

Changing Paradigms for E-learning Pedagogy: Social Networking Technologies for
Teaching and Learning in Canadian Post-Secondary Institutions

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Abstract

Information and communication technologies have made significant contributions to our social, economic, and political structures. It has also contributed to education. Massification, internationalization, access, and constraints of distance in education have been addressed using the Internet to foster interactions and collaboration among learners and instructors, and to deliver content in an increasingly globalized world. In recent times, social media has entered the fray which though empowering, is also disenfranchising – a duality that is often perceived from its disruptive tendencies than from its enabling attributes, broadly to socio-political structures but specifically to education.

This paper argues that the growth of the Internet is important for teaching and learning in that it facilitates education in ways that were previously challenging. It recognizes the growth of social media as an emerging Internet technology that can add value and benefit existing methods of online or distance education if they are systematically and homogeneously applied. It explores the adult learning context, examines the characteristics of adult learning, describes social media and its affordances, aligns adult learning characteristics to social media affordance, explores, through the use of a framework, commonalities between adult learning characteristics and social media affordance, and from this hypothesize that social media can be effective in teaching and learning. This paper has implications on pedagogy and on content delivery in the post-secondary level.

Keywords: distance education, online learning, distance learning, post-secondary education, social media, paradigm, pedagogy, internet, technology, blended learning, elearning

Introduction

Information and communications technology (ICTs), particularly the Internet, continue to play a significant role in shaping current and future social, economic and political structures, at all levels (Souter, McLean, Akoh & Creech, 2011). They are one of the many drivers of globalization, they enhance communication, influence relationships, and empower and also disenfranchise citizens. They are disruptive, and at the same time creative, in ways that challenge existing structures and causes us to rethink society and how we learn, work and play (LeNoue, Hall, & Eighmy, 2011; Jiao & Miao, 2010; Souter, McLean, Akoh & Creech, 2011). They have become the tool for mediating our human activities (LeNoue, Hall, & Eighmy, 2011). Broadband Internet, an ICT, has potentially contributed \$500 billion to the GDP of the US, and between \$300 to 400 billion in Europe (World Bank, 2009). They play a significant role in research and development, and innovation in fields of nanotechnology, biotechnology, and tele-health, and they foster the sharing and dissemination of knowledge. Information flows are increasingly used as a measure of wealth (LeNoue, Hall, & Eighmy, 2011), and major investments consider them as essential factors that must be present in order that investment decisions can be made in countries, particularly developing ones (World Bank, 2009).

ICTs and broadband Internet have also played an important role in education. Distance education delivered through broadband Internet on fixed, wireless or mobile devices has replaced mail-delivered correspondence courses (Rudestam and Schoenholtz-Read, 2002). Traditional institutions globally are increasingly offering distance courses in competition with virtual institutions somewhat replacing past archaic and latent education delivery methods such as through CDROM or satellite. New forms of content distribution have emerged that use modern mobile devices to access content, and various forms of academic institutions chose different

delivery methods to offer content to various forms of learners using the Internet (Rudestam and Schoenholtz-Read, 2002). The education landscape is changing to meet the needs of working students, mostly adults with familial commitments who are responding to the growing demands from the industry for specialization and professional development (USGAO, 2002). However, socio-cultural barriers, economic constraints, institutional obstacles, political and personal factors contribute to some of the challenges to access, especially to women in sub Saharan countries (Tanye, 2008). Access is further constrained by the increasing enrolment rates into traditional universities especially in developing countries, which are underfunded (Sall & Ndjaye, 2007, p. 45) and are unable to sustain this growth. New methods of delivering content, teaching, learning research, and school administrations at formal and informal settings, and to traditional and non-traditional learners are therefore required to address these growing demands particularly for developing countries, and more specifically to Canadian institutions that seek to target students in this increasingly globalized educational market. ICTs and broadband can play a role here.

It is often challenging to quantify the cost of technology and its influence on social, economic and governance aspect. Revenue figures mentioned earlier as contributions to GDP are attempted estimates which often do not account for other costs or benefits such as social capital, savings, or costs that are usually associated with technology use. Institutions globally continue to grapple with the true cost of Internet technologies and attempts have been made to develop indicators and indexes that could quantify certain aspects. One such measure published by the International Telecommunications Union (ITU) examines readiness, use and impact in selected countries globally. In relation to education the important role that ICTs play suggests that the ineffective use of the Internet and computers could contribute to lowering education levels

especially in developing countries (ITU, 2009). Its 2011 report closely relates the differences in levels of education and income inequalities as a major factor that can affect Internet uptake (ITU, 2011). Increasingly, ICTs are linked to education, economic growth and development.

