McMaster University Library
Blended Learning Task Force
Report and Recommendations

April 9, 2011

Karen Nicholson, Teaching and Learning Librarian (Chair)
Gord Beck, Map Specialist
Andrew Colgoni, Science Fluencies Librarian
Ines Perkovic, Liaison Librarian - Business
Olga Perkovic, Liaison Librarian - Social Sciences and Humanities
Susan Shepley, Liaison Librarian - Social Sciences and Humanities

Table of Contents

Executive Summary

The Blended Learning Task Force was charged with the following tasks as part of McMaster University Library's Strategic Plan 2011-2013[1]:

- Strike a working group to review the delivery models for library instruction with the intent to dramatically increase the use of online (versus face-to-face) delivery.
- Identify best practices in blended learning in higher education.
- Gather input from stakeholders including liaison librarians and campus partners.
- Make evidence-based written recommendations to the University Librarian regarding a blended model for instruction at McMaster University Library, aligned with the Library's vision and within the library's current fiscal constraints.

In the following report, the Task Force:

- Identifies best practices in blended learning in higher education;
- Identifies best practices in blended and online learning for information literacy instruction;
- Summarizes feedback gathered from Library liaison staff; and
- Makes recommendations about a blended learning pilot for "course redesign" models for information literacy instruction at McMaster University Library.

In today's technology and media rich environment, information literacy must be understood as a broad set of skills and competencies, including information and computer literacy, geospatial literacy, quantitative literacy, digital media literacy, visual literacy and critical thinking. McMaster University Library acknowledges these multiple literacies in its use of the term "21st century fluencies" to describe the programs and support it provides to teach students "to be successful, ethical information seekers" in order to advance "teaching, learning and research at McMaster" (McMaster University Library, 2010). Throughout this document, the term "information literacy" is used in its broadest sense to denote these multiple literacies.

Information literacy instruction at McMaster University Library is currently offered within the context of a 'liaison' program that matches librarians and staff with departments and programs. The primary model of curricular integration is course-related, with liaison staff[2] invited to provide guest lectures or workshops intended to direct students to resources, such as the library catalogue, databases, maps and web sites, they will need to use in order to complete a particular assignment.

In order to determine the strengths and weaknesses of this model, the Task Force conducted a literature review of best practices in blended learning for higher education and for information literacy instruction, and library integration into learning management systems. We also invited liaison staff to conduct a SWOT analysis. Basd on the evidence obtained, we recommend that blended learning should maintain the following successful aspects of the liaison program and information literacy instruction at McMaster University Library:

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[1] Available at: http://library.mcmaster.ca/sites/default/files/final-strat-plan-brochure-2011.pdf

[2] Liaison staff refers to librarians and paraprofessional staff in Maps, Data and GIS who deliver information literacy instruction.

- Partnerships between library liaison staff and faculty;
- Liaison expertise in information literacy skills and competencies;
- Face-to-face (F2F) instruction to address higher-level learning outcomes;
- Integration into the McMaster learning management system, Avenue to Learn.

It should also address the following weaknesses:

- Redundancy in information literacy instruction for students enrolled in large, first-year undergraduate courses;
- Duplication of effort by liaison staff in preparing instructional materials;
- Inconsistencies in learning outcomes and content for first-year courses;
- Content-heavy, teacher-centered instruction;
- A lack of integration of information literacy skills across the undergraduate curriculum;
- A lack of evidence that learning outcomes are being met;
- Insufficient online resources to support students at point of need;
- Insufficient liaison staff to respond to student requests for one-on-one assistance;
- Insufficient liaison staff to do outreach and to provide additional F2F instruction to upper level students.

Blended learning is "a pedagogical approach that combines the effectiveness and socialization aspects of the classroom with the technologically enhanced active learning possibilities of the online environment" (ECAR, 2004, p. 3). It has the following characteristics:

- A shift from lecture to student-centered instruction for both the face-to-face and online components;
- Increase in interaction between students and the instructor, their peers, [and] the course content;
- Integrated formative and summative assessment mechanisms for students and instructors.

Blended learning entails more than simply adding online elements into a traditional course structure; it requires a thorough reassessment and re-engineering that fully integrates **both** face-to-face and online aspects of the course. Blended learning model liaison staff continue to: (a) provide instruction to undergraduates at all levels in the classroom and online; (b) liaise with faculty, and (c) be embedded in the learning management system.

The Task Force examined course redesign models proposed by the National Center for Academic Transformation (NCAT) as a means to integrate online learning into the Library's current model of information literacy instruction. It is our recommendation that a course redesign "replacement" model be used to pilot blended learning in selected first-year undergraduate courses with large enrolments in 2011-12.

The Task Force makes the following 15 specific recommendations about implementing a blended learning model for information literacy at McMaster University Library. A detailed version of these recommendations is available on pages 19-25 of this report.

Brief Recommendations

Teaching and Learning

1. Pilot blended learning, using a course redesign "replacement model" in selected first-year undergraduate courses with large enrolments in 2011-2012.

2. Implement mandatory pre- and post-assessments in the pilot courses to verify student learning outcomes are being met.

3. Develop standardized information literacy learning outcomes for all first-year undergraduate courses.

4. Work with departments and the Centre for Leadership in Learning (CLL) to map information literacy outcomes into the curriculum as part of program-level curriculum mapping initiatives required by Ontario's *Quality Assurance Framework*.

Content Management and Technology

5. Use Avenue to Learn as the primary platform for the online delivery of information literacy instruction during the pilot.

6. Use online learning objects in a variety of formats, created by both the CLL and liaison staff.

7. Create a strategy and supporting policies for the creation and management of information literacy learning objects and resources.

8. Provide ongoing technical support for the creation, distribution, and archiving of online learning objects.

Publicity, Outreach and Communication

9. The McMaster University Library administration, in partnership with the CLL, should implement a multi-pronged communication plan to share information about the blended learning pilot with faculty, and to raise awareness of the value of information literacy instruction and faculty-liaison collaboration.

Training and Support

10. Provide training and support in best practices for blended learning to liaison staff who will provide blended information literacy instruction.

11. Build awareness of the blended learning initiative among, and provide support to Library public service staff, including Library Services, Maps, Data and GIS, Lyons New Media Centre, library IT support staff and student employees.

12. Provide in-person research help support in the Mills Learning Commons.

Evaluation

13. Implement the NCAT financial planning tool to determine the cost effectiveness and sustainability of the blended learning strategic initiative.

