# Knowledge Link ››

REVIEW OF E-LEARNING IN CANADA :
A ROUGH SKETCH OF THE EVIDENCE, GAPS AND PROMISING DIRECTIONS

Objectives

This review of the current literature on e-learning was conducted under a contract with the Canadian Council on Learning. The review encompasses public, research, policy and practitioner perspectives, assesses what is incomplete in the various literatures, explores what works (best practices) and provides a vision for promising new lines of research.

The review focused on the role of e-learning in the following areas: early childhood learning; elementary and secondary learning; post-secondary learning; post-secondary learning; adult learning; and health and learning.
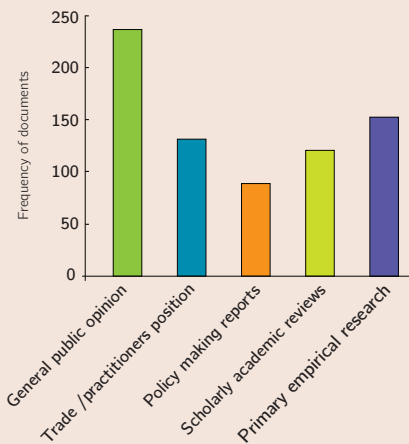
This inaugural issue of Knowledge Link provides a summary of our analysis of the literature and presents the implications of the findings for elementary, secondary and post-secondary learning and for policy makers in all areas.
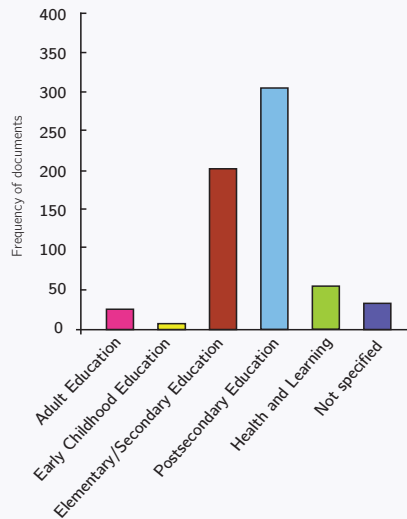
The Argument Catalogue

A total of 2,042 items were identified through online searches within the following literatures: policy documents, public opinion (newspaper) articles, practitioner (trade) articles, scholarly reviews and Canadian empirical studies.

A subset of 1,146 items were reviewed with 726 items included. Reviewers counted positive, negative and neutral messages in each body of literature. The major messages were also extracted from each document.

CSLP / CEAP
CENTRE FOR THE STUDY OF LEARNING AND PERFORMANCE
CENTRE D'ÉTUDES SUR L'APPRENTISSAGE ET LA PERFORMANCE

CKAN NOW
Canadian Network for Knowledge Utilization

Implications

Elementary / Secondary

When implemented appropriately, technology tools are beneficial to student 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 obtain the best results from e-learning.

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 and 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.

Policy Makers

Effective and efficient implementation of e-learning technologies represents new challenges for practitioners, researchers, and policy makers.

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).

Professional education, development, and training for educators must ensure that teachers will be equipped to make optimal pedagogical use of new methods.

School administrators must balance the needs of all stakeholders, and the cost-benefit ratios of technology tools, when 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.

Public Opinion

• E-learning is a rapidly growing field in education.

• E-learning provides greater access to educational programs.

• Funding the high costs of e-learning may divert resources away from other educational priorities.

• There is some concern about potential negative impacts of e-learning on the development of children's creative skills.

• Teachers and classrooms will remain essential in the world of e-learning.

Primary Studies

• Some learners are better prepared to use e-learning effectively than others.

• Effective instructional design for e-learning does not resemble traditional pedagogical methods.

• Teachers require professional development and training to use technology effectively.

• Collaborative methods afforded by online technologies facilitate the development of higher-order thinking.

• E-learning provides disabled students with previously unavailable educational opportunities.

Policy Documents

• Policy makers are mostly favorable towards e-learning.

• There is a need to bridge the gap between theory, research, and practice.

• Technology should be introduced and used only in appropriate contexts.

• There are four major reasons for using e-learning: economic competitiveness, educational attainment, increased access, and catalyst for educational change.

Reviews

• The reviews of e-learning range from neutral to positive; it is at least as effective as traditional instruction.

• We need to address design issues and new strategies for teaching and learning.

• Effective e-learning requires the presence of immediate, extensive, and sustained support.

• There is an absence of strong empirical evidence to support the use of e-learning.

Practitioners

• E-learning increases accessibility, flexibility, and opportunities for learning.

• E-learning requires careful attention to instructional design, pedagogical planning, professional training and fiscal support.

• We need new policies and strategies to meet the emerging social demands of educational technology.

Analysis of Results

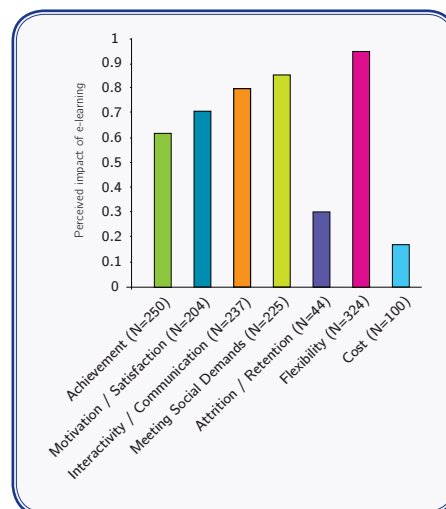## Quantitative Summary of the Canadian Primary Research

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 (50th 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.

The analysis of the retrieved and coded documents reflected the following findings:

- **R**emarkable consistency emerged across the sources of literature and, to a lesser extent, across the CCL theme areas, early childhood learning, elementary and secondary learning, post-secondary learning, adult learning, and health and learning.

- **E**-learning is generally believed to have positive impacts, especially on achievement, motivation, communication, learning flexibility, and meeting social demands.

- **P**erceived impacts of e-learning are higher for distance education, where technology use is required, and lower for face-to-face instructional settings.

- **P**erceived impacts of e-learning are higher for network-based technologies than for non-networked technology integration in educational settings.

- **P**edagogical uses of technology, student applications (i.e., students using technology) and communication applications had a higher impact score than instructional or informal uses.

- **S**tudent-centred applications of technology are believed to be more effective than teacher-centred applications used for delivery of information.

- **C**ompared to issues of course design and infrastructure/logistics, the issue of professional development received little attention.

- **T**echnology is mostly used for communication and presentation purposes.

- **C**anadian research on e-learning is mainly qualitative in nature, offering little experimental evidence to answer the question of "what works" in e-learning settings.