

This is the author-created version of the following work:

Bruce, Christine, and Hughes, Hilary (2010) *Informed learning: a pedagogical construct attending simultaneously to information use and learning*. Library and Information Science Research, 32 (4) A2-A8.

Access to this file is available from:

<https://researchonline.jcu.edu.au/55458/>

Crown Copyright © 2010 Published by Elsevier Inc. All rights reserved.

Please refer to the original source for the final version of this work:

<https://doi.org/10.1016/j.lisr.2010.07.013>

Informed Learning: a pedagogical construct attending simultaneously to information use and learning.

Christine Bruce, Hilary Hughes.

Corresponding author Christine Bruce, Faculty of Science and Technology, Queensland University of Technology, c.bruce@qut.edu.au

Abstract

The idea of informed learning, applicable in academic, workplace and community settings, has been derived largely from a program of phenomenographic research in the field of information literacy, which has illuminated the experience of using information to learn. Informed learning is about simultaneous attention to information use and learning, where both information and learning are considered to be relational; and is built upon a series of key concepts such as second-order perspective, simultaneity, awareness, and relationality. Informed learning also relies heavily on reflection as a strategy for bringing about learning. As a pedagogical construct, informed learning supports inclusive curriculum design and implementation.

This paper reports aspects of the informed learning research agenda which are currently being pursued at the Queensland University of Technology (QUT). The first part elaborates the idea of informed learning, examines the key concepts underpinning this pedagogical construct, and explains its emergence from the research base of the QUT Information Studies research team. The second presents a case, which demonstrates the ongoing development of informed learning theory and practice, through the development of inclusive informed learning for a culturally diverse higher education context.

Introduction

Information literacy research and scholarship in the last twenty years, especially in Australia and Europe has focused on engagement with information in the learning process. Much of this work has been trans-disciplinary, of interest to both information and educational researchers, and consequently published across both those domains. Indeed, recent analysis has identified that only 31.82 percent of information literacy publications appear in the information and library science literature (Ahorony, 2010, p.270). Information literacy research, exploring engagement with information amongst communities of learners, has focused either on the information literacy experience, or the socio-cultural context associated with such experiences.

The sociocultural work is of more recent date, and has largely been led by European information literacy researchers such as Louise Limberg (Limberg and Alexandersson, 2010) and Sanna Talja (e.g. Kautto and Talja, 2007); in Australia, Annmaree Lloyd (2006, 2007); and in New Zealand Li Wang (2007). The work focused on the experience of information literacy has a lengthier history. This trajectory commenced with an investigation into people's varying experiences of information literacy (Bruce, 1997b), and established the relational model of information literacy (Bruce, 1997a). This line of research has since developed, for example in the United States (Maybee, 2006), and the United Kingdom (Boon, Johnston and Webber, 2007; Williams, 2007). These lines of research have revealed clearly the need to distinguish the view of information literacy as a series of skills to be acquired,

from the view that information literacy is about effective engagement with information, when learning in different contexts.

This line of research, detailed in the next sections of the paper, led to the establishment of the concept of ‘informed learning’. Informed learning has been described as

using information, creatively and reflectively in order to learn. It is learning that draws on the different ways in which we use information in academic professional and community life, and it is learning that draws on emerging understandings of our varied experiences of using information to learn (Bruce, 2008, p.vii)

Informed learning is simultaneously about information use and learning.

This paper discusses key aspects of informed learning in two parts. The first explores the idea of informed learning and key concepts underpinning the construct, as well as its emergence from the research base of the Queensland University of Technology research team. This first section establishes the theoretical foundation for informed learning and the research background from which it emanates. The second part of the paper discusses associated research about the idea of inclusive informed learning, its capacity to support learning approaches in culturally diverse contexts, and its application to an academic learning context. The second part explores the face validity of the pedagogical construct through examining its applicability to multicultural learning contexts.

While much of the underpinning research has come from tertiary learning environments, the idea of informed learning is applicable to a wider range of contexts, in particular workplace and community. The unique contribution of informed learning is to bring a research-based theoretical perspective which offers insights into the nature of learning through information use; a perspective not commonly taken by either information researchers who focus on the role of information and information behaviours, or educational researchers who focus on the nature of learning. It is simultaneous attention to both information use and learning which is the key ingredient of the informed learning concept and ongoing research.