Despite the recent growth in telecommunications infrastructure deployment and use globally and specifically in Africa where more than eight percent of its population use mobile phones with a projected reach of 41 percent at the end of 2010 (ITU, 2010) and in which over 65 percent of the continent live under the footprint of a mobile network that stimulated about \$56-billion in private sector investments between 2004 and 2008 (World Bank, 2010); more needs to be done to leverage the benefit of this technology. The continent's Internet penetration is projected to reach 9.6 percent by the end of 2010 – although showing growth, it is still a far cry from global averages. Broadband penetration has grown but remains low at 1 percent compared to 24.6 percent in developed countries and eight percent globally by the end of 2010 (ITU, 2010).

The underlying questions are, how much of this development such as the growth of the Internet and mobile technologies have been leveraged for teaching and learning? What are the opportunities that these technologies offer to narrow the gaps and address the barriers to education in developing countries? And how can Canadian institutions leverage these gaps to benefit from this increasingly globalized education landscape?

This growth of technology and the growing enrollment rates have implications on the sustained economic and social development of a people. Certain gaps can be addressed through the enabling and improvement of access to educational content and material, and through developing educational frameworks that leverage technology's value. The Collaboration for Online Higher Education and Research (COHERE) is one institution in Canada that seeks to

advance the use of technology, particular the Internet for the provision of quality education, teaching, and research. Universities and institutions of higher learning are often left on their own to figure out their needs and how they can adapt teaching and learning styles to technology's potential. This body of institutions has come together to address blended learning concerns in the Canadian context (COHERE, 2011). The decisions they make can influence how Canadian education and institutions could become more accessible to international students. However, interventions such as those spearheaded by COHERE are insufficient to address challenges and to leverage inherent benefits if institutions are left to themselves to navigate this rapidly evolving educational and technology terrain. Policies are needed at the university, national, and provincial levels to address these concerns and to explore these opportunities. Policies that integrate technology use for teaching and learning in higher education institutions could be an option.

This paper argues that the growth of the Internet is important for teaching and learning in that it facilitates education in ways that were previously challenging. It recognizes the growth of social media as an emerging Internet technology that can add value and benefit existing methods of online or distance education if they are systematically and homogeneously applied. The paper starts with description of the method used for the literature review. The following discussion section highlights the adult learning context, it describes social media, and explores the use of a framework for which their application can be applied to teaching and learning. The section on challenges recognizes the difficulties with this approach, particularly because social media specifically are emerging technologies and ICTs broadly have been erroneously perceived as a silver bullet to educational challenges. Finally, the paper explores some issues of standards as a measure of the quality of social media use, and then draws some conclusions.

Method

The review of literature was conducted following a broad search of academic journals and databases on three major themes; adult education; various representations of learning that make use of technology such as distance education, online learning, computer mediated learning, and e-learning. A review of global policy positions on the growth of technology and the Internet and how they influence education was conducted specifically targeting global policy sites such as the World Bank and the International Telecommunication Union. In the case of social media use in education, search parameters were narrowed down to its use in post secondary settings and to parameters for evaluating social media use. The matrix below (See Table 1) describes the framework that informed the review of literature for this paper.

Table 1: Literature review matrix

Concepts	Adult Education	Social media use in PSE. Evaluating Social media	ICTs and Globalization of learning	Elearning, distance education, online learning, CML
Authors, phrases, statements, policies, arguments, references				

Discussion

Institutions in North America, particularly in Canada and Europe have recognized ICTs and the Internet's transformative and enabling potential to education. A recent study of over 2500 US colleges and universities in fall 2008 showed that online enrolment growth rates superseded higher education enrolment by 15.8% and over 4.6 million students took online courses (LeNoue, Hall, & Eighmy, 2011). This sort of growth along with efficiencies in time and facilities use, and marketability, has resulted in institutions having to increasingly offer fully online, blended or hybrid courses (Coheer, 2011). Price-per-student is lower while access to quality educational resources have improved. One area where online education has been applied is in adult and post-secondary education, informal; non-formal and formal settings. Adults seek additional training to meet the growing demands for their work, and to support their quest for continuing education throughout the lifespan (Rudestam and Schoenholtz-Read, 2002). Adult learning is usually voluntary, undertaken under complex circumstances and with multiple commitments to work, family and friends while meeting multiple demands for time and energy, and they are conducted in recognition of adult need for flexibility and individuality of the learning experience.

