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Editorial: Filling the Gaps in Educational Technology Research

Michele Jacobsen and François Desjardins

The Winter 2007 issue marks the beginning of the 33 rd Volume of the Canadian Journal of Learning and Technology. This peer-reviewed journal welcomes papers on all aspects of educational technology and learning. The journal is interested in receiving manuscripts building on and relating to the following topics: learning theory and technology, cognition and technology, instructional design theory and application, online learning, computer applications in education, simulations and gaming, and other aspects of the use of technology in the learning process. The field of educational technology continues to expand and CJLT also welcomes papers on emerging topics such as social networking, mobile learning, user-created content, augmented reality, massively multiplayer online games, robotics and learning and virtual worlds. Readers unfamiliar with the history of CJLT may be interested to learn that with the publication of Volume 28 in 2002, the present journal replaced the Canadian Journal of Educational Communication (CJEC). Hlynka (2002) reminds us that in the early 1980s, CJEC replaced the original journal and newsletter, Media Message, under the editorship of Richard Lewis. Just over five years ago, former editors Rick Kenny and Mary Kennedy published the Winter 2002 issue of the newly named CJLT, closely followed by the first online issue in Spring of that same year. The present editorial team members have been the stewards of CJLT since 2005 and, in addition to the present issue, have added six issues to the collective knowledge base. It that in that period, the francophone presence in the journal has grown from about one French article published per year to an almost constant one article per issue. Increased francophone presence is also reflected in the increased number of manuscript submissions. We are encouraged by this steady upward trend and hope to see this number continue to increase. We are also very pleased that recently we have also received some interest and even manuscripts from French Europe and Africa. As part of a brief retrospective on the journal, it is fitting to draw upon an editorial published nineteen years ago in CJEC. Educational technologists can be recognized by the stars in their eyes. They know they are sitting on the most explosive potential of the century. Theirs is the apex of innovative motivation. Whether they are fashioning learning environments, creating media, designing instruction or effecting research and theory, educational technologists have a dream-a dream that can sustain them, and those they touch, well into the next century. (Beckwith, 1988, p. 3) Let us dream about the explosive potential of educational technology in the hands of innovative motivated, starry-eyed designers, developers and researchers in the context of recent phenomena. For example, in what ways are participatory Web 2.0 applications and second generation web services (Cremonini, 2007) influencing and changing education? Has the exponential growth of user-created, original online video in YouTube.com affected how we think about designs for learning? Should it? A few years ago, in the context of a story about a master architect, several apprentices and the evocative learning environment of the architecture studio, Seely Brown (2002) challenged

the field to think about how we build social spaces and learning environments that facilitate our ability to be encultured into a practice. An army of researchers and educators have launched learning projects in Second Life (http://www.secondlife.com), a popular virtual digital world imagined, created and owned by its "residents" since 2003. Given the explosive potential of recent ideas such as Web 2.0, YouTube and Second Life, and the field's interest in many new technologies for learning, the journal expects to receive a diverse range of manuscripts that continue to build and also to challenge our collective knowledge and understanding about learning and technology in the coming years.

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The Middle English word gap descends from the Old Norse for chasm, both of which denote a marked interruption of continuity. The field of educational technology yields new knowledge, in part, via systematic, disciplined and or critical inquiry into the design, development and or deployment of learning interventions, systems and solutions. A diverse range of research methods and approaches, at both ends and along the qualitative and quantitative continuum, enable educational technology researchers to identify, to address and to fill the many gaps in our present knowledge and contribute to the integrity, or continuity, of our field. Educational technology research is framed by questions and or hypotheses and is often conducted through empirical, narrative and / or descriptive means to uncover or revise understanding by identifying persistent trends, offering authoritative explanations, creating models, outlining theories, designing applications and reflecting on values, beliefs and purpose. The outcomes of our investigative efforts often include new or revised questions and ideas along with refined understandings and recommendations for practice and future research.

Each of the papers in the present issue shares a common characteristic; each identifies and fills a gap in our current understanding. In keeping with the journal mandate, each paper contributes new and / or significant knowledge which addresses, or fills, a marked interruption in our knowledge about learning and educational technology. Authors who have contributed their work to the present issue of CJLT offer a range of perspectives and have taken diverse approaches to educational technology research. It has been a sincere pleasure to work with each scholar to prepare the seven manuscripts for publication.

The current issue of CJLT contains seven articles that represent various approaches to educational technology research and teaching (four research papers, two case studies and one position paper). Authors use experimental, qualitative, survey, case study, critical inquiry and descriptive approaches to investigate key questions and fill gaps in the knowledge of our field.