14. Survey faculty, students and library staff to determine satisfaction with the Blended Learning Initiative and to gather feedback for enhancements.

15. Use appropriate measures to assess the effectiveness, convenience and efficiency of the blended learning initiative.

Introduction

The Blended Learning Task Force has been charged with the following tasks as part of McMaster University Library's Strategic Plan 2011-2013[3]:

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Information Literacy Instruction

Information literacy is most commonly defined as "a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (American Library Association, 1989). An information literate individual is able to:

- Determine the extent of information needed;
- Access the needed information effectively and efficiently;
- Evaluate information and its sources critically;
- Incorporate selected information into one's knowledge base;
- Use information effectively to accomplish a specific purpose; and
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally.

According to the Alexandria Proclamation of 2005 (UNESCO, 1995-2011), information literacy and lifelong learning are

> beacons of the Information Society, illuminating the courses to development, prosperity and freedom. Information literacy empowers people in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals. It is a basic human right in a digital world and promotes social inclusion in all nations.

In today's technology and media rich environment, information literacy must be understood as a broad set of skills and competencies, including information and computer literacy, geospatial

[3] Available at: http://library.mcmaster.ca/sites/default/files/final-strat-plan-brochure-2011.pdf

literacy, quantitative literacy, digital media literacy, visual literacy and critical thinking. "The emergence of social media and collaborative online communities requires a re-framing of information literacy as a metaliteracy that supports multiple literacy types" (Mackey & Jacobson, 2011, p. 62). McMaster University Library acknowledges these multiple literacies in its use of the term "21st century fluencies" to describe the programs and support it provides to teach students "to be successful, ethical information seekers" in order to advance "teaching, learning and research at McMaster" (McMaster University Library, 2010). Throughout this document, the term "information literacy" is used in its broadest sense to denote these multiple literacies.

Over the past two decades, the development of students' "generic graduate attributes" or "generic skills" has become increasingly important in higher education. As Barrie (2006) states, "One obvious way in which universities have sought to articulate their role and purpose is through a description of the qualities of their graduates" (p. 215). The Australian Higher Education Council (1992) describes these skills or attributes as the

> skills, knowledge and abilities of university graduates, beyond disciplinary content knowledge, which are applicable in a range of contexts and are acquired as a result of completing any undergraduate degree. They should represent the core achievements of a university education. (cited in Barrie, 2006, p. 217)

In Ontario's *Quality Assurance Framework* (Ontario Universities Council on Quality Assurance, 2010), the University Undergraduate Degree Level Expectations (UUDLEs) and Graduate University Degree Level Expectations (GDLEs) are described as "Ontario universities' academic standards [that] identify the knowledge and skill outcome competencies that reflect progressive levels of intellectual and creative development" (p 4).

Academic librarians, working collaboratively with faculty, foster the development of a number of generic skills in students, information literacy and critical thinking in particular. Librarians have long advocated that the most effective model to develop information literacy skills is to embed them into the curriculum (ACRL, 2000; 2003). In spite of this however, the fifty-minute "one-shot" guest lecture by the librarian in a credit-bearing course continues to be the most common model for information literacy instruction in Canadian higher education, followed by general orientation workshops. This form of "course-related"[4] information literacy instruction corresponds to what Barrie (2006) describes as "precursor" and "complement" conceptions in which generic skills are viewed as foundational skills that round-out disciplinary knowledge.

Badke (2011) aptly describes the problems of the course-integrated model as follows:

> In information literacy, though we are dealing with a complex and challenging set of understandings and skills that require much instruction and practice to develop to the point of sophistication, the response of academia to this point has been to make it a remedial issue. That approach indicates a misunderstanding of the nature of the challenge and, indeed, of the nature of information literacy itself. ...This notion creates a damaging circular argument—if information literacy is primarily taught through one-shot sessions, then it must be remedial and easily accomplished within the time allotted, otherwise more time would be devoted to it. But, because universities devote so little

[4]ACRL Information Literacy Glossary
http://www.ala.org/ala/mgrps/divs/acrl/issues/infolit/overview/glossary/index.cfm

> time to it, the assumption of faculty is that the one-shot is sufficient and that little more can be done to improve student abilities through specific instruction. ...The reality, however, is that students develop genuine information literacy the way many other knowledge-based skills develop—from a combination of instruction and practice over a significant period of time. Information literacy is a challenging discipline involving effort closer to learning a new language than to learning to read a spreadsheet. (pp. 130, 132)

A number of studies in library and information science have explored the barriers and challenges librarians face in working with faculty to integrate information literacy into the curriculum. These include: differences between faculty and librarian "cultures" (Hardesty, 1997); the complex nature of the faculty-librarian relationship (Given & Julien, 2005; Julien 2000, 2003, 2006); and the misalignment between the information seeking practices of faculty and students (Leckie, 1996). Barrie (2004a, 2004b, 2006) explores faculty conceptions of generic graduate attributes in order to consider the contribution of disciplinary background and the implications for curriculum reform. A key argument of his research is that "the extent to which the rhetoric of such statements [descriptions of graduates attributes] actually represent a shared understanding of the outcomes of a university education of a matter of conjecture" (Barrie, 2006, p. 216). More recently, researchers have focused on student attitudes towards libraries and their perceptions of their information and technology skills (OCLC, 2005; Hargittai, Fullerton, Menchen-Trevino & Thomas, 2010; Head & Eisenberg, 2010).

Information Literacy Instruction at McMaster University Library

Information literacy instruction at McMaster University Library is currently offered within the context of a library liaison program that matches librarians and staff with departments and programs. The primary model of curricular integration is course-related, with liaison staff[5] invited to provide guest lectures or workshops intended to direct students to resources, such as the library catalogue, databases, maps and web sites, they will need to use in order to complete a particular assignment. The evaluation and management of information sources are also frequently addressed topics. Liaison staff work collaboratively with faculty to design information literacy classes and, in some cases, assignments. They are well versed in the principles of active learning, and most have had exposure to the principles of instructional design, including writing student-centered learning outcomes, and tools such as lesson plans. In order to provide students with an opportunity to actively experiment with the material being taught, classes are held in the Library's e-classrooms and in campus computer labs whenever possible. In general, learning outcomes are not directly assessed, although faculty or library staff may indirectly assess them by examning the sources cited by students to see if they meet pre-established criteria (e.g., are they peer-reviewed, are they from academic journals, etc.). Student and faculty satisfaction is not systematically measured, although anecdotal evidence can be gathered from faculty and student feedback. In general, despite the best efforts and commitment of liaison staff to integrate information literacy into the curriculum, information literacy instruction at McMaster suffers from the shortcomings of the remedial model described by Badke (2011) above.