As a result, adult programs are centered around their lives and life experiences; and it must include them in the design, direction and implementation of the learning experience; offer flexibility to them in time, place and mode; recognize mutual respect between them and the teacher; and provide them with a positive learning environment with regular and constructive feedbacks (Rudestam and Schoenholtz-Read, 2002). Learning methods that amplify the professor (as the expert) over the student (as passive and naïve) do not apply well to the average adult learner. They would rather be collaborative partners in the learning process because the adult

brings in a mature perspective to the class. (Rudestam and Schoenholtz-Read, 2002, p. 7). Structured online learning tends to accommodate these needs of the adult learner – for flexibility in time and space, and for the shared collaborative nature that it provides. It is important to define a number of concepts surrounding distance learning and then I will return to their application to the adult learner.

Defining e-learning

Firstly, there is no single definition of e-learning that embraces the broad and varied forms in which technology has been applied to teaching and learning. Commencing with what used to be called “distance education” which describes a technology facilitated relationship between teachers and students spread across geographic locations (Rudestam and Schoenholtz-Read, 2002, p. 5) to computer mediated learning (CML) as the delivery of coursework and degree programs over the internet (Stevens-Long and Crowell, 2002, p. 151), or blended learning, which is the “thoughtful fusion of face-to-face and online learning” (Garrison & Vaughan, 2008); or simply, e-learning “which describes a wide set of applications and processes which use any available electronic media in the pursuit of vocational education and training [and] includes computer-based learning, web-based learning, virtual classrooms and digital collaboration” (Mason & Rennie, 2006, p. xvi), no single term capture various contextual concerns. The evolving nature of the English language and the internet, the availability of different delivery methods of computer, technology and internet use for education makes a single all-descriptive term nearly impossible. For the purposes of simplicity, the term online learning or e-learning is used interchangeably in this paper to capture these broad applications and definitions.

Historically and even presently, different types of institutions and various forms of partnerships have characterized the landscape of online learning (Rudestam and Schoenholtz-Read, 2002, p. 10-12):

- Nontraditional distance learning universities who have ventured from the traditional delivery of distance education courses by correspondence to a combination of face-to-face and distance modalities, or fully online. Examples are Athabasca University and the United Kingdom Open University.
- Traditional university and e-learning partnerships mostly resulting in the creation of a for-profit institution that delivers online learning. Examples include UNext.com, which sets itself up as a link between individual learners and Fortune 500 companies.
- Traditional Universities offering free online learning curriculum and content have emerged in recent times. Examples include MIT with its open courseware concept.
- Organizations representing e-learning for profit that sell online courses or via CDROM. Examples include the Global Education Network (GEN).
- New for-profit Universities that deliver both campus-based and online programs including corporate certificate programs. Examples include Phoenix University, Jones International, Strayer University Online, De Vry's Keller School of Management Capella University, Argosy University and Walden University.
- For-profit e-learning organizations or commercial learning companies who use technology such as video lecture, chat and asynchronous formats to deliver professional training career courses. Examples include Kaplan College (Information technology and law programs), and Sylvan Learning Center.

- Corporate online universities developed by large corporations to produce and deliver corporate information. Examples include McDonald's Hamburger University, Motorola University, Daimler Chrysler University online, General Motors University, NCR University and Shell Open University.
- Nonprofit online learning efforts spearheaded by institutions promoting free online courses, content, and various educational resources. Examples include Sloane Foundation's Asynchronous Learning Network and geteducated.com.
- Combined models delivered using new and emerging technologies such as iTunes-U, which enables universities and corporations to produce and deliver podcasts of contents to individuals.

These varying definitions of online learning described earlier, and the institutions and forms of partnerships that have characterized distance education described above all agree to the importance of the use of technology, specifically the internet, for teaching and learning. The internet has been employed to deliver content using four primary models: a) the naïve delivery model of posting lecture notes without the opportunities for interaction (using email), b) the standard model which draws on web technology to encourage interaction, c) the evolutionary model that allows for the fluid delivery of course materials throughout the learning, d) and the radical model which dispenses with lectures and relies on interactive groups of students (Rudestam and Schoenholtz-Read, 2002). These methods substantially differ from one other in the quantity and quality of the technology that is used, and at the point at which technology is introduced into these forms.