In the first research paper, entitled A Formative Analysis of Resources Used to Learn Software, Robin Kay examines and compares the effectiveness of a wide range of resources used to learn a new software package: human assistance (the experimenter), the manual, the software itself (other than the menu), the software main menu, the software help system, the screen, and the keyboard. In what ways do people best learn how to use software? Given the range of supports available, what methods do beginner, intermediate and advanced users tend to rely on most when learning new software? Do people generally prefer trial and error over software manuals, online help and human support? This comprehensive, formal comparison of seven resources used to learn computer software addresses a significant gap in our present knowledge about the relative strengths and weaknesses of each. Kay used think-aloud procedures to gather information from thirty-six adults while they learned to use a spreadsheet package. He found that the main menu, the screen, and the manual were the most

effective resources used. While human assistance produced short term gains in learning, this approach was not significantly related to overall task performance. Searching the keyboard was frequently done, but was relatively ineffective for improving learning. Software help was the least effective learning resource. Kay reports on some individual differences in using resources with respect to ability level (beginner, intermediate and advanced) and gender. Kay offers several suggestions to educators of computer studies based on the findings of this study, as well as recommendations for future research in this area.

In the second research paper, entitled Mathematics, Science, and Technology in Secondary Schools: Do gender and region make a difference?, Qing Li examines interaction effects of gender and region (urban vs. rural) on student beliefs about women in math and science, on their attitudes towards math and science, and their confidence in the use of technology from a multivariate analytical perspective. Li also examines differences in confidence using technology between high school students who consider math-related or science-related careers and those who do not. Survey responses from 450 secondary students showed interaction effects of gender and region on student beliefs and attitudes. Gender differences in students' beliefs about women in math and science change significantly depending on the location of the school. Namely, the difference is smaller in urban schools than in rural schools, which suggests that region plays a major role in forming students' beliefs about mathematics and science. An encouraging finding from Li's research was that more female students than male students believed that technology was effective for their learning. Regardless of gender, students who considered math-related and science-related future careers were more confident in using technology than those who were not. Why is it important to keep revisiting questions about the relationship between gender, technology and learning? The well-documented, persistent gender gap in mathematics and science careers, coupled with an emerging gender inequity in technology-related occupations, calls for ongoing exploration of gender issues in these areas. While this investigation address a gap in our knowledge, Li's study indicates that there is a great deal of work still to be done in education to address the different math, science and technology experiences and views of male and female students in urban and rural schools.

In the third research paper, entitled Genèse d'une communauté virtuelle d'apprenants dans le cadre d'une démarche d'apprentissage collaboratif à distance, Sylvie Grosjeanexamines the emergence of a learner's virtual community in a collaborative learning setting in order to further understand the process of how such a community defines itself and gives itself a social existence. This is an empirical study of the initial phase of development named the "engagement phase", using the three dimensions of Wenger's (1998) concept of community of practice: mutual engagement, joint enterprise and shared repertory, in which Grosjean analyses the interactions between subjects communicating via a discussion forum. She examines an interactive dynamic through the analysis of linguistic (electronic conversation) and non linguistic (artefacts, intermediary objects) forms of communication. Grosjean found that in order for this community to emerge, each student first had to become visible to the others and had to join-in by sharing certain aspects of their identity such as their respective study or career paths and also by discussing their expectations towards the course. This allowed each member of the group to better understand the individual motivations and objectives of their colleagues before agreeing on a common objective. She concludes by stating that participants in such a learning community not only need to share an objective but that they can and should also express their respective needs in order for this community to meet the expressed goals of all concerned. This finding is of particular interest given the phenomenal move towards mobile learning and the creation of communities of practice in the school context to help teachers with professional development. Grosjean's paper addresses a gap between understanding the global pedagogical benefits of such a strategy and the particular practical factors that actually make it work.

The fourth paper in this issue is a position paper entitled Wicked ID: A Conceptual Framework for Considering Instructional Design as a Wicked Problem. Katrin Becker's paper is an interesting and well-crafted treatise on the nature of ID problems and the relationship between ID and software design. Becker argues that the process of instructional design has parallels in other design disciplines and connects lessons learned in software design to current approaches in ID. The comparison between software and instructional design is used as a springboard to suggest that instructional design is almost always a Wicked Problem. She articulates a connection between Wicked Problems as first described by Rittel and Webber in 1973 and six well-known instructional design models. Accepted and tested approaches to the solution of Wicked Problems, such as social planning, organizational management and software design, and the application of these examples to ID, are described. By outlining a meta-model for ID and explaining how it might be used in the current context, Becker offers the field a unique lens through which to view ID. Becker identifies and addresses a gap in our knowledge with this creative and innovative approach to analyzing and understanding instructional design.

