Informed learning in online environments: Supporting the higher education curriculum beyond Web 2.0

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Introduction

As boundaries between physical and online learning spaces become increasingly blurred in higher education, how can students gain full benefit of Web 2.0 social media and mobile technologies for learning? How can we, as information professionals and educators, best support the information literacy learning needs of students who are universally mobile and Google-focused? This chapter presents informed learning as a pedagogical construct with potential to support learning across the higher education curriculum, for Web 2.0 and beyond.

Informed learning (Bruce, 2008) responds flexibly to the dynamic information-learning environment of higher education, embracing the opportunities of learning and teaching with new and emerging media. It supports a holistic learning approach whereby students consciously engage in a process of using information to learn specific content or practices. By promoting inquiry and problem-solving, and the adoption of discipline or context specific knowledge and practices, it enables learners to develop flexibility and confidence to use information in constantly evolving information environments. In this way, informed learning shifts the focus of information literacy education from mastering information skills, to using information critically, ethically and creatively to learn within the wider context of students’ disciplinary learning.

After outlining the principles of informed learning and how they may enrich the higher education curriculum, we explain the role of library and information professionals in promoting informed learning for Web 2.0 and beyond. Then, by way of illustration, we describe recent experience at an American university where librarians simultaneously learned about and applied informed learning principles in reshaping the information literacy program.
Informed learning for online intensive HE information-learning environment

The contemporary HE information-learning environment is online intensive and dispersed. Learners and educators are culturally and socially diverse and often physically remote from their institution’s home campus. They have access to an ever widening range of Web 2.0 resources from myriad international and local sources, way beyond the controlled environs of their institution’s learning management systems (LMS) such as Blackboard and Moodle. Since Web 2.0 media are in a constant flux of evolution and extinction, students need to develop the confidence and flexibility to take the changes in their stride. However, while contemporary learners (of all ages) are increasingly IT savvy, they tend to demonstrate quite limited critical and strategic approaches and tend to rely on familiar, popular tools such as Google (Head and Eisenberg, 2010; Hughes, 2009; Lorenzo and Dziuban, 2006). This apparent information literacy imbalance (Hughes, 2009; Hughes, Bruce and Edwards, 2008) signals the need to foster deeper information literacy learning among students. In response, informed learning offers information professionals and educators a set of principles for developing critical, ethical, creative and reflective information use and learning.

Informed learning (Bruce, 2008) is a pedagogical construct that supports active learning and inquiry across the curriculum in higher education. Informed learning reflects evolving theory and practice of information literacy education. It involves a shift of focus from information skills and competencies to students’ experiences of using information as they engage with academic or professional content and practices relevant to their area of study. In the context of constantly advancing online media and changing interfaces, teaching about digital skills or functions of particular databases is of limited long-term value to learners; thus, with informed learning, information skills represent ‘building blocks’ rather than intended outcomes.

In contrast with skills-based information literacy education, informed learning focuses on how people use information to learn. This is understood to be a complex experience, which at one level may be represented as seven faces of informed learning (Bruce, 1997, 2008). In other words, learners may experience information literacy in differing ways, which include using information tools to search for information, as well as extending their knowledge base, creating new information and using information wisely. Informed learning is a holistic approach where students learn simultaneously about particular subjects(s) whilst learning about, or becoming aware of, how they use information. It takes account of learners’ varied experiences to ensure the relevance of learning activities and assessment to diverse contexts. The design of informed learning places equal attention on what is learned, and
how working with information contributes to the learning process. Thus, students learn specific academic and professional content or practices, whilst becoming aware of their experience of information use.

**Principles of informed learning**

The theory and practice of informed learning is explained in detail elsewhere (Bruce, 2008; Bruce and Hughes, 2010). To summarise, the key principles are that:

1) Informed learning builds on learners’ own experiences of using information to learn
2) Informed learning promotes the simultaneous learning of discipline or professional-related content or practices, and learning about the experience of using information
3) Informed learning is about changing learners’ experiences, to be reflective learners, helping them to develop new and more complex ways of working with information

Educators could ask students to reflect on their experiences of information use as part of the learning process, and introduce them to new ways of using information to learn as part of that process. Students could be encouraged to embrace other forms of information use such as using technology for communication and awareness, or using information for the benefit of others.