In order to confirm liaison staff's perceptions of the strengths and weaknesses of our current model of library instruction [primarily face-to-face (F2F), delivered in small group hands-on sessions], the Blended Learning Task Force invited liaison staff to complete a SWOT analysis.

[5]Liaison staff refers to librarians and the paraprofessional staff in Maps, Data and GIS who deliver information literacy instruction.

Their responses, summarized below, confirm the issues associated with the remedial model and provide additional insight into the challenges the redesign should address.

SWOT Analysis

Strengths and Opportunities

The current model has a number of advantages and benefits. The liaison program has formalized and strengthened long-standing partnerships between library liaison staff and faculty, and repeat sessions from year-to-year are an indicator that faculty perceive the value of information literacy instruction. Face-to-face course integrated instruction emphasizes the importance of the skills and material being taught and the role of the librarian as a partner in teaching and learning. Students see the library staff as a knowledgeable and helpful resource. Liaison staff has developed knowledge of pedagogy and information literacy, and the staff members are deeply committed to their role as teachers. Instruction can be adapted to meet the specific needs of the students and faculty. Face-to-face instruction, which allows for dialogue and collaborative learning, is seen to be more appropriate than blended learning to achieve higher-level learning outcomes. The Teaching and Learning Librarian is seen to be a valuable resource, and her role emphasizes the value the Library places on information literacy instruction. In terms of technology, the e-classrooms are well equipped, and liaisons continue to integrate themselves into the learning management system, Avenue to Learn.

Weakness and Threats

The current model also suffers from a number of disadvantages and weaknesses. First, there is a perceived lack of advocacy and leadership from the Library administration for the formal integration of "21st century fluencies" into the curriculum. As a result, faculty may not perceive a need to integrate information literacy skills into their courses. In addition, the curricular integration of information literacy skills across departments and programs is uneven, and skills are not introduced progressively throughout the curriculum. A further problem is that the concept of "21st century fluencies" remains unclear to faculty and to some library staff as well.

Poor communication from top-to-bottom and across the Library also poses challenges. Changes to library services (e.g., the PrintSmart system, ILL, the Library web site) and library spaces (e.g., renovations, changes to the location of service points and departments) are not shared in a timely fashion, with the result that faculty and students may receive inaccurate information during instruction sessions. A lack of co-ordination and collaboration across libraries results in inconsistencies in instructional design (e.g., student learning outcomes, content, instructional strategies and resources), and in duplication of effort on the part of liaisons. Instructional materials and support resources are not posted to the learning management system or the Library web site in a standardized or systematic way. There are insufficient opportunities for liaison staff to share information and knowledge. Communication between liaison staff and library services staff about research assignments and questions received at the research help desk is also an issue.

In terms of the liaison model, liaison staffing is inadequate to handle requests for instruction effectively. This also limits the Library's ability to do outreach to new user groups (e.g., new faculty, graduate students) or "non-traditional" groups (e.g., continuing education students, high school students). The model of bringing students into the library in course sections or tutorial groups for small group hands-on repeat sessions is cost- and resource- inefficient: it requires

too much staff time, the e-classroom is booked to capacity, and liaisons spend too much time preparing instructional materials. Despite the fact that the liaisons appear to value active learning, instruction is largely lecture-based; several respondents described this as "too much 'point and click' instruction" and "death by PowerPoint". Rising enrolments at the university are also problematic: large classes require assignments that are less time-consuming to mark, such as multiple choice questionnaires, resulting in a "dumbing down" or oversimplification of material. Liaison staff also acknowledged the challenges of integrating active learning in large classes.

With regard to technology and online support, several respondents commented on the difficulty of navigating the library web site. The result is too much class time is spent explaining how to find information instead of focusing on higher order skills such as evaluating information sources. There is a lack of online resources to support students at point of need. Technology support in the libraries is slow to respond to problem reports and there are often laptops in the e-classrooms that require updates or do not function. The technology infrastructure across campus is poor, with few computer labs/classrooms and incomplete wireless coverage across campus.

Students' Information Literacy Skills

The literature on students' information literacy skills provides evidence of and insight into the issues that the blended learning initiative should address.[6]

A number of recent studies indicate that today's students, often referred to as "millennial" or "NetGen" students, are prolific users of information and communication technologies. A survey of college students conducted by the Online Computer Library Center (OCLC) in 2005 found that 93% are satisfied or very satisfied with their overall experience of using a search engine, compared with a satisfaction rate of 84% for librarian-assisted searches. These findings are supported by the 2009 EDUCAUSE Center for Applied Research (ECAR) *Study of Undergraduate Students and Information Technology 2009,* in which eight out of ten students surveyed indicated they are very confident about their ability to search the Web effectively and efficiently. Although these students reported being less confident in their ability to evaluate information and their knowledge of the legal and ethical aspects of access to information, they still rated their skills highly. The same study also found that students' use of social networking sites and text messaging is so widespread that it has effectively reached a ceiling.

Despite students' widespread use of social media however, they use a limited variety of technologies and lack many of the information literacy and technology skills necessary for personal and professional success in the information economy (British Library, 2008; Grant, Malloy & Murphy, 2009; Hargittai & Hinnant, 2008). According to a 2009 Ontario Confederation of University Faculty Associations (OCUFA) survey of over 2000 faculty and librarians, respondents perceive that students are less prepared for university than they were three years earlier, and exhibit "a lower level of maturity, poor research skills as evidenced by an over-reliance on Internet tools like Wikipedia as external research sources, an expectation of success

[6] This literature review is based, in part, on a document prepared by K. Nicholson during her secondment to the CLL, *Faculty of social sciences digital media literacy course (draft). December 23, 2009.*

without the requisite effort, [and] an inability to learn independently" (¶6). This finding is supported by a 2008 British Library study of the information-seeking behaviour of the "Google Generation" that indicates that despite a "widening access" to technology, young people's information skills have not improved. On the contrary, "their apparent facility with computers disguises some worrying problems":

