A Review of e-Learning in Canada: A Rough Sketch of the Evidence, Gaps and Promising Directions

ARTICLE

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Abstract & Citation

Abstract

This review provides a rough sketch of the evidence, gaps and promising directions in e-learning from 2000 onwards, with a particular focus on Canada. We searched a wide range of sources and document types to ensure that we represented, comprehensively, the arguments surrounding e-learning. Overall, there were 2,042 entries in our database, of which we reviewed 1,146, including all the Canadian primary research and all scholarly reviews of the literature. In total, there were 726 documents included in our review: 235 – general public opinion; 131 – trade/practitioners' opinion; 88 – policy documents; 120 – reviews; and 152 – primary empirical research. The Argument Catalogue codebook included the following eleven classes of variables: 1) Document Source; 2) Areas/Themes of e-learning; 3) Value/Impact; 4) Type of evidence; 5) Research design; 6) Area of applicability; 7) Pedagogical implementation factors; 8) A-priori attitudes; 9) Types of learners; 10) Context; and 11) Technology Factors. We examined the data from a number of perspectives, including their quality as evidence. In the primary research literature, we examined the kinds of research designs that were used. We found that over half of the studies conducted in Canada are qualitative in nature, while the rest are split in half between surveys and quantitative studies (correlational and experimental). When we looked at the nature of the research designs, we found that 51% are qualitative case studies and 15.8% are experimental or quasi-experimental studies. It seems that studies that can help us understand "what

works" in e-learning settings are underrepresented in the Canadian research literature. The documents were coded to provide data on outcomes of e-learning (we also refer to them as "impacts" of e-learning). Outcomes/impacts are the perceived or measured benefits of e-learning, whereas predictors are the conditions or features of e-learning that can potentially affect the outcomes/impacts. The impacts were coded on a positive to negative scale and included: 1) achievement; 2) motivation/satisfaction; 3) interactivity/ communication; 4) meeting social demands; 5) retention/attrition; 6) learning flexibility; and 7) cost. Based on an analysis of the correlations among these impacts, we subsequently collapsed them (all but cost) into a single impact scale ranging from –1 to +1. We found, generally, that the perception of impact or actual measured impact varies across the types of documents. They appear to be lower in general opinion documents, practitioner documents and policy making reports than in scholarly reviews and primary research. While this represents an expression of hope for positive impact, on the one hand, it possibly represents reality, on the other. Where there were sufficient documents to examine and code, impact was high across each of the CCL Theme Areas. Health and Learning was the highest, with a mean of 0.80 and Elementary/Secondary was the lowest, with a mean of 0.77. However, there was no significant difference between these means. The impact of e-learning and technology use was highest in distance education, where its presence is required (Mean = 0.80) and lowest in face-to-face instructional settings (Mean = 0.60) where its presence is not required. Network-based technologies (e.g., Internet, Web-based, CMC) produced a higher impact score (Mean = 0.72) than straight technology integration in educational settings (Mean = 0.66), although this difference was considered negligible. Interestingly, among the Pedagogical Uses of Technology, student applications (i.e., students using technology) and communication applications (both Mean = 0.78) had a higher impact score than instructional or informative uses (Mean = 0.63). This result suggests that the student manipulation of technology in achieving educational goals is preferable to teacher manipulation of technology. In terms of predictor variables (professional training, course design, infrastructure/ logistics, type of learners [general population, special needs, gifted], gender issues and ethnicity/race/religion/aboriginal, location, school setting, context of technology use, type of tool used and pedagogical function of technology) we found the following: professional development was underrepresented compared to issues of course design and infrastructure/ logistics; most attention is devoted to general population students, with little representation of special needs, the gifted students, issues of gender or ethnic/race/religious/aboriginal status; the greatest attention is paid to technology use in distance education and the least attention paid to the newly emerging area of hybrid/blended learning; the most attention is paid to networked technologies such as the Internet, the WWW and CMC and the least

paid to virtual reality and simulations. Using technology for instruction and using technology for communication are the two highest categories of pedagogical use. In the final stage, the primary e-learning studies from the Canadian context that could be summarized quantitatively were identified. We examined 152 studies and found a total of 7 that were truly experimental (i.e., random assignment with treatment and control groups) and 10 that were quasi-experimental (i.e., not randomized but possessing a pretest and a posttest). For these studies we extracted 29 effect sizes or standardized mean differences, which were included in the composite measure. The mean effect size was +0.117, a small positive effect. Approximately 54% of the e-learning participants performed at or above the mean of the control participants (50 th percentile), an advantage of 4%. However, the heterogeneity analysis was significant, indicating that the effect sizes were widely dispersed. It is clearly not the case that e-learning is always the superior condition for educational impact. Overall, we know that research in e-learning has not been a Canadian priority; the culture of educational technology research, as distinct from development, has not taken on great import. In addition, there appears to have been a disproportionate emphasis on qualitative research in the Canadian e-learning research culture. We noted that there are gaps in areas of research related to early childhood education and adult education. Finally, we believe that more emphasis must be placed on implementing longitudinal research, whether qualitative or quantitative (preferably a mixture of the two), and that all development efforts be accompanied by strong evaluation components that focus on learning impact. It is a shame to attempt innovation and not be able to tell why it works or doesn't work. In this sense, the finest laboratories for e-learning research are the institutions in which it is being applied. Implications for K-12 Practitioners When implemented appropriately, technology tools are beneficial to students' learning, and may facilitate the development of higher order thinking skills. Student manipulation of technology in achieving the goals of education is preferable to teacher manipulation of technology. Teachers need to be aware of differences between instructional design for e-learning as compared to traditional face-to-face situations. Immediate, extensive, and sustained support should be offered to teachers in order to make the best out of e-learning. Implications for Post-Secondary Some educators suggest that e-learning has the potential to transform learning, but there is limited empirical research to assess the benefits. Post-secondary education would benefit from a Pan-Canadian plan to assess the impact of e-learning initiatives. It is important that instructional design match the goals and potential of e-learning. Research is needed to determine the feasibility and effectiveness of such things as learning objects and multimedia applications. Properly implemented computer mediated communication can enrich the learning environment; help reduce low motivation and feelings of isolation in distance learners. E-learning appears to be more effective in distance education, where technology use is

required than in face-to-face instructional settings. Implications for Policy Makers Effective and efficient implementation of e-learning technologies represents new, and difficult, challenges to practitioners, researchers, and policymakers. The term e-learning has been used to describe many different applications of technology, which may be implemented in a wide variety of ways (some of which are much more beneficial than others). School administrators must balance the needs of all stakeholders, and the cost-benefit ratios of technology tools, in deciding not only which technologies to use, but also when and how to implement new technologies. Traditional methods of instructional design and school administration must be adjusted to deal with the demands of distance education and other contexts of technology use. Professional education, development, and training for educators must ensure that teachers will be equipped to make optimal pedagogical use of new methods.

Citation

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