EDUCATIONAL TECHNOLOGY: HARNESSING NEW TOOLS TO SUPPORT INFORMATION LITERACY

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Abstract
Educational technology is changing the face of teaching and learning. It can play a stimulating role within a single class or it can provide the mechanism for delivering an entire course. The exploration and adoption of new technologies offers librarians an opportunity to evolve their role. Librarians are logical contributors in the development of project work in which electronic resources and learning tools are required. Librarian expertise in the digital environment spans a complex array of scholarly resources, learning objects, and Web documents. Instruction librarians are at the forefront of information technology and are ideally suited to participate in new institutional experiments with educational technology. Digital learning resources must be selected and organized. Methods of access to online journals, electronic collections, and multimedia must be developed. New types of assignments that foster active learning and collaboration must be invented. Ways of creating and delivering information literacy resources must be created. This paper describes how librarians can use their knowledge of information and educational technology to enhance their involvement in curriculum development. The primary goal of this participation is to foster information literacy. Some scenarios are simple and require little investment. Others require full partnership as a course designer where information literacy objectives align with course goals.

Librarian engagement in the learning enterprise
Over the past 30 years, the work of librarians has mirrored the evolution of our understanding of learning. Interest in learning theory in the 1970s encouraged librarians to build rich collections to address specific teaching and learning objectives. Emphasis on learning also highlighted the educational role of the librarian and in the 1980s the concept of information literacy was born. Evolution of our teaching role was stimulated by public access to the Web in the mid 1990s. One stimulus was the change resulting from the information explosion. A part from the sheer volume and rate of information production, the second spur was the creation of new forms of digital information and the tools by which they are accessed. A third motivation resulting from the extent of information resources, their diversity, and their accessibility, was in the evolving concept of information and media literacy and the notion of ‘learning to learn’. A fourth change appeared in the field of education with the development of new methods for teaching and learning arising from increased access to digital information, new forms of educational technology, and our understanding of the processes of learning.

There is more to learn and less time in which to learn it. In a comprehensive analysis of the world’s entire sphere of data, researchers at the University of California at Berkeley estimate that the entire history of humanity accumulated 12 exabytes of information (1,000,000,000,000,000,000 bytes). Today, 12 exabytes is produced every 2.5 years making the need to understand how to locate information using effective research strategies more
important than ever. Librarians are expected to select, organize, and manage digital resources; they know where and how to find information, regardless of format or content. Information seekers turn to us when they are confused by the plethora of available databases and by Web searches that produce inaccurate and unscholarly results. Need a video, an mp3, an audio file, a photograph, an image, articles from scholarly, popular or news sources, a learning object, a reliable website, a listserv, an e-book? We are now master caretakers of the nebulous virtual library in addition to the traditional physical collection. Our methods and interfaces for connecting people with resources have diversified. Today we use educational technologies to offer course-integrated information literacy development, interactive tutorials, and virtual reference.

Apart from managing the sheer quantity and diversity of information, we must also simultaneously assist learners in understanding the breadth and depth of what's available. Information literacy has evolved to include media and computer literacy, awareness of new forms of digital information, and the tools by which they are accessed, and methods for managing, producing, and sharing information. Educators in the 1990s identified information literacy as a foundation for learning in an environment where students need to engage with information as part of their formal learning process. The hallmark of a good education was once the understanding of a body of knowledge, but today it is the skills of analysis, evaluation, and synthesis that are critical for sense-making in our vastly resource-rich world. Despite the ocean of information confronting us there is no assurance that it can be found or understood, or that we will learn from it. With the growing need for lifelong learning in our society, universities are also entreated to engage students in research in as many undergraduate courses as possible - essentially reinventing the learning process. Movement towards a new model of learning that explores how students might engage with their teacher, with one another, and with learning resources in a rich and complex networked environment poses a new challenge in higher education. In effect, we have all become students again; the process of learning itself has become a focus of education and is coined by the phrase ‘learning to learn’.

