during these months. However, as time passed, students became connected, developed greater rapport, and supported each other within the subgroups – such were the beginnings of our cohort learning model.

In August 2008, students, faculty, and administrative and support personnel met for the face-to-face orientation week at the university in Athabasca, Alberta. Orientation is part of the first course, EDDE801: Advanced Topics and Issues in Distance Education. The stated objectives are as follows:

1. effectively access, throughout the remainder of their doctoral program, the resources of Athabasca University, in particular the Centre for Distance Education;
2. draw upon the interpersonal support, camaraderie, and intellectual stimulation of the cohort, based on rapport resulting from meeting and working together face-to-face with other students and faculty;
3. use various tools and procedures supported by Athabasca University for communications, assignment preparation and presentation, research, and data analysis;
4. adopt procedures for accessing, analyzing, notating, and storing for future reference important literature from the field of distance education and related areas;
5. discuss basic research findings, concepts, ideas, opinions, and trends as found in the core and supplemental readings, and apply these to issues in distance education practice;
6. practice collaborative development and presentation techniques and demonstrate these in the student presentation, at the program orientation, and in the EDDE 801 seminar sessions;
7. meet program faculty and begin the process of articulating and clarifying research interests and linking these with possible supervisors and committee members. (Athabasca University, Centre for Distance Education, 2008c)

The in-person orientation activities consisted of presentations by faculty and university representatives, including administrative, library, and technical staff. Students met with faculty advisers to consult and discuss research interests. Additionally, each of the assigned student subgroup presentations for the first assignment was completed. Synergies were created during

the presentations and orientation as students were empowered, constructed meaning, developed collegiality, and gave and received support within the cohort. According to Saltiel and Russo (2001), learners' efforts increase in an education program that creates a learning environment for cohorts in which synergy is present. The students deemed this orientation as critical for setting the foundation to begin building a group relationship and a sense of community based on the "connection, belonging, and comfort that develops over time among members of a group who share purpose or commitment to a common goal" (Conrad, 2005, p.2).

Following this orientation, students participated in the EDDE801 course activities, both synchrously and asynchrously. Regular synchronous Elluminate seminars provided an opportunity for the delivery of course content, for additional collaborative learning activities, for interaction with guest speakers, and for didactic discourse on distance education. Asynchronous online forums using Moodle facilitated further interaction and critical reflection, providing the medium for each student to engage in dialogue and to moderate class discussion individually and collaboratively. In addition to the synchronous course seminars and asynchronous online discussions, synchronous sessions initiated by the cohort were held using Elluminate. These sessions provided a venue to discuss various topics as well as to enhance camaraderie and to offer collegial support. Faculty and students also conversed with one another using e-mail, telephone, and Skype. Interaction is a crucial element in distance education (Moore, 1991; Garrison & Cleveland-Innes, 2005) as it reduces transactional distance and facilitates the construction of higher levels of knowledge and more meaningful understanding.

As discussed by Manos, McCoy, and Morgan (2005), a common stressor for graduate students in cohorts is time management. The carefully planned doctoral program structure provides clear participation requirements and context expectations. When the second course, EDDE802: Advanced Research in Education, began in the second term, concerns were voiced among students about the intensive scheduling of the course. As a group, students met synchronously on Elluminate and asynchronously by exchanging group emails to respond to each other's concerns, to collaborate as a cohort, and to come to a consensus on an action plan that would effect change. As a result of this cohesive focus, a group email was sent to the faculty articulating the students' shared perspectives and collective position on the EDDE802 schedule. "The cohort often becomes a powerful group in a brief period of time. Individual members combine together to act as one while the faculty and the administrators become the other force" (Saltiel & Russo, 2001, p. 9). Faculty responded expeditiously, and via a combined student-faculty Elluminate session the intensive scheduling of the EDDE802 course was adjusted to assuage the cohort's time management concerns. While the doctoral students are evolving as change leaders, the faculty is embracing the power of the cohort.