Taking the example of a nursing course, an educator could translate the above principles into the following goals for an inquiry based project about common medical conditions:

1) As the initial stage of the inquiry, the students will use a personal blog to document information gained previously through informal family experiences and formal practicum experiences in a community health centre
2) Students will work in small groups to create a series of wikis on different medical conditions to organise, share and evaluate information gained from a range of online sources
3) Students will use their personal blogs to reflect on their information use and learning experiences throughout the inquiry process, focusing in particular on new Web 2.0 strategies or sources they could use to create a social network for sufferers of a particular medical condition. They will make informed decisions about which tools to use, and the kinds of information and interactions to include, to best meet their intended users’ needs
In this way, informed learning principles lead to an educational focus on understanding students’ existing experiences of using information; building into the curriculum relevant experiences that will encourage them to adopt the desired approaches to information use; building reflection on those experiences into the curriculum; and where possible, enabling them to apply their experiences to novel contexts (adapted from Bruce 2008, p. 12-13). When developing curriculum, the principles can also inform the development of specific learning outcomes that combine subject learning and experiencing information use. Continuing the nursing example, students’ learning outcomes for the inquiry project could be expressed as follows:

On completing this unit of work, you will have:

- experienced information literacy in different ways by using information to learn about liver disease in diverse online settings, for example, via information portals of professional health services, blogs of voluntary support groups or the interactive display of a research foundation
- used information effectively in a range of contexts, and employed transferable approaches, to learn about the varying information needs of parents of children and carers of elderly relatives with liver disease
- discerned different ways of thinking about information use applied to problems, by participating in a web-based debate on liver transplantation and alternative treatments
- considered information as subjective and transformational in character by reflecting on how you would inform and advise a relative diagnosed with liver disease
- explored the socially distributed character of information literacy by engaging in and reflecting on, online forums dedicated to supporting sufferers of liver disease.

Informed learning in practice

To explain how informed learning might be applied in practice, Bruce, Hughes and Somerville (2011) describe a possible inquiry-based team project to select an “ideal study abroad destination”. In that scenario, first year university students use information critically, ethically and creatively in different forms and ways; to learn about a variety of geographical locations, cultural and educational practices; and to make a wise decision about the personally relevant matter of where to go for their study abroad program. The following two examples, which feature recently implemented units of study, further demonstrate the viability of informed learning for diverse educational settings. While both

Hughes and Bruce (2012) Informed learning in online environments
incorporated informed learning principles, they were very different in terms of learners, disciplinary content and context.

Personalised Language Development (in 2009) was part of the Master of TESOL program at Queensland University of Technology, (Bruce and Hughes, 2010). The principal aim of the unit was to enable learners, teachers and researchers of English as a second or foreign language to develop fluency in academic English and familiarity with scholarly research conventions. The students embarked with their colleagues on an ‘informed learning journey’ in which they learned how to use scholarly information whilst developing knowledge on professionally relevant topics. Throughout this process they reflected on and shared their experiences of using information to learn, both face to face and online via blogs.