Supporting information literacy through educational technology initiatives

The driving force behind adoption of educational technologies in universities is the belief that they will enhance learning. Educational or learning technology is defined as the use of computerized information and communication tools in teaching and learning. Librarians can evolve their teaching role by collaborating with faculty to introduce learning technologies in courses, in either face-to-face or online modes. Survey results of how university faculty use technology in their teaching suggest that many instructors are just beginning to establish patterns of how they structure and organize course materials on the Web. The time is right for librarians to offer assistance in using educational technologies to maximize access to digital resources and to re-introduce the need for teaching the research process in the nebulous information environment. There is a need to build a library presence within course websites, to identify multimedia and assignments that enrich learning environments through active collaborative participation, and to embed information literacy development through new learning structures, including the Learning Commons concept and in online distance courses. The Learning Commons is an accessible, collaborative space where people pursue and share ideas. This enriched learning environment brings together tools, resources, and support for the academic experience of students. The dedicated space unites people who assist students through individual consultation, workshops, peer mentoring, and collaboration, and it includes improved support for accessing and exploring digital resources and technology.
Introducing educational and information technologies across the curriculum.

There are various approaches open for academic librarians seeking to introduce educational and information technologies to enhance information literacy development across the curriculum. Approach 1 is about creating a library portal on web course page. The first stage is to review the course home pages at your institution. Students in both on-campus and distance courses benefit from a library presence on these sites. Without a portal to institutional resources, students tend to google. They prefer the Web as an information source because it offers seductively easy access to apparently high-quality full-text resources and requires no learning of specialized library tools. Carlson records the observations of a history professor at Furman State: “Students have this idea that there is no difference between searching on the Web and searching in the library”. This faculty member names librarians as the “new allies in the fight against research by googling”. He recommends creating a library portal on course web sites that includes descriptions of key tools in the discipline, links to databases, electronic reserve readings, bibliographies, help guides (e.g. citation style), and contact information for the librarian specialist in that area. According to another professor of Web design technology, “The library is really good at vetting and organizing published content, while the educational-technology groups work with faculty with their unpublished content. And yet students need both at their fingertips. We don't want them just going to google”. Courseware developers should provide a section for adding library-related information to every course page to promote library connectivity to classroom learning and project work.

Some instructors attempt to counteract the google phenomenon by providing links to ‘electronic reserve’ journal articles and full-text websites. However, if the links are the sole complement of learning materials for the course then the opportunity for information literacy development is lost. In limiting the information-finding experiences of students for the sake of convenience, instructors fail to teach students how to select and evaluate sources appropriate to their needs. This precludes student skill development by not engaging them in the independent search for relevant learning materials.

The second approach is concerned with designing online interactive information literacy modules. The act of making a library portal on course Web pages may encourage student use of research tools. It should be acknowledged, however, that learning to use these resources effectively in the context of assignments necessitates information literacy development and not just the provision of web links. This highlights another venue by which librarians are using educational technologies to foster information literacy development.

Ten years ago librarians used the adage ‘garbage in, garbage out’. Electronic searches match the words of the query and depend entirely upon the language of the user. Today this phrase is replaced with ‘garbage in, gospel out’, signalling the commonly held misperception by students that computers are adept enough or big enough to find relevant matches regardless of the unsuitability of the initial query. Librarians must continue to educate themselves in the best mechanisms for using new information tools and pass this knowledge on to others so that the wealth of information at our disposal can be tapped effectively and efficiently. Online modules on research strategy, mining the invisible Web, searching specific subject databases, and citation management and style should be linked to course pages. Today’s students prefer software that offers interactivity, visual as opposed to text-based presentation, and sound and video. Librarians should make use of programs that offer these features. Examples include RoboDemo, ScreenCam, Camtasia, Viewlet Builder, and Flash. Distance learners are in special need of access to information literacy tutorials. It is unfortunate that links to electronic journal articles and web pages are sometimes the only resources offered in virtual classrooms. To empower distance learners with independent research skills, librarians are crafting interactive tutorials in relation to course curriculum. Johnstone and Krauth list a number of
modules that highlight conceptual frameworks within the research process and promote understanding of academic research and the tools that support it.