E-learning and the Adult Learner

Earlier, the paper described the elements of learning that are suitable for the adult. In this section, I will describe technology, particularly social media's attributes which may be useful for the adult learner and then draw congruence between both.

For learners particularly adults, technology attributes that seamlessly align well with them and their style of learning can contribute to gains and can aid in leveraging the useful elements inherent in both. The concept of grafting in agriculture explains this further. Grafting a branch from one tree into the stem of another is a symbiotic relationship which usually results in a mutually beneficial partnership. In this case, the grafted branch benefits from the sap that flows through the tree while it contributes its quota in the absorption of carbon from the atmosphere. Such mutual benefits is akin to the kind of gains that exist between learners and technology – technology need humans to propagate its good uses, and humans leverage its benefits for their use in many areas, including education.

Another way of examining this relationship is by exploring the context of tools and their applications through what is known as affordances. The concept of Gibson's affordance is best described as the relation affordance and agency. Affordance relates "attributes of something in the environment to an interactive activity by an agent who has some ability, and an ability relates attributes of an agent to an interactive activity with something in the environment that has some affordance." (Greeno, 1994). In describing Gibson's concept of affordances, Greeno (1994) posits:

Is the affordance that a chair provides for sitting a property of the chair, a property of the person who sits on it or perceives that he or she could sit on it, or something else? [...]. Affordance is a property of whatever the person interacts with, but to be in the

category of properties we call affordances, it has to be a property that interacts with a property of an agent in such a way that an activity can be supported.

By this, Greeno (1994) argues in support of “presence” – a “property” of the chair and agency, a property of the agent or person – as essential ingredients for an activity to occur. However, the presence of agency and affordance alone are insufficient for the action of sitting to take place. Additional elements are needed including the motivation to engage in the activity (of sitting in the chair), which results in satisfaction after that activity has been successfully and satisfactorily executed – in this case rest from prolonged standing. Greeno (1994) suggests that affordances are preconditions for an activity to occur. Similarly, the use of technology for teaching and learning requires various affordances including that of presence – of the tools, in this case, technology for teaching and learning; and of the agents – educators who must apply these tools in order to produce learning. Besides, presence, Gibson describes other affordances of “access” – that is available because the chair is “present”; of “expression” or the intention of the proposed action; of “creation” referring to the energy dissipated and required for the action to take place; of “interaction” between the chair and the agent; and, of “aggregation” of various “presences” or preconditions required for the singular action of sitting. Social media offers similar affordances.

Collaborative, Semantic Web or social media and Education

Later in this section, I will link Gibson’s concept of affordance to social media use in the post-secondary setting, but it is important to define some concepts. ICTs and the Internet applied to any field and particularly to the field of education foster innovation – that is radical, evolutionary, and sometimes revolutionary (Coheer, 2011). Cross border distance education, e-

learning, or blended learning resulting in shared curriculum and delivery methods (for examples, iTunes-U) have continue to emerge and to cause shifts from older forms (described earlier) to new and more socially relevant forms that explore the contributions of new collaborative technologies called Web 2.0 and 3.0. (LeNoue, Hall, & Eighmy, 2011; Jiao, & Miao, 2010) Teaching and learning institutions or universities that want to remain relevant in globalized context and within a newly reconstructed context of social relationships must address how they recognize and apply ICTs and the Internet, particularly social media in their teaching and learning strategies.

The collaborative web often described as the second generation of Internet based services emphasizes collaboration and sharing among users, while the semantic web is the integration and combination of data, and the facilitation by computers to make meaning and to create better understanding. (Lytras, Damiani & Ordóñez de Pablos, 2009; Wikipedia, n.d.; www.w3.org, n.d.). They represents a category of tools and a way of working that is collaborative in nature and that provides an open means of sharing information and knowledge (Donston, 2008), Social media tools used for crowdsourcing, video and voice streaming, collaborative content creation, and shared knowledge spaces offer exciting and innovative ways of teaching, researching and learning. Open source technologies and its philosophies have changed our perception of teaching and learning and how we collaborate and share knowledge online through use of open educational resources, open online text books, open journals, open research and even open knowledge. These principles are also applicable to social media.

Social media in the form of collaborative (Web 2.0) and semantic (Web 3.0) webs portray attributes of Gibson's concept of affordances. Some examples include tools that provide **access** to resources such as information (Google) or people (Facebook); of **declaring** or **stating**

presence (most instant messenger status); of **expression** (Second Life); of **creating** new content and resources (blogs, wikis, and podcasts); of **interaction** with others (twitter, skype); and of **aggregation** of resources (RSS feeds). These functions, or affordances now inform how content should be delivered and how older forms of content delivery described earlier should be reconstructed if they are to remain relevant.