- Little time is spent in evaluating information, either for relevance, accuracy or authority;
- They have a poor understanding of their information needs and thus find it difficult to develop effective search strategies;
- They exhibit a strong preference for expressing themselves in natural language rather than analyzing which key words might be more effective; and
- They find it difficult to assess the relevance of the materials presented and often print off pages with no more than a perfunctory glance at them. (p. 12)

According to Head and Eisenberg (2009), students find academic research challenging, and "the most difficult part of the research process" may be "finding contexts for 'backgrounding' topics and for figuring out how to traverse complex information landscapes" (p. 1). There is "strong and credible evidence that learners require support for online research skills and critical/evaluative approaches to information; also that they over-estimate their own capabilities and are naïve about the provenance and purpose of messages in digital media" (Beetham, McGill & Littlejohn, 2009, p. 19). Hargittai and Hinnant (2008) and Hargittai and Walejko (2008) discredit the stereotype that all "millennial" students are highly skilled in the use of information technologies and draw our attention instead to a "second-level digital divide" that exists among young adult Internet users.

A JISC-funded meta-analysis by Beetham, McGill & Littlejohn (2009) provides further insights that inform our recommendations:

- Learners lack general research skills, and "digital scholarship" should continue to be an element of the curriculum throughout study and not confined to first year modules.
- Learners expect digital technologies to be used consistently in their programs of study, and with a clear educational rationale. Instructors' skills and confidence with technology are therefore critical to learners' development.
- There is a clash of knowledge cultures, emerging particularly around issues of plagiarism and originality in student writing.
- Most learners use only basic functionality and are reluctant to explore the capabilities of technology, take risks with their study practices, or make critical and reflective choices about technology use.
- Students are often dissatisfied with the feedback and assessment process, which may indicate a lack of understanding of academic expectations, and again a contest over knowledge values. There is little evidence of feedback being used as a mechanism for learning development.
- Learners require support in migrating to more ICT-based study practices and in using subject-appropriate technologies for deep learning. There is also evidence that learners benefit from being able to use their own technologies for learning, including software and services, and that in some institutions this is problematic. There are also indications that support for learners ICT skills needs to move from 'training' on institutionally provided

> technologies to more tailored support for the technologies learners choose or are constrained to use – which can be peer-led (e.g. student help desks, study 'buddies').

Identifying and Addressing Problems through Redesign

What is Blended Learning?

According to the EDUCAUSE Center for Applied Research (ECAR) (2004), blended learning is "a pedagogical approach that combines the effectiveness and socialization aspects of the classroom with the technologically enhanced active learning possibilities of the online environment" (p. 3). It has the following characteristics:

- A shift from lecture to student-centered instruction for both the face-to-face and online components;
- Increase in interaction between students and the instructor, their peers, [and] the course content;
- Integrated formative and summative assessments mechanisms for students and instructors.

Blended learning entails more than simply adding online elements into a traditional course structure; it requires a thorough reassessment and re-engineering that fully integrates face-to-face and online aspects of the course.

> ...Rather than changing a single module within a programme to include blended learning, it is better to undertake an entire curriculum review, and to identify suitable places to include blended activities. Of course, the selection will not only be dictated by the appropriateness of the learning outcomes, but also by the availability of suitable teaching staff and other constraints such as timetabling and room allocation. In many ways we see this approach to the inclusion of blended learning as being similar to that of generic key skills; it is much improved by a curriculum-wide process, rather than doing it all in a single module, often out of context. (Davis & Fill, 2007, p. 825)

The implementation of blended learning is highly context-dependent and varies widely across institutions. "More concrete definitions of blended learning, ones that are appropriate to your institution, college, or department, need to emerge from local curricular and institutional goals and priorities" (Diaz & Brown, 2010, p. 4).

According to Diaz and Brown (2010), blended learning offers a number of benefits to institutions, students and instructors. Technology can serve to facilitate and encourage the addition of structured time on task. Students like blended learning because it is convenient, reduces logistical demands, increases learner flexibility, and enhances learning through the use of technology. Areas of student dissatisfaction with blended learning include: reduced face-to-face time, issues with technology, reduced instructor assistance, feeling overwhelmed and increased workload. For faculty, the main issues are teaching and learning effectiveness, and "finding the time to research, develop, and implement blended courses" (p. 3).

Zhang, Watson and Banfield (2007) conducted a systematic review to compare the influence of face-to-face and online computer assisted instruction on students' learning and affect. They found the majority of studies indicate that face-to-face and computer assisted instruction are equally effective at engaging students. Anderson and May (2010) conducted a field experiment to explore how face-to-face, online, and blended learning instructional formats influenced students' retention of information literacy skills. The results of their review

> ...indicate that method of instruction (online vs. FTF vs. blended) does not influence students' retention of IL skills. All methods of instruction can be equally as effective. ...These findings support existing research that students can learn as much in online as in F2F environments, but are in contrast to the findings about blended IL instruction being more effective than online and face-to-face IL instruction. (p. 498)

Two key considerations in the success of blended learning initiatives include collecting information on student and faculty member satisfaction, and understanding and supporting effective scalability (Diaz & Brown, 2010).

Blended Learning and Information Literacy Instruction

Dewald (1999b) examined 19 online library tutorials for their effectiveness, concluding that Web-based library tutorials should mirror the best practices of in-person instruction. She concludes that online learning is most effective when used in conjunction with face-to-face instruction.

> Academic libraries are developing Web-based library tutorials to supplement limited numbers of librarians in the face of increasing library instruction demands, and it may be tempting to administrators faced with tight budgets to avoid hiring more instruction librarians. However, online tutorials cannot completely substitute for a human connection in learning. If librarians take seriously what has been learned over many years of perfecting library instruction, then those best practices that are applicable to a Web environment should be examined. Thus, Web-based library tutorials are best used in connection with academic classes rather than in isolation. (p. 31)

This is echoed in the UCLA *Information Literacy Program's Blended Instruction Course Task Force Report* (Grassian et al., 2005) which states that:

> Courses which offer a balanced mix of in-person and remote technology-based teaching/learning, result in more positive student learning and satisfaction than courses which are completely in-person or completely online.

Integrating Information Literacy Instruction into the Learning Management System

There is a significant body of literature that examines library integration into learning management systems. Shank and Dewald (2003) provide an in-depth analysis of the benefits and drawbacks. Benefits of macro-level integration (i.e., outside of specific courses, at the "community" level) include: increased visibility of the library's resources and services, and the

increased ease of access for both faculty and students, and it does not require faculty to commit time and energy to making these resources available. Shortcoming include the lack of personalized and customized resources for both students and faculty, and the lack of direct contact with a librarian.