The third approach is to collect and organise multimedia materials. A focus on teaching quality in higher education has arisen in the past two decades; evidence the rise of instructional development centres on North American campuses. One activity in these centres is to spotlight teaching methods that enhance student learning. One student-engaging approach is the use of materials that prompt participation and address a range learning styles. Such content can be as simple as a video or as complex as an online simulation. Librarians who specialize in multimedia collection are developing another avenue for improving collaboration in the classroom. A library website can identify sites and search techniques to find: videos in the library and on the Web (e.g. Open Video Project); libraries of primary sources (e.g. Library of Congress American Memory Collection, Early Canadiana Online); image libraries (e.g. Smithsonian Institute; Images Canada); audio collections (e.g. Canadian Broadcasting Corporation Archives); webcasts; and learning objects such as:

- MERLOT (Multimedia Educational Resource for Learning and Online Teaching): http://www.merlot.org/
- CORIL (Cooperative Online Repository for Information Literacy): https://ospace.scholarsportal.info/community-list
- PRIMO (Peer-Reviewed Instructional Materials Online Database): http://cooley.colgate.edu/dbs/acrlprimo/showrec.html

The fourth approach can be to contribute to and use information literacy repositories. Learning object repositories are a recent addition to the array of educational technologies. A learning object is defined by the Co-operative Learning Object Exchange (CLOE) as: “any digital entity designed to meet a specific learning outcome that can be reused to support learning” (http://learnware.uwaterloo.ca/projects/CCCO/cloe_about_def.html). Some learning object repositories cover all disciplines while others specialize in information literacy such as PRIMO in the United States and CORIL in Canada. The advantage of a repository is that an instructor or librarian can download existing resources and adapt them to the local environment. Objects in CORIL are peer-reviewed and include interactive tutorials for specific assignments, databases, and courses. Examples include an interactive tutorial for a social work assignment at Ryerson University in Toronto Ontario; a self-directed course workbook for graduate rehabilitation students; and a video on assignment design for faculty.

Partner with an instructional development centre provides the fifth approach. Instruction librarians are well positioned to contribute to learning strategies in the classroom and should explore partnerships with campus teaching centres. They often have teaching experience with both small and large classes in face-to-face and online environments. They design research assignments that support good pedagogy and develop lifelong learning skills in students. They identify learning materials including scholarly works, images, photographs, primary sources, news articles, statistics, artefacts, Web pages, videos, music, simulations, virtual field trips. They create Web pages, interactive tutorials, and use course design tools and listservs. Librarians often practise active learning techniques and test new methods of engaging students. They provide email consultation and virtual reference. Taken as a whole, the breadth and depth of this background make them ideally suited to participating in new institutional experiments in the design and application of educational technology. Local teaching centres would benefit from librarian participation in workshops such as assignment design and assessment, information literacy development, and using multimedia in the classroom.
One form of faculty-librarian collaboration at Queen’s University is the participation of a librarian in a faculty position called a Learning Technology Faculty Associate (LTFA). The role of the LTFA is to facilitate the critical and effective use of educational technology in the learning environment at Queen’s. A librarian held this position with four faculty members over several years and had the opportunity to:

- collaborate with colleagues to use educational technology in their classes,
- engage more sceptical colleagues in exciting new technology initiatives,
- advocate for greater institutional support for educational technology in the curriculum,
- offer workshops and programs that develop skills with new learning technologies,
- research the effectiveness of teaching and learning with technology.

Becoming part of a learning technology team is another approach. Learning Technology Teams (LTT) at Queen’s University provided an opportunity for librarians to contribute to short-term learning technology projects. The LTT is a group of individuals with different areas of expertise that provide support to a faculty member as he/she integrates technology into a specific course. Team membership brings together instructors, librarians, instructional designers, technical support personnel, and other faculty members who have successfully used technology in their teaching to support the use of technology in a specific course. The goal of the team is to enhance the learning environment in student courses through identification of teaching and/or learning challenges. Each member brings a specialty to the table. The faculty member brings in-depth subject expertise. The instructional designer brings knowledge of how pedagogical tools can be used to achieve desired learning outcomes. The librarian has an understanding of information resources and the electronic tools for accessing them and is practiced in collaborative enterprise through work with faculty and students on a daily basis in the interpretation of research requests. Technical support people are experts in specific hardware and software and often bring a broader knowledge of the range of technological tools that could be applied to instruction.