Collaborative group work in EDDE802 also created challenges with time management due to out-of-time and out-of-space virtual connectivity. Students were not only confronted with differences in time zones within Canada (from British Columbia to Newfoundland) but also internationally as several students were presenting at workshops/conferences in Nairobi, Spain, or Dubai. At the same time, the technology meant sometimes enduring balky connections. Through this group work, rich peer teaching occurred as students with distance instructional design experience

encouraged novice online learners, thus facilitating communication and knowledge sharing. Time management issues with EDDE802 pushed the cohort to be creative and innovative, share knowledge, while accommodating individual differences, and problem solve collaboratively. "As with a finely tuned guitar when the change of one string produces a different sound, interwoven factors contributing to online learning community create a fluid and shifting dynamic" (Conrad, 2002, p. 18).

Another common stressor for graduate students, indicated by Manos, McCoy, and Morgan (2005), is financing their studies. A current limitation of this program is the lack of funding opportunities for students in their first year of studies. The total cost for the program is $41,840 (Canadian) including textbooks (based on 2008 fee levels). Alternative funding sources are being sought by AU and by the doctoral students.

Throughout the first year of this doctoral program, individual stressors such as marital difficulties, family tragedies, illnesses, work commitments, and the birth of a baby influenced individual students' contributions and participation in the courses. However, during these times students collectively rallied around each other, promoting a sense of belonging and mutual support within the cohort. Other than the five-day orientation workshop at the beginning of the program, face-to-face networking opportunities among the doctoral students over the past year have been few. Some students have met at workshops/conferences or on an individual basis. However, although there was a high level of social presence in the online environment during the courses, students felt these limited face-to-face meetings were valuable. As Tisdell et al. (2004) state, group support may become a vital aspect of knowledge construction for students.

In addition to the cohort support, CDE administrative personnel and AU support staff have been exceptionally obliging in responding to queries and requests. Students are encouraged to communicate with their faculty advisers on a regular basis. The AU library has provided excellent service and support, sending out requested library resources in a timely manner.

Conclusion

Athabasca University has successfully launched the Doctor of Education in Distance Education program. Integral to this launch for the doctoral students has been the excellent pedagogical, developmental, institutional, and technological support at Athabasca University. As the president of AU, Dr. Frits Pannekoek, said, "Athabasca University has established itself as a world leader in providing high-quality distance education, and it is fitting that AU's first doctorate reflects our area of expertise " (Athabasca University, 2008b).

As the second year commences, students in the first cohort of the EdD (Distance Education) program are developing strong social and cognitive presence as they collaborate, build relationships, challenge ideas, and construct knowledge through critical discourse. Accordingly, as the first cohort in the new program, we bring what we study to life.

Acknowledgement

The author acknowledges the invaluable support of fellow AU doctoral classmates, Dr. Susan Moisey, Dr. Pat Fahy, and the CDE staff in the development of this paper.

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International Review of Research in Open and Distance Learning
Volume 10, Number 6. *ISSN: 1492-3831*

December – 2009

Book Review

Online Learning as a Strategic Asset

Authors: S. McCarthy and R. Samors (2009). *Online Learning as a Strategic Asset, Vol. 1: A Resource for Campus Leaders*. Washington DC: Association of Public and Land-Grant Universities. Available from http://www.aplu.org/NetCommunity/Document.Doc?id=1877

Author: J. Seaman (2009). *Online Learning as a Strategic Asset, Vol. 2: The Paradox of Faculty Voices*. Washington DC: Association of Public and Land-Grant Universities. Available from http://www.aplu.org/NetCommunity/Document.Doc?id=1879

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The two-volume study, *Online Learning as a Strategic Asset* (recently published in print and online), is a joint project of the Association of Public and Land-Grant Universities and the Sloan National Commission on Online Learning. It reports the results of a benchmark study intended mainly as a planning resource for campus leaders. Volume 1 focuses on online learning as a vehicle for advancing an institution's strategic goals; volume 2 examines faculty views and experiences in online teaching. The title of chapter 5 in volume 1 nicely encapsulates the scope as well as the value of the entire work: Dispelling Myths, Raising Questions, Creating Opportunities for Dialogue. In an era when many institutions are finally embracing online learning, yet few recognize the strategic value of such an initiative, it is critical that decision-makers know the right questions before they can arrive at useful responses.