Learning in the 21st Century (in 2010) was a first year experience course (unit of study) at University of Colorado Denver (Hughes, Basile and Bruce, manuscript). In this course, students learned about basic learning theory whilst exploring their own learning styles and needs and conducting a simple research project. The disciplinary focus of the unit was ‘learning’. Informed learning elements were woven explicitly through the course syllabus and were implemented through weekly class activities and assessment. From the outset, students were encouraged to consider themselves as informed learners who were undertaking an informed learning journey through the course, and beyond. The students’ informed learning included making decisions about which information types and sources would best meet their needs, whether print, digital, personal interaction or sensory. In addition to attending on-campus classes, they visited other educational sites, such as the Natural History Museum and a Nursing Simulation Laboratory, in order to experience differing learning technologies and contexts. Importantly, they also engaged with various Web 2.0 media, including Google and Google Scholar (for sourcing information), Google Docs (for organising and communicating information), blogs (for reflecting on their information use and learning), Flickr and YouTube (for presenting information to classmates). Again, they documented and shared their learning through informed learning maps and treasure chests in various formats including blogs and wikis, and hand-made artefacts. In their learning maps the students presented written and graphical reflections on their informed learning journey. In their treasure chests, they collected useful information of various types, gathered during their informed learning journey. These included: references, links to web sites, journal articles, video clips, photos, feedback from mentors, museum pamphlets; one student included an encouraging letter from her grandmother written 10 years previously.
The above examples were not specifically Web 2.0 projects, but rather informed learning experiences which incorporated Web 2.0 elements. Both were situated principally in a traditional classroom. In contrast, the Informed Cyberlearning case study presented in Chapter 13 demonstrates informed learning principles applied to a wholly online context.

**Informed learning and Web 2.0 (and beyond)**

The nature of information literacy in Web 2.0 environments is under discussion, with the suggestion of Information literacy 2.0 being a subset of a broader information literacy framework (Spiranec and Zorica, 2010). However, informed learning does not distinguish between ‘traditional information literacy’ and digital, mobile or Web 2.0 literacy. The principles of informed learning remain constant across learning environments and disciplines. They are applicable to the use of all technologies, both existing and emerging, from the pen to the i-pad, embracing Web 2.0 and beyond.

The Web 2.0 galaxy offers a vast array of learning tools and environments, which support participative engagement, multi-tasking and mobile learning. In order to flourish in this rapidly evolving Web 2.0 galaxy, where new applications are constantly being born and others are morphing or becoming extinct, both educators and learners need the well developed problem-solving and critical capabilities that informed learning aims to develop.

A possible challenge for informed learning educators is to determine which Web 2.0 applications are most conducive to particular learning outcome(s). Different Web 2.0 tools lend themselves to different learning experiences. For example, Facebook might be a suitable option for sounding out popular sentiment on a topical issue, whilst Google Scholar would be a more productive source of research data. Table 1 below suggests possible Web 2.0 options for enhancing particular informed learning experiences. The left hand column outlines *the seven faces of informed learning*, or different ways in which learners may experience information use (Bruce, 2008). The middle column indicates the nature of each of these experiences for informed learners. The right hand column identifies possible Web 2.0 options to support these informed learning experiences. (The table shows an extremely limited representation of Web 2.0 options; and the tools listed are often relevant to more than the one category of experience shown here. For more extensive Web 2.0 selections for educators, see O’Connell, n.d.)
Experiences of informed learning | Experiences of informed learners with Web 2.0 | Possible Web 2.0 options
--- | --- | ---
1. Information awareness | Scanning, exploring and sharing information in Web 2.0 and other online environments | Google, Facebook, LinkedIn
2. Sources | Sourcing information of all kinds (including text, graphics, audio and video) in Web 2.0 and other online environments to meet learning needs | Google Scholar, YouTube, Flickr
3. Process | Engaging with Web 2.0 and other digital media to learn, for example through, inquiry, problem or resource-based learning | Zoho Projects, Ning
4. Control | Organising information in Web 2.0 and other online environments, making and managing connections between information and learning needs, for assignments and projects, both independent and collaborative | Google Docs, Dropbox, Delicious, Zotero (for citation)
5. Knowledge construction | Developing personal understandings of knowledge domains, via Web 2.0 and digital environments, through critical and creative thinking processes | Inspiration (concept mapping), Wordpress (blogging)
6. Knowledge extension | Creating and communicating new knowledge in Web 2.0 and online environments, innovating and creating new insights and new solutions to problems as outcomes of learning activities and assessment | Wikispaces, Posterous, Glogster, Weebly (web site) Second Life, Prezi
7. Wisdom | Using information wisely and ethically in Web 2.0 and other online environments, applying knowledge developed through learning and assessment activities to further social and educational well-being | Open source journals, Creative Commons, Online forums and support groups