One Learning Technology Team at Queen’s helped a professor introduce educational technology in a second-year Shakespeare class of 100 students. The course followed Shakespeare’s development as a dramatist through careful reading of 12 plays in relation to social, historical, and intellectual contexts. The librarian was the project leader and introduced a range of new learning tools: a virtual tour of the Globe theatre; videos of modern stagings of several plays; audio files on the Web of selected speeches; a library portal to research tools and guides; photographs and images on the Web reflecting theatre practice and costuming variation; and PowerPoint slides as a tool to organizing these features during lectures.

Learning commons projects are also an alternative and provide approach 7. In response to the impact of electronic information and the need to support scholarly use of information resources, many academic libraries are developing a Learning Commons. The Common offers another venue to connect information literacy to the student learning experience. A Commons model that goes beyond straightforward access to technology to focus on learning with technology invites partnership with other campus units that provide support across the research continuum. Writing centres, technology units, learning strategies groups, and special readers’ services for those with learning and physical disabilities provide help at various points during assignment completion. Bringing related services together offers an integrated learning environment where use of information technology is enhanced through formal and informal instruction programs and reference assistance.

The final approach is concerned with online course development. Further along the continuum of involvement with educational technology is participation in online coursework.
Collaborative multidisciplinary teams are not yet recognized as the preferred means for exploring educational technologies in higher education. However, several American institutions use a faculty-librarian-staff team model and have found them to be highly successful. There are several noteworthy examples of in-house teams that include librarians on curriculum projects that use educational technology, including online course components. At Indiana University Purdue University Indianapolis (IUPUI), instructional teams are spearheaded by the university libraries and involve “a collaborative effort led by a member of the teaching faculty working with a librarian, a technologist, a counsellor, and a student mentor.” The Jumpstart program at the University of Southern California involves project teams with instructional technologists, librarians, and other technology professionals. Arizona State University employs multidisciplinary development teams to support faculty in their efforts to develop multimedia or Web instruction. UWired at the University of Washington draws on collaborative teams to provide access to the tools and resources needed to use technology to enhance teaching and learning; promote fluency with information and information technology; and to foster innovation in technology-enabled teaching and learning.

At Queen’s University a course called ‘Teaching and Learning in an Online Environment’ was co-designed by a librarian and an educational advisor. This online course was devised for faculty who intend to teach online and demonstrates how course work, information literacy, and the building of learning communities all support one another in the virtual learning environment. Librarians can encourage a resource-rich environment rarely occurs without their direct involvement in the planning and development of online courses. This collaboration is crucial for a web-savvy generation of learners because it teaches course content using information-related tasks that go beyond googling and expose the multitude of rich text and multimedia in the invisible web of library resources.

Evolving our role to remain relevant with digital natives

To remain relevant to the next generation of learners, librarians must address difficult questions: What societal changes are being driven by new technology? How do we shape our role and our information systems to best serve our users? Marc Prensky characterizes today’s students as digital natives. The natives want to:

• receive information really fast (at twitch speed),
• parallel process and multi-task,
• see graphics before their text,
• access information randomly whenever and wherever they are,
• network and be connected to others,
• have instant gratification and frequent rewards,
• have all information systems to work like Google.

With fewer students coming to the library, the library must go to them. Whether by course page, virtual help, online tutorial, or embedded information tasks, librarians must be proactive in reaching today’s learners. Although we are digital immigrants who speak with an accent, we can experiment with educational and learning technologies to reach out to the Net generation. The President of Johns Hopkins University recently described the critical function of librarians: “Massive information overload is placing librarians in an ever more important role as human search engines. They are trained and gifted at ferreting out and vetting the key resource material when you need it. Today’s technology is spectacular — but it can’t always trump a skilled human. Have you hugged your librarian today?”
References