> Students using courseware would not likely develop familiarity with any librarians in this model. Rather, they would be able to get many of the resources and services they needed right from their desktop computer. In essence, students would become virtual library users when accessing online full-text databases, catalog, pathfinders, and other helpful resources from courseware. Consequently, they may not be able to develop their search skills and utilize the full power of the databases to locate the most appropriate resources for their class assignments. (Shank & Dewald, 2003, ¶17)

Benefits of micro-level integration (i.e., within specific courses) include strategic positioning of library resources and services. Having access to library resources at point of need increases the likelihood that students will use them. Enhanced collaboration between librarians and faculty members is another benefit, providing opportunities to discuss details and difficulties of research assignment details, to enhance library services for students, and to create avenues for the integration of information literacy skills into other courses. Integration also allows greater contact between students and librarians, without requiring faculty members to give up more class time. Instead, students can contact a librarian using online chat, email or the message board within the learning management system. (Shank & Dewald, 2003)

The major drawback of micro-level integration is the amount of time and effort required of the librarian. A 2007 study by Bielema, Crocker, Miller, Reynolds-Moehrle and Shaw documents the role of librarians embedded in the learning management system at the University of Missouri-St. Louis. The study indicates that online interaction with students was more time-consuming for librarians than face-to-face, raising concerns about the scalability of online or blended learning collaborations. In addition, the lack of in-person interaction was cited as an obstacle to effective communication during the reference interview and ultimately, in providing students with the help that they need.

> This was a more time-consuming method of library instruction, and as librarians were occupied with other projects/activities, sharing of responsibilities became necessary. While the extent of participation must be agreed upon with the faculty member, the librarian must commit and remember to monitor the discussion and be an active participant. In addition, there is the related problem, generic to all electronic communication, an expectation of quick turn-around (usually 24 hours or less). And, as the librarian (TA) might be enrolled in more than one class, the time commitment will increase exponentially.
>
> The strictly online environment may assume student knowledge of how to search for information sources. However, even very technologically savvy students may not be familiar with library database searches, specifically. This lack of experience can greatly increase the burden on the reference librarian of not only pointing to appropriate resources, but also instructing students in the mechanics of doing a database search to obtain best results.

> The lack of "instant feedback" that the librarian and student experience during a face-to-face reference interview is also potentially time consuming. The give and take flow of ideas in the face-to-face setting takes longer online. Missing are the student's instantaneous verbal cues and body language that the reference librarian uses to focus the search. (p. 342)

Faculty may also be reticent about granting the librarian access to the course.

> They need to see the librarian as a consultant in courseware, and some faculty members may not be willing to do that. Likewise, faculty may have difficulty sharing control of their courseware-enhanced course. This will require establishing a relationship of mutual trust in which the faculty member feels comfortable sharing editorial control of the courseware content. (Shank & Dewald, 2003, ¶35)

Ohio State University Library (2008) implemented a "toolkit" approach to integrating the library into Desire2Learn. A key feature was the creation of a "Librarian" role inside the LMS, with all the access and permissions of the instructor role, with the exception of the grade book. This role must be granted in a course by the instructor. The Librarian role distinguishes the librarian from other instructional assistants in the course, such as teaching assistants, and clarifies for students what kind of help each can provide.

Blended Learning Redesign Models

The Blended Learning Task Force examined course redesign models proposed by the National Center for Academic Transformation (NCAT) as a means to integrate online learning into the Library's current model of information literacy instruction. The NCAT course redesign process has three goals:

1. To improve student learning outcomes;
2. To reduce costs; and
3. To allow faculty to spend less time delivering content and more time answering student questions and providing individualized assistance.

The achievement of these goals requires "significant structural change" for both F2F and online learning components (Twigg, 1999). A blended learning model would provide a number of solutions to the structural problems identified in the SWOT analysis above:

> Good pedagogical practice enhanced by technology supports shifts in the nature of the teaching-learning enterprise, making it more active and learner-centered. Alternatives that improve quality involve, among other things, shifting repetitive tasks from instructors to IT-based resources and developing IT-based interactive materials. Technology can be deployed to optimize sound pedagogy by making it more consistent, by providing additional practice and examples and rapid performance feedback, and by making more instruction available on-demand. (Twigg, 1999, p. 15)

The *NCAT Program in Course Redesign* (Twigg, 1999) identifies the following five models for course redesign.

1. The **supplemental model** retains the basic structure of the traditional course and supplements lectures and textbooks with technology-based, out-of-class activities, and/or changes what goes on in the class by creating an active learning environment within a large lecture hall setting.
2. The **replacement model** reduces the number of in-class meetings and replaces some in-class time with out-of-class, online, interactive learning activities and/or makes significant changes in remaining in-class meetings.
3. The **emporium model** eliminates all class meetings and replaces them with a learning resource center featuring online materials and on-demand personalized assistance, using an open attendance model and/or a required attendance model depending on student motivation and experience levels.
4. The **fully online model** eliminates all in-class meetings and moves all learning experiences online, using Web-based, multi-media resources, commercial software, automatically evaluated assessments with guided feedback and alternative staffing models.
5. The **buffet model** customizes the learning environment for each student based on background, learning preference, and academic/professional goals and offers students an assortment of individualized paths to reach the same learning outcomes.

In addition, Twigg (1999) identifies the following three criteria for course redesign:

1. Institutional readiness;
2. Course readiness; and
3. Identifying the academic problems the redesign is intended to address.

It should be noted that these criteria were developed for institutions considering the redesign of existing *courses*, while information literacy instruction at McMaster University Library does not constitute a course. As a result, the NCAT course redesign criteria is not entirely applicable. These criteria, and the degree to which they are being met in the Library context, are discussed below.

1. Institutional Readiness Criteria

- Institution must want to reduce costs and increase (academic) productivity.
- Institution must view technology as a way to achieve strategic academic goals rather than as a general resource for all faculty and for all courses.
- Institution's goal must be to integrate computing into the campus culture.
- Substantial number of the faculty (and librarians) must have an understanding of and some experience with integrating elements of computer-based instruction into existing courses.
- Institution must have a demonstrated commitment to learner-centered education.
- Institution must recognize that large-scale course redesign using information technology involves a partnership among faculty, IT staff and administrators in both planning and execution.