Table 6.1: Experiences of informed learning with Web 2.0

Putting together such a table raises four important considerations. First, while certain Web 2.0 tools might be more useful than others for particular informed learning experiences, the variety and accessibility of social media ensure that informed educators and learners are limited more by their imaginations than by the tools. Second, Web 2.0 tools are integral to the informed learning process; they mediate information use and learning, just as books, documentaries and Bunsen burners do. Third, Web 2.0 media -can be transformative through their ubiquity and mobility, and their ability to support informed learning any place, any time. They facilitate communication between information using learners and provide a participative context where information can be shared, consumed and produced (Bruns, 2008). Thus, Web 2.0 represents both a virtual learning space and a suite of online resources for learning. Fourth, returning to the principle that informed learning promotes the simultaneous learning about subject and the experience of using information, it is notable that we can learn about Web 2.0 as an information environment whilst using Web 2.0 tools to learn in an academic field, as illustrated by the case study in Chapter 13.
Librarian roles in informed learning

The idea of informed learning as a way of thinking about both learning and information literacy requires the dual lenses of interest in content (discipline and professional expertise) and process (information use experiences, that are ultimately also embedded in context). Typically discipline experts adopt one lens, and information professionals or librarians adopt the other. The challenge of informed learning for both -academic teachers and information professionals is to bring these lenses together for students through learning design and implementation. The intended outcome is a combination of discipline based learning and awareness of information use in the learning process.

Ideally, library and information professionals would work together with discipline teachers, either in a professional development capacity, encouraging discipline teachers to embrace informed learning, or as members of a collaborative teaching team. This was the case in the previously mentioned Queensland and Denver examples, where a librarian was part of both unit teams and collaborated with the teachers in planning and presenting research-based activities. Fundamentally, informed learning is a way of thinking about information literacy education that is embedded or integrated in the curriculum. The language of informed learning places emphasis on the importance of information use in the learning process, and makes it possible for librarians to communicate important dimensions of their potential contribution in the educational environment with discipline-centric colleagues. As outlined below, the current Auraria informed learning project at University of Colorado Denver (USA) provides a real-life example of how this might be achieved.

The Auraria informed learning project

Librarians at the Auraria Library have adopted informed learning as a basis for revitalising their information literacy programs and strengthening partnerships with academic teaching colleagues. In order to bring about these changes, the librarians undertook to first extend their knowledge and expertise. The planning and implementation process is supported by a continuing professional development program, with the librarians themselves engaging in informed learning as they develop familiarity with the principles, practices and literature of informed learning.

The Auraria informed learning project is strongly collaborative. It arose from shared professional and research interests of Dr Mary Somerville (Auraria Library Director), Professor Christine Bruce (Queensland University of Technology) and Dr Hilary Hughes.
(Queensland University of Technology). The practical implementation of the project began during Hughes’s period as Fulbright Scholar-in-Residence, based in the Auraria Campus during August-December 2010. It was launched through an introductory workshop on the ‘Six frames of informed learning’ presented by Bruce and Hughes. Since the initial goal was to enable the librarians’ to become conversant with informed learning principles and practices, Hughes led a series of workshops, guided readings and discussion over the next four months. These activities resulted in significant practical outcomes, which include: frameworks for collaborative planning and implementation of curriculum-based informed learning; a revised policy document and planning process in the form of an Informed Learning Blueprint; and the creation of new promotional and instructional materials. The framework shown in Table 2 below, which was used for professional development purposes at Auraria Library, provides a glimpse into the introductory stage of the planning process for informed learning.