As it relates to the adult learner, social media tools can contribute to narrowing the gaps between the haves and the have-nots because of their minimal cost of entry and use. They leverage the new and essential elements of the Internet for the delivery of content, for research and for sharing knowledge. These are the factors that make learning useful, contribute to narrowing gaps and leveling the playing field. They facilitate self-directed learning, allowing access unencumbered by time and location (LeNoue, Hall, & Eighmy, 2011); and they favor a constructivist approach where students are active participants and co-producers of knowledge rather than passive recipients and ordinary consumers that traditional practices make of them (Golding, 2011; LeNoue, Hall, & Eighmy, 2011).

Experience and prior learning, their ability to be autonomous, self-directed, demand driven, ability to interact, and collaborate with others are elements that adults are conversant with – functions that are already inherently supported in collaborative and semantic webs, and can be enhanced through social media tools. Teaching and learning framed in this context therefore require a re-thinking in many areas – in the role of the student, the teacher, and broadly across academic communities (LeNoue, Hall, & Eighmy, 2011), and they call for embracing philosophies that are sometimes characterized by radical paradigm shifts.

This shifting role is not about the direct application of new technologies to existing learning practices without carefully rethinking strategies for best fit (Cohere, 2011). Neither is it about the introduction of automated administration and Learning Management Systems (LMS) to the school environment. ICTs and the Internet in teaching and learning transcend the use of LMS. Current LMS's approach collaboration through applets such as chat facilities, blogs, and collaborative discussion tools that simulate similar social networking tools. While this integrated platform provide some level of security and content control, learners may find them insufficient and their independent social media counterparts more appealing – for their ease of use, from the inherent value gained from social interactions, because of their low bandwidth requirement, and in most cases the availability of low cost of data bundles on mobile devices. Learners may be willing to compromise the access that social media tools provide than those offered by the LMS.

My experience of using social media tools for teaching and learning in delivering a fully online course for the University of Manitoba, Distance Education department is in consonance with this position. Most learners on the course express pleasure in using social media tools such as third party wikis or blogs for online collaboration, group interactions and class discussions than the applets of similar functions built into the LMS. The LMS increasingly plays the function of a central location through which administrative information like assignment due dates and course contents is shared, than as an integrated learning platform that plays a key role in fostering the delivery, distribution, and active participation of learners.

It is this position, one in which school administration have come to settle on – that an LMS is the central convening point and the anchor for an online learning experience – that often creates the negative perception and unsuitability of other tools such as those provided by social media. This misconception has contributed to a view that construes technology use or social

media and their potential contributions as inherently insecure and intrusive of privacy. Administrators have not as much as considered their use or allowed for a position to be created that is informed by rigorous research and empirical studies. Instead a position is taken that is based on perceptions, which is rather subjective. Indeed, more action based research is required that would draw out the best and worse practices, and from which lessons can be learned, but until then, administrative procedures should accommodate their use and abhor the standard denial approach that social media has been greeted with. After all, technology, and social media is upon us and we should find ways of effectively leveraging its benefits.

Having said this, it is important to state that these tools are not a panacea to existing challenges in delivering quality education. Indeed, there is no silver bullet to the growing challenges facing education in the developing world and globally. Issues of access to infrastructure, electronic journals, research funds and libraries; availability of appropriate physical environment conducive to research, teaching and learning; and resources – both human and material, constitute some of the challenges in higher education. These should be addressed using a holistic approach and should involve collaborative strategies with stakeholders from the private sector, government, civil society working in the area of research, education and knowledge production, and academia itself.

Social media use in administration, teaching and learning presents new sets of challenges at the conceptual and personal level. For instance, questions of standards and their harmonization across institutions of higher learning (see the next section); plagiarism and intellectual property rights are conceptual challenges that need new approaches and more systematic ways of addressing. Physical challenges allude to the willingness or the lack of one towards the use of technology for research, administration, and teaching and learning even when they are available.

Further, a lack of experience and skills to use social media constitute other difficulties and may further expand the gap between the technology savvy and technophobes. (Coheer, 2011) Privacy and online security pose new sets of challenges which institutions, governments at the provincial and federal levels, academic bodies, and teachers should consider as they institute policies, design learning outcomes, and develop curriculum at various educational levels.