The fifth paper in this issue is a case study by Eric Nippard and Elizabeth Murphy entitled Social Presence in the Web-Based Synchronous Secondary Classroom.Current understanding suggests a relationship between social presence and students' satisfaction and perceptions of success. However, the extensive literature dealing with social presence and online learning tends to focus on higher education. There is a paucity of research on the experiences of school age learners in online and web-based learning environments. Nippard and Murphy's descriptive case study addresses a significant gap in current research by exploring how teachers and students manifest social presence in the web-based synchronous secondary classroom (WBSSC). Nippard and Murphy describe how high school students and teachers manifested social presence through choice of specific tools, choice of communication conventions and in a context of digressions from the curriculum. Findings suggest that certain contexts and conditions are more conducive than others in promoting teachers' and students' manifestations of social presence, which has implications for practice. While expressions of social presence by the students and teachers occurred most often in a context of digressions that drew attention away from the delivery of content, these digressions also served to foster the communication of affective, cohesive and interactive responses.

Roland van Oostveen and William Muirhead's case study, entitled Faculty Use of Tablet Computers at the University of Ontario Institute of Technology, is the sixth paper in this issue. This timely article addresses a serious gap in present knowledge about instructor deployment of tablet computers for personal use, research activities and teaching practices in higher education. A purpose of this research project was to evaluate the value of tablet computers within a ubiquitous computing environment. In this study, "additional value" was defined to be any added benefit provided by tablet computers over conventional laptop computers, while "value" was determined by the "richness" of faculty's overall computing experience in instructional, research and personal settings. Van Oostveen and Muirhead describe in detail the context of use for faculty and students based on the planning and construction of integrated network environment in which all lecture halls, tutorial rooms and informal learning spaces (hallways, restaurants, foyers, study rooms and the library) were equipped with both wired and wireless Internet access to the university network. An online survey, interviews and faculty journals and a review of teaching materials developed using the tablet computers provided data for analysis. The ways in which the introduction of tablet computers changed established computing behaviors by faculty are summarized in four themes: a) Enhancing mobility of faculty, b) Transforming the development of learning materials in and out of class, c) Enhancing faculty feedback to students and d) Altering instructional pacing during lectures. Van Oostveen and Muirhead report on faculty speculation regarding the effects of tablet

use by students as well as suggestions for improving tablet computer design. The article concludes with a number of recommendations for the expanded use of tablet computers within higher education settings and directions for future research.

In the final paper in this issue, entitled College Student Internet Use: Convenience and Amusement, Genevieve Johnson summarizes results from a large scale survey of college students. Do college students interpret their use of the Internet as frustrating, convenient, a waste of time, or a source of fun? To what extent and in what ways do college students use the Internet to communicate, access websites, and play games? Based on a statistical analysis of responses from more than four hundred Canadian college students, Johnson describes current Internet use and patterns of online behavior and explores the implications of such for online instructional practice. Results describe college students, with rare exception, as Internet users. The vast majority of college students frequently communicate online and access websites. While an Internet game experience is typical, relatively few college students are heavy online gamers. Overwhelmingly (i.e., 77.8%), college students conceptualized the Internet as a convenience, although 17.8% considered the Internet a source of amusement. Approximately 5% of college students reported negative perceptions of the Internet (frustrating or a waste of time). Online educators may legitimately assume that one in 20 college students would benefit from Internet skills training and/or instructional strategies that enhance effective utilization of e-learning opportunities. Johnson's study addresses a gap in our knowledge of the specific use and online behavior patterns of Canadian college students.

In closing, we want to acknowledge the tremendous service provided by CJLT's international editorial board and our reliable team of peer reviewers. A great deal of hidden volunteer effort supports the scholarly review process of an academic journal. After a paper has been reviewed by the editorial team, it is blinded and sent to three expert peers for their assessment of the manuscript's quality and potential contribution to the field. Peer reviewers submit comments and a recommendation to the editorial team to aid in the publication decision making process. At least 21 peer reviewers contributed their feedback and expertise to the review of the seven manuscripts in this issue. Peer review, by its very nature and, some would argue, by necessity, is anonymous. A journal maintains its scholarly integrity by employing a valid and reliable peer review process. CJLT has become known by authors for the extensive and in-depth nature of the peer review. Many CJLT authors, even those the journal has been unable to publish, have acknowledged and expressed appreciation for the extensive and helpful feedback provided by CJLT's peer reviewers. A sincere and heartfelt thank you to the entire editorial board and each of the journal's peer reviewers for making a scholarly contribution to the field of educational technology.

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