(a) Key concerns

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<th>Why?</th>
<th>University &amp; library mission, professional excellence, system improvement</th>
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<tbody>
<tr>
<td>Where?</td>
<td>Library as place, learning space, physical setting, social environment, virtual space</td>
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<tr>
<td>Who?</td>
<td>Stakeholders: students, clients, teaching and admin staff, library staff</td>
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<tr>
<td>What?</td>
<td>Reports, strategic plans, curriculum documents, architectural plans</td>
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<tr>
<td>How?</td>
<td>Learning and assessment activities, teaching approaches, orientations, workshops, projects, research, collaborative partnerships</td>
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(b) Assessing student information and learning needs

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(c) Planning informed learning

<table>
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<tr>
<th>Library as resource</th>
<th>Library as space</th>
<th>Library as service</th>
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<td>Why?</td>
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(d) Supporting informed learning

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<th>Library as resource</th>
<th>Library as space</th>
<th>Library as service</th>
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<tbody>
<tr>
<td>What will I do to help other people learn?</td>
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<td></td>
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<tr>
<td>What do I need to learn?</td>
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Table 6.2: Planning framework for informed learning
Regarding the four parts of the framework:


(b) Focuses on the context and informed learning needs of students using Auraria Library. The five questions prompt the librarians to gather, process, organise and communicate essential information about the Auraria Library users as informed learners. Depending on the level of inquiry and timeframe, this stage might take several hours, weeks or months.

(c) Involves a change of perspective to focus on 3 key roles of the library in informed learning, as a resource for learning (or collection of myriad resources), as a space for learning, for social interaction and as a service (or multiple services) to support learning to a diverse range of information users and learners.

(d) Focuses on the informed learning process, of both library users and the librarians themselves. The learning process is inextricably linked with the library’s 3 roles as resource, space and service. This section emphasises that the librarians themselves need to be informed learners in order to support the information use and learning of library users.

The framework supports an ongoing process of inquiry and reflection, which informs planning, decision-making, implementation, problem-solving, evaluation and ongoing development of informed learning.

An essential element of the Auraria Library project is reaching out to teaching colleagues and learning advisors, to promote the opportunities and benefits of collaboratively developing curriculum and teaching. Faculty members noted for their innovative approach to learning and teaching are invited to participate in regular informed learning development meetings with librarians. A practical expression of this collaborative process is the previously mentioned first year experience course, for which a librarian led two classes and became a ‘cool’ library contact person for the students.

Web 2.0 media are integral to the Auraria Library project. For example, an informed learning wiki has become the central organising and productive focus for the project and virtual home of the Informed Learning Blueprint. In undertaking the informed learning planning process outlined above, attention is constantly paid to digital resources, virtual spaces and online learners. Online surveys and polls are used to assess student and staff learning needs and outcomes, as well as coordinate meetings. Twitter and an online ‘Ask a librarian’ help line are being used to communicate with the library’s informed learner patrons. Skype enables team cohesion and communication.
The Auraria Library experience and the framework (Table 2 above) offer a model for library practitioners at other institutions who are seeking to reshape or enrich their information literacy programs. While informed learning is ideally curriculum-wide, it is realistic for librarians to work with like-minded teaching colleagues to gradually build a community of informed learning practice. Informed learning principles can be gainfully applied at the level of a particular lesson or unit of study. Successful outcomes can then be showcased more widely, as a way to spread the message and draw in further collaborative partners. For example, the first year experience class at University of Colorado Denver was the subject of a faculty development seminar at Auraria Library in April 2011. In order to demonstrate collaborative potential of informed learning, the co-teachers (Dr Carole Basile and Dr Hilary Hughes), the first year coordinator (Dr John Lanning), a librarian (Karen Sobel), and a student peer Mentor (An) all contributed to the panel discussion. Notably, the transformative learning outcomes were represented by two students, Jordan and Anthony, who described how the unit had helped them better understand the different ways that they (and other people) learn and so tackle personal challenges, such as developing self-discipline for their study and finding greater direction in their lives.