Standards and measuring quality of social media use

Questions of standards arise under this new paradigm. For instance, by what standards can a course delivered using social media particularly in post-secondary and adult education setting be measured? How can its content and delivery methods be measured for quality? These questions resulted in the definition of evaluation criteria for social media use in a Finnish University. Using a methodology involving a systematic review of scientific databases on human computer interaction, psychology and pedagogy, and extensive testing with several students over a two-year period, Silius, Kailanto & Tervakari (2011) generated a set of ten criteria for evaluating social media use in teaching and learning. These include: privacy and security, information reliability, supporting navigation, accessibility and motivating the user, presentation of content, visual design, readability of text, media elements, and technical implementation. Through this, they were able to evaluate the quality of social media use in a post-secondary context and establish the elements that must be present in future delivery of online courses. These elements are in consonance with Badrul Khan's framework for evaluating e-learning.

Khan's (n.d.) framework highlights the elements and essential components that must be present for effective content delivery in an e-learning context. These include:

- Pedagogical analysis of the content, audience, learning goals, and outcomes

- Review of the technological infrastructure and their conformance to teaching and learning
- Evaluation of the design interface for a useful teaching and learning experience
- Meta-evaluation of the learning, instruction and learning process.
- Appropriate management of the learning process from start to finish
- Evidence of support to learners and presence of administrative support
- Consideration for ethics

While these models explore the effectiveness of social media use in teaching and learning, and perhaps research, they highlight the constraints of existing models of online content delivery. They also create a new layer of responsibility for the instructor or school administration which should not see their use as a replacement for pedagogy, rather as playing a complementary role of facilitating learning. As social media use continues, more discussions of standards may arise that will ground them in theory and that may perhaps help to improve their use for teaching and learning.

Moving forward

In the meantime, to engage in this shift, certain literacies are needed. First, digital literacies, which include the ability to navigate the Internet, search for information from credible sources, and identify relevant and applicable information, is an essential skill that must be acquired. The growth of the Internet has resulted in a large set of information sources and knowledge bases that require literacy skills in order to find relevant and credible information and knowledge from the pile. Secondly, identities are shaped through collaborations with others online. Each forum we contribute to, each blog post we author, each comment we make, and

each profile we create contributes to our identity. Users should therefore pay attention to the alignment of their online personae with their real life ones.

Thirdly, learners should keep track of their learning because the benefits from online learning and the use of social media tools may not be immediately visible. Hence, learners should develop the lifelong learning skills necessary to track their own learning and work so that they could be referenced for future use. Fourthly, security and privacy concerns must be at forefront of the online learner. With the growth of cyber crime and identity theft, learners should develop the literacies that help them to protect their identity and personae. Lastly, trusting the Internet or certain aspects of it relates directly to how much value a learner receives from its sources. Building trust on the Internet depends on the ability to critically analyze and verify sources of information. Literacies are required to iteratively build and develop this confidence.

Conclusion

This paper has attempted to shift the reader's perception from an indifferent or negative one towards a more favorable and acceptable view of social media use in teaching and learning. It has argued that the affordance that social media provides is congruent with the characteristics that must be present for adults to learn. A number of recommendations are therefore emergent from this brief that may require necessary policy and administrative level attention in post-secondary institutions and school management bodies.

First, academic institutions, governments and policy makers should recognize the opportunities that the growth of ICTs and the Internet offer to teaching and learning. The focus should not be limited to improving access to research materials, or to educational administration only but in recognizing their potential for the transformation of teaching and learning; for creating linkages across boundaries between students and faculties, and for producing the international knowledge worker capable of participating in the globalized world.

Secondly, innovative forms of partnerships may be required to advance technology use in higher education institutions. Public private partnership models which draw upon expertise from the industry should help in defining areas in which technology use in education can respond to societal needs and increasing global demands. New strategies are required that invite local industries to support research and the development of homegrown tools, applications and services that leverage collaborative and semantic web attributes, that meets the nuances of the Canadian learning environment, and the external/international student market that they seek to attract, and that positions them to participate in the global knowledge economy.

Finally, a scan of the literature shows a limited amount of research in the use of new web technologies for teaching and learning in most countries. Further research based on evidence may be required that are particularly focused on action based methods in higher education settings where lessons can be drawn, and experiences adapted to reflect practices – improving or declining. The outcomes of research should contribute to the development of policies, partnerships, strategic plans and their implementation.

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