These relatively slim volumes present findings and recommendations based on 231 interviews at 45 public institutions and on close to 11,000 responses to a faculty survey. The nearly 100 pages of text are augmented by several appendices, including lists of the participating institutions, the interview and questionnaire design and methodology, and the research instruments. The report is a publication that more scholarly types might question as a worthwhile contribution to the literature in this field, but I suspect that many practitioners will likely appreciate its merits. True, it does not add to the field's theoretical foundations, nor does it claim to do so. Rather, this material is especially well suited for administrators who are non-experts in distance education and who require succinct and accessible information to guide their planning.

In this regard, I am reminded of a recent conversation with a campus academic leader who asked me to recommend a source that would inform him of what he needed to know, distilled to its essence, to best advance the institution's emerging distance education agenda. I immediately

thought of this publication because of its straightforward style and its no-nonsense recommendations, which, while sensible, are often overlooked (e.g., establish an institution-wide planning group to guide and monitor the process). Part of its inherent appeal is that the advice is based on responses from the very constituencies this decision-maker must be attentive to, especially going forward within an environment that has yet to demonstrate widespread enthusiasm for online education.

The working premise of this project is that as technology increasingly pervades society, our academic institutions "risk becoming 'obsolete' if they do not adapt to changing demographics and market forces." The report puts particular emphasis on the finding that although close to half of the responding CEOs recognize there is some strategic value in offering online courses, less than one-half actually include online education as part of their strategic plans, even as enrollments surge in many of these institutions. This disparity, plus the relative lack of knowledge that campus leaders possess regarding faculty attitudes toward, and involvement in, online instruction, further diminishes the potential of online learning as a strategic institutional asset.

An especially appealing aspect of this resource, and one which those lacking experience in this domain will hopefully benefit from, is its effort to dispel many prevailing myths about what distance education is and what it is not. At the same time, it also provides useful data-driven evidence to those who already know the virtues of online education by highlighting findings that experienced practitioners can tout as more than simply anecdotal reporting. A particularly compelling phenomenon that is documented is that once faculty members gain experience with online teaching they are overwhelmingly positive in their perception of its quality, compared to their peers who have had no prior experience (80% of whom, nonetheless, are convinced it is inferior to face-to-face courses).

The findings, though aimed at public universities, are equally relevant for private colleges as no institutions today can afford missteps in such a complex enterprise. The history of various attempts to initiate distance education offerings is not especially inspiring, but it is cautionary in that many failed efforts have dissuaded those prospective providers of online educational opportunities from any further activity in this arena. As a consequence, in addition to limiting universities' ability to become more relevant in the digital age, the lack of success due to inadequate planning has also reinforced those skeptics who remain convinced that it is not a viable or credible means of teaching and learning.

But it must be noted that however insightful or accessible a particular set of guidelines might be in advancing institutionally sponsored online learning it simply will not occur without appropriate institutional leadership. And while decision-makers need not be experts in this field, they must at least recognize the potential of online education for their institutions and be willing to create the conditions for innovation in this direction. This will best happen if they manifest transformative leadership. Yet, typically, campus leaders ascend to senior roles via a largely transactional style that is focused more on relationships within the existing environment than on promoting bold action that transforms their institution and brings it to a new place. If there is any area of

engagement that truly requires transformative leadership, it is in the advancement of online education, not to supplant face-to-face instruction but rather to augment conventional approaches.

Many universities thrive on preserving traditional practices, rather than on fostering technology-enhanced pedagogy. When they do recognize that such initiatives may not threaten their legacy, after all, they too often lack any viable mechanisms that can contribute to planned systematic change. And entering the brave new world of distance education is not so much about selecting appropriate technology; rather, it is about managing change. This change process requires that leaders articulate and arrive at an inspirational and doable mission for their organization, that they empower and energize followers to implement that mission, that they be aware of their various stakeholders' values and needs, that they integrate congruent values into the organizational culture, and that they press their institution to improve continuously with minimal disruption and resistance. If there is merit in this approach to becoming relevant in the digital age, *Online Learning as a Strategic Asset* can indeed be a valuable instrument to achieve this goal, provided it gets sufficient attention from campus leaders. The task is too important not to succeed!