**Benefits of informed learning for Web 2.0 and beyond**

Informed learning underpins a holistic learning approach that responds to contemporary social, cultural, technological and pedagogical trends. Through its combined emphasis on information use, discipline content, learning processes, and reflection, it enables students to develop understandings and practices to succeed as lifelong learners and global citizens in an increasingly dispersed society. Informed learning empowers students to reap the benefits of emerging mobile technologies that allow engagement at any time, in any context (Johnson, Smith, Willis, Levine and Haywood, 2011). Through ongoing exploration and reflection, students become able to venture safely and confidently into and between familiar and fresh online environments.

With Web 2.0, communicating and publishing is relatively easy, through social software such as blogs, wikis, Twitter, and Facebook. While this leads inevitably to an over-proliferation of information of widely varying quality, the advantage of Web 2.0 for informed learners and educators is that Web 2.0 media encourage curiosity and creativity in environments which are becoming increasingly familiar and hospitable to contemporary learners. It makes sense for educators to engage learners with Web 2.0 media in ways that make most sense to them.
The multiplicity of information sources and forums in the online environment can be both liberating and bewildering for students. Informed learning places particular emphasis on developing a critical approach that will allow students to discriminate information of varying quality and relevance, and to identify information that responds to specific needs at appropriate levels. In addition, informed learning promotes reflective information use and learning, whereby students can build upon previous experiences in future contexts.

The Web 2.0 environment is unpredictable and serendipitous. Students need to be alert to risks and opportunities, and to attend to their rights and responsibilities. Informed learning promotes ethical information use that upholds citizens' rights to freely access and publish information. It fosters respect for text in all forms (words, images, sounds) through understanding of intellectual property and the legal implications of copyright. Importantly, an informed learning approach can raise awareness of varying cultural sensitivities towards original and shared work and differing academic conventions around the world. In this approach, students are encouraged to use Web 2.0 tools such as delicious and Zotero and to adopt Creative Commons practices. Informed learning can also be a context for equipping them with strategies to preserve their privacy and safety online.

Both Web 2.0 media and informed learning can support HE institutions in producing graduates who are both independent thinkers and team players. Web 2.0 media afford high levels of social interaction and multi-tasking, as demonstrated throughout this book. Informed learning provides a basis for enhancing the quality of these interactions and supporting productive collaboration. Students can learn to work in virtual teams to carry out design projects. Educators can meet colleagues from down the corridor and around the world in webinars or Second Life to develop their knowledge and practice. Librarians, lecturers, ESL teachers and learning advisors can come together online or face-to-face to plan and implement new curricula that incorporate the creative online strategies.

In online environments, as elsewhere, effective learning and teaching builds on a sound conceptual basis and a holistic commitment. From a pedagogical perspective, informed learning, by focussing attention on the processes of information use, minimises the mentality and chance of ‘copy and paste’ that can occur in online learning. Informed educators model ethical uses of information and base learning activities and assessment around inquiry and problem-solving. They generally focus on academic integrity rather than plagiarism, adopting an educational rather than a punitive position.
Intercultural fluency is particularly critical at a time when revolutions are brought about through Web 2.0 media. Informed learning responds to the social and cultural diversity of contemporary higher education populations. It is essentially inclusive by encouraging learners to share their diverse cultural, linguistic and professional knowledge (Bruce and Hughes, 2010). This inclusive approach not only enables students to develop familiarity with a wider range of information sources, but also to become aware of different social and political contexts that affect the ways people access, use and value information around the world. In this way, students of all backgrounds, domestic and international benefit through widening their information horizons.

**Conclusion**

Educational technologies and learning spaces are constantly evolving. Like the evolution of other technologies before, Web 2.0 media and their future evolutions have the potential to transform learning and information literacy education. Like earlier technologies, we need to allow Web 2.0 to help us better meet learning objectives, and also to influence the nature of objectives that are possible. Web 2.0 is yet another information and learning environment, one in which we want our students to be both comfortable and experienced as they engage with information to meet academic, professional and personal needs. Informed learning is offered as a framework to assist this process; providing ways of thinking for learning design which will allow learners to use information of all kinds and in different technological spaces, through Web 2.0 and beyond.

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