Institutional Readiness Criteria that are not Currently Being Met or Insufficient Information is Available

- Institution must have a mature IT unit to support faculty integration of technology into courses.
- Institution must have established ways to assess and provide for learner readiness to engage in IT-based courses.

2. Course Readiness Criteria that are Currently Being Met

- Improvements in the course potentially must have a high impact on the curriculum.
- The course must offer the possibility of capital-for-labour substitution.
- Decisions about the curriculum in the department, program or school must be made collectively—in other words, beyond the individual faculty member (librarian) level.
- Project participants must have the requisite skills.
- Course's expected learning outcomes and a system for measuring achievement must be identified.
- Faculty (and librarians) involved must have a good understanding of learning theory or access to expert partners.

Institutional Readiness Criteria that are not Currently Being Met or Insufficient Information is Available

- Faculty (librarians) must be able and willing to incorporate existing curricular materials into the project in order to focus work on redesign issues rather than on materials creation.
- Innovation must have a business plan in order to support the ongoing operation of the redesigned course.

3. Identifying the Academic Problems the Redesign is Intended to Address

According to Twigg (1999), "after determining the institution is ready and selecting an appropriate course, the next planning step is to identify the academic problems that the redesign intends to address" (p. 14). The blended learning course redesign should address the following issues with information literacy instruction at McMaster University Library:

- Redundancy in information literacy instruction for students enrolled in large, first-year undergraduate courses;
- Duplication of effort by librarians in preparing instructional materials;
- Inconsistencies in learning outcomes and content for first-year courses;
- Content-heavy, teacher-centered instruction;
- A lack of integration of information literacy skills across the undergraduate curriculum;
- A lack of evidence that learning outcomes are being met;
- Insufficient online resources to support students at point of need;
- Insufficient human resources to support the current liaison model;
- Provide additional time for liaison staff to respond to student requests for one-on-one assistance;
- Free up librarians to deliver additional F2F instruction to upper level students.

Blended Learning Task Force Recommendations

Teaching and Learning

1. Pilot blended learning, using a course redesign "replacement model" in selected first-year undergraduate courses with large enrolments in 2011-2012.

The Task Force recommends adopting a two-stage approach to the redesign of information literacy instruction for the University Library. In the first stage, a **replacement model** would be used as the preferred redesign model for first-year undergraduate courses. This model would allow students to learn basic skills online at their own pace, using a combination of online learning objects including screencasts, self-paced tutorials and online quizzes. This would be supplemented by liaison staff holding scheduled virtual and face-to-face office hours. More advanced information literacy skills would continue to be taught by a librarian to second, third and fourth year students in the classroom.

The initial focus of the replacement model should be selected first-year courses with large enrolment that already have an information literacy component taught by a liaison staff member. Examples of these courses include Commerce 1E03, Environmental Science 1G03, Social Sciences Inquiry and Sociology 1A06.

The following criteria could be used to identify courses for inclusion in the pilot:

- First-year required or elective courses with large enrolments;
- Courses in which the library already provides information literacy instruction (build on existing assignments, collaboration);
- Courses in which the information literacy skills addressed are at a basic level (e.g., library orientation, navigating library web site, identifying and selecting information resources, evaluating sources, differentiating between primary and secondary sources, reading citations, managing information, academic integrity); and
- Courses with a visual literacy component (e.g., map skills).

These courses will make ideal testing-grounds for the blended learning initiative for a number of reasons. First, the Library has an established relationship with the instructor and information literacy instruction is already included in the curriculum. Second, they meet the NCAT course readiness criteria: introducing blended learning will have a high impact on the curriculum, and should offer the possibility of capital-for-labour substitution by eliminating duplication of effort on the part of liaison staff and reducing the number of hours spent on course preparation and delivery. A list of some potential courses is available in Appendix 2.

Online learning should focus on:

- Time-consuming processes;
- Step by step methods ('click here' instruction);
- Instructions that students would be likely to repeat or review; and
- Skill development.

In-class learning should focus on:

- Differences between high school and university research (for level I);
- The research process;
- Identifying, evaluating and using scholarly information sources;
- Big picture ideas;
- 'Why' aspects rather than 'how';
- Academic integrity & plagiarism avoidance;
- Evaluation of sources, both traditional and non-traditional; and
- Addressing content that is specialized and/or discipline-specific.

In a later phase, an **emporium model** could be implemented as a means to make resources for self-directed learning available to students outside targeted courses, in particular, students who are new to McMaster and student groups who are currently under-served, such as graduate students. The implementation of this model will depend on assessing the success and sustainability of Phase I, and on availability of resources.

2. Implement mandatory pre- and post-assessments in the pilot courses to verify student learning outcomes are being met.

In order to evaluate the effectiveness of blended learning for information literacy instruction to undergraduate students enrolled in the pilot courses, pre- and post-test assessments should be implemented. The use of a standardized information literacy test, such as the Standardized Assessment of Information Literacy Skills (SAILS), should be considered.

3. Develop standardized information literacy learning outcomes for all first-year undergraduate courses.

The current model of library instruction at McMaster often results in first-year undergraduate students receiving library instruction multiple times in their first two semesters, with content that is highly repetitive. Conversely, some first year students do not receive any information literacy instruction at all. By developing standardized learning outcomes, all first-year students will be able to learn skills that are relevant to their studies and provide a foundation for further skill development. This will also help to ensure that students not enrolled in the blended learning pilot courses will have developed the same information literacy skills by the end of their first year of studies as those who were. In order for this to occur, the Library Administration will need to provide advocacy among deans, chairs and at curriculum planning committees.

These learning outcomes should be based on the Association of College and Research Libraries' *Information Literacy Competency Standards for Higher Education* (ALA, 2000).

4. Work with departments and the Centre for Leadership in Learning to map information literacy outcomes into the curriculum as part of program-level curriculum mapping initiatives required by the *Quality Assurance Framework*.

Ontario's new *Quality Assurance Framework* includes undergraduate and graduate degree level expectations which outline the minimum threshold knowledge, skills and competencies students are required to demonstrate in order to successfully complete their degree programs. Information literacy competencies figure prominently in the degree level expectations at both the

undergraduate and graduate levels. One way for programs to demonstrate their students have achieved these outcomes is by mapping them to the curriculum. Librarians can provide valuable expertise to the CLL and to faculty on best practices in information literacy instruction, including "identifying the scope (i.e., depth and complexity) of competencies to be acquired on a disciplinary level as well as at the course level, and sequencing and integrating competencies throughout a student's academic career" (ACRL, 2003). Liaison staff should be involved in the mapping of information literacy skills and competencies across the curriculum.

Content Management and Technology

5. Use Avenue to Learn as the primary platform for the online delivery of information literacy instruction during the pilot.

Desire2Learn, branded locally as Avenue to Learn or A2L, is the learning management system for McMaster University. Using A2L as the primary platform for delivery of the online components will ensure a level of consistency in the way that library instruction is delivered and learning outcomes are assessed. Using the learning management system will allow the Library to track student activity at individual and aggregate levels, and will facilitate assessment of student performance on practice exercises. Since a large number of undergraduate classes already use Avenue to Learn, most students are familiar with it and use it regularly. A2L supports a range of learning objects and technology and the Centre for Leadership in Learning is available to provide technical support. In addition, many librarians currently have a presence in A2L, and provide support for students by creating widgets and course guides, holding virtual office hours, and answering questions on message boards. As part of the blended learning pilot, liaison staff will hold virtual office hours and answer questions via A2L's internal email and chat. The "Librarian" role within A2L should be implemented, and liaison staff will need to be given this role within all pilot courses. Outside of the blended learning pilot, McMaster Libraries should emulate the steps taken by Ohio State University Library (2008) to integrate the library into Desire2Learn, and create a "Librarian" role. This Librarian role will distinguish the librarian from other instructional assistants in the course, such as teaching assistants, and clarifies for students what kind of help each can provide.

Learning objects could also be made available to all students inside Avenue to Learn at an institutional level (Shank and Dewald's "macro-level" described above) without being integrated inside a specific course. In order to ensure that all library users, including those outside the McMaster community, and the Library's public service staff, can access these learning objects, these must also be made available from a variety of access points **outside** the learning management system, including the Library's web site, YouTube, iTunesU, etc.

6. Use instructional materials in a variety of formats, created by both the CLL and liaison staff.

Twigg (1999) and Diaz and Brown (2010) recommend using existing course materials in order to focus efforts on course design and implementation. An inventory of our current online learning objects and resources should be created. The following resources/sites should be investigated for the purpose of identifying existing content that can be re-purposed or adapted:

- Library web site;
- Library's shared network drive ("M" drive);

- OCUL libraries' web sites;
- Avenue2Learn widgets; and
- Animated Tutorial Sharing (ANTS) open source information literacy tutorials http://ants.wetpaint.com/ .

Guidelines for the selection of appropriate online learning objects should be established.

A variety of types of learning objects should also be created. For example, Bowles-Terry, Hensley and Hinchliffe (2010) found that brief screencasts work well to provide specific, point of need instruction for specific, discrete skills such as navigating and searching the library catalogue, databases and web site.[7] Interfaces change frequently for these tools so these learning objects will need to be updated quickly and easily. For this reason, liaison staff need to be trained in the use of learning technologies in order to create and update learning objects as needed. Liaisons will also need access to the hardware and the software required for this purpose. Longer tutorials with embedded quizzes created in a software such as Articulate could be used to address more advanced skills, such as distinguishing between primary and secondary sources or evaluating information sources (Bowles-Terry, Hensley & Hinchliffe, 2010; Dewald, 1999b). According to Dewald (1999b), "modules that provide information in small blocks, breaking it up into parts and subparts with summaries and reviews, help learners absorb material gradually and organize the material in their own minds" (p. 29). Citation style guides that can be downloaded as printable PDFs are also popular with students.

Examples of learning objects and resources that will require maintenance and updating and should be creating by liaisons include:

- Presentations;
- Screencasts;
- Course guides;
- Subject guides;
- Citation guides; and
- Widgets.

Examples of content to be created by the CLL include:

- Articulate presentations;
- Videos; and
- Animations (e.g., coordinate systems, map projections).

7. Create a strategy and supporting policies for the creation and management of information literacy learning objects and resources.

Blended learning requires the use of numerous online learning objects which range from presentations (i.e., PowerPoint, Articulate, screencasts) to static web pages, "widgets", and links. Blended Learning courses will require continual review and updating. Content should be managed centrally, and guidelines and workflows for the creation and updating of future learning objects will need to be established. Liaison staff will require the ability to update content from both on and off-campus locations.

[7] In fact, students surveyed indicated that they found 2-3 minute screencasts to be too long, leading the authors to recommend a length of less than one minute. It should be noted that students also indicated a preference for simple, factual instruction without unnecessary embellishments.

Additionally, the delivery of learning objects may be facilitated by the creation of web pages devoted to a learning 'pathway'. These may take the form of a static web page created for a specific course with online learning objects sequenced to enhance learning of specific concepts. The page may provide options for achieving an end goal, through different learning objects. Dewald (1999b) describes these as "guided yet user-definable paths":

> A variety of learner ability levels and learner-chosen objectives can be accommodated when the student is allowed some degree of choice in the learning path to follow. ...This flexibility allows the learner to customize the instruction, thus keeping the learner's interest, an intrinsic motivational factor. (p. 29)

Management of and creation of these web pages will need to be supported in consultation with Library and Learning Technologies.

8. **Provide ongoing technical support for the creation, distribution, and archiving of digital instructional materials.**

A blended learning instructional model is heavily dependent on digital, online material, and therefore must be supported with the appropriate technical infrastructure for creation, distribution and archiving of this material. Liaison staff will need access to appropriate hardware and software such as Articulate and Camtasia. In addition, once the initial round of learning objects has been created, plans and procedures will need to be established for the creation of additional learning objects and continual review of existing objects.

Publicity, Outreach and Communication

9. **The Library Administration, in partnership with the CLL, should implement a multi-pronged communication plan to share information about the blended learning pilot, and to raise awareness of the value of information literacy instruction and faculty-liaison collaboration.**

The move to a blended learning model marks a significant change in the way the Library provides information literacy instruction. As a result, it will be important that a multi-pronged communication plan be implemented to ensure that administrators, faculty, library staff, and students understand what blended learning is, why it is being implemented at McMaster, and how it will impact them. Communication must come from the Library administration and must be broad, consistent and timely.

York and Vance (2009) advocate that marketing should clearly outline what library liaisons can and will do as a collaborator in the blended environment. Starting communication early will reap benefits later, especially as satisfied faculty and instructors share their experiences by word of mouth.

Training and Support

10. Provide training and support in best practices for blended learning to liaison staff who will provide blended information literacy instruction.

In order for liaison staff to provide effective instruction in a blended learning environment, including updating and creating learning objects, they will require training and support in the use of relevant technologies (e.g., Avenue to Learn, Articulate, Camtasia, Elluminate).

11. Build awareness of the blended learning initiative among, and provide support to Library public service staff, including Library Services, Maps, Data and GIS, Lyons New Media Centre, library IT support staff and student employees.

The introduction of a blended learning model may have an impact on the demand for service at library service points, both in terms of the number and types of questions asked. A communication plan needs to be established to ensure that liaison staff, Library Services, Maps, Data and GIS, and Lyons New Media Centre staff understand the new blended learning model, have access to learning objects, and can provide feedback to the Blended Learning Implementation Team and the Library Leadership Team.

12. Provide in-person research help support in the Mills Learning Commons.

It will be important to ensure that students are aware of the online learning support materials that the Library has created and the ways that they can obtain more in-depth assistance if necessary. In the Mills Library, the main area for students to conduct their coursework is in the Learning Commons. Currently however, research help is only provided at the Mills Library Research Help Desk, located one floor below the Learning Commons in a poorly lit, badly signed and somewhat inaccessible location. In our opinion, students in the Learning Commons would be better served if the service point in the Learning Commons were staffed by Library Services staff who can provide adequate research help beyond the resources and support provided online. According to a study of student learner preferences for library video tutorials conducted at the University of Illinois (Bowles-Terry, Hensley & Hinchliffe, 2010), some students prefer to ask for assistance in-person or via email or chat even when they could chose to watch a video instead. It is important to continue to provide a number of options for students seeking assistance. A second, less preferred option, would be to make more effective use of existing student employees in the Learning Commons by training them to provide appropriate referrals to online resources or to the Research Help Desk.

Evaluation

13. Implement the NCAT financial planning tool to determine the cost effectiveness and sustainability of the blended learning strategic initiative.

The NCAT provides a financial planning tool that can be used to determine whether or not the course redesign is cost effective. We recommend this tool be used to determine the cost effectiveness of the Blended Learning pilot project.

14. Survey faculty, students and library staff to determine satisfaction with the Blended Learning Initiative and to gather feedback for enhancements.

The Blended Learning Task Force has already begun the design of a survey for faculty to determine their satisfaction with online and face-to-face delivery models for information literacy instruction. We recommend that the survey be completed and administered to faculty to gauge their satisfaction with blended learning for information literacy instruction. Ethics approval should be obtained so that the results of the survey can be disseminated. Surveys should also be administered to students and to library staff.

15. Use appropriate measures to assess the effectiveness, convenience and efficiency of the blended learning initiative.

While user satisfaction and cost-effectiveness are important measures, they alone cannot measure the success of a blended learning approach to information literacy instruction. The use of a rubric designed to assess online instruction, such as the Rubric for Online Instruction, ROI (http://www.csuchico.edu/celt/roi/) will both assist in the creation of blended learning material and help assess project outcomes. Recommendations 13-15, in conjunction with student learning evaluations, will provide a robust and holistic evaluation of the blended learning pilot.

Appendix 1: Blended Learning Challenges

Diaz & Brown (2010)

Logistics and Administration Challenges

- Scaling up blended learning models to accommodate large-enrollment classes
- Implementing blended learning in a way that addresses budget issues and physical space limitations
- Marketing blended learning courses in a way that is clear and differentiates the model from other course types
- Achieving consensus on the F2F-to-online time ratio in blended courses
- Approaches to faculty/librarian development and course development funding

Research and Quality Assurance Challenges

- Managing blended learning data collection from diverse sources (instructors, departments, other units)
- Identifying important/relevant blended learning data from the institution, units and individual instructors
- Developing models for measuring blended learning course effectiveness and implementing improvements
- Funding/supporting research and quality assurance work

Faculty/Librarian Development Challenges

- Getting the faculty to undertake a thorough redesign of their courses
- Course design or redesign funding
- Development of summative and formative assessment strategies appropriate to the blended learning model
- Determining and organizing the competencies needed to design and implement effective faculty development for blended learning

Course Design Challenges

- Sorting out the intellectual property issues associated with blended learning course development and maintenance
- Determining how quality is defined, and identifying elements of successful blended learning courses
- Effective use of technology in the blended course
- Effective models for team development of blended learning courses

Appendix 2: Potential Pilot Courses

Course	Large Enrollment?	Established Relationship?	Fundamental information literacy skills addressed?	Visual literacy component (e.g., spatial literacy, graphicacy)
Environmental Science 1G03	√	√	√	√
Geography 1HA3 1HB3	√	√	√	√
Commerce 1E03	√	√	√	x
Social Sciences Inquiry 1S03	x	√	√	x
Sociology 1A06	√	√	√	x

Appendix 3: Sample Technologies

Adapted from Grassian et al., 2005

Technology	Description	Possible Academic Usage
Course Management Systems (CMS)	A password-protected online system which allows enrolled students and faculty access to course-specific content and tools. McMaster uses Desire to Learn, but other examples include Blackboard, Moodle, Sakai and Angel.	Course calendar, announcements, discussion forums, instant messaging/chat, file and link sharing, quizzes, content display, etc.
Podcasting	An audio recording that is typically distributed by an RSS feed, but can be shared by other means.	Audio lectures, walking tours of libraries or other university facilities, guest lectures or panel discussions, recorded events.
Vodcasting / Video	A video recording, often of a lecture or presentation, typically distributed by RSS feed, but can be shared by other means.	Re-using a video presentation or lecture, providing the F2F experience to students unable to attend, guest lectures or panel discussions.
Articulate	A presentation tool that incorporates powerpoint slides with video and images, self-directed navigation and integrated quizzes and surveys.	Interactive asynchronous presentations, quizzes and feedback.
Widgets	Self-contained modules that contain specific content that can be slotted into different courses.	Including important links, content, contact information, chat functionality, etc. into course content, particularly in the CMS.

Screencasting/Screen Capture	Software for capturing still or video images of an entire computer screen, or parts of it. Captured images can be annotated, narrated or otherwise modified.	Training or demos for software, course management systems, library databases, and other web applications; narrated slide shows or web tours.

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