The idea of informed learning and its research foundations

Informed learning (Bruce, 2008) marks a recent advance in information literacy research and associated theory development. It offers a conceptual frame for enacting the *relational approach to information literacy*, as represented by the *Seven faces of information literacy* (Bruce, 1997b).

Information literacy is variously interpreted in the research community. Lloyd (2006, p. 578) suggests that it “is a variable construct and is shaped and understood according to context”, which is evidenced by continued debate about the nature of information literacy, and its relationship to other generic skills, literacies and sociotechnical practice (Lorenzo & Dziuban, 2006; Tuominen, Savolainen, & Talja, 2005). Increasingly information literacy is associated with learning (Bruce, 1997b; Kuhlthau, 2004; Limberg, 1999) or ways of knowing (Lloyd, 2006).

Information literacy education also takes various forms, which may focus on content, competence, learning to learn, or personal relevance to learners. The most comprehensive

form, which reflects the relational frame for information literacy education, assumes information literacy to be “a complex of different ways of interacting with information” (Bruce, Edwards, & Lupton, 2006, p. 5). The relational model is represented by Bruce’s (1997b) *Seven faces of information literacy*, which demonstrates that people experience information literacy in qualitatively different ways.

Informed learning (Bruce, 2008) envisages that learners in social, workplace and academic contexts will experience different information concepts and practices, thereby learning *about* and learning *with* information. Through a reflective process, they explicitly turn their attention towards their learning about those practices, and so become able to transfer their learning to new contexts. Rather than focussing on separate information skills, *informed learning* aims to promote critical and strategic approaches to solving complex problems in differing contexts. Informed learning is therefore integral to the learning process, rather than simply proposing an additional set of information skills to be mastered. In this way it differentiates itself from approaches to information literacy education which engender sequential “tick the box” processes (Johnston & Webber, 2003).

The idea of informed learning has emerged from recognition that the information literacy agenda, of growing importance to the information science research domain, typically does not explicitly differentiate between the teaching of skills and the design and implementation of curriculum which focuses on the processes of using information to learn. The idea of informed learning thus may be distinguished from the first of these notions of information literacy. The purpose of introducing the concept is to highlight that side of scholarly discourse that considers effective use of information for learning, rather than focusing predominantly on the acquisition of information skills. Informed learning proposes the value of learners and teachers consciously paying attention to interaction with information as learners engage with their fields of interest. It represents one possible pedagogical direction for information literacy education.

Informed learning draws deliberate attention to the relationship between information use and learning, a relationship which is mostly taken for granted and not placed under scrutiny. Typically, the relationship between information use and learning is sufficiently assumed that the very idea of ‘informed learning’ may appear tautological.

Exploring the meaning of ‘inform’ however, begins to reveal the potential influence of information on learning. ‘Inform’ is characterised as “giving form or shape, giving vital organising power; giving life; imbuing with vitality; animating; molding; fashioning (Webster, 1913, p.). In the case of informed learning, we would expect to see that information use gives form and shape, gives organising power, gives life, animates, figures and fashions learning, as well as imbuing learning with vitality.

The idea of informed learning is grounded in a program of research which has illuminated the experience of using information to learn in many contexts. Much of this research program is associated with the phenomenographic tradition (Marton & Booth, 1997), introduced to the LIS field by Bruce (1997b) and Limberg (2000), which is concerned with the use of information for learning within the context of people’s experience. While informed learning is about using information to learn, and curriculum design which explicitly attends to that process, informed learners are those who are aware of the role that information is playing in their learning experiences and are able to use that knowledge to their advantage.

Several studies, which stem from the QUT Information Studies research program, have built on the relational approach to information literacy (Bruce, 1997a,b). All of these studies have illuminated aspects of the interdependence between information and learning. Many, such as Edwards (2006) and Lupton (2004; 2008) belong to a broader program of phenomenographic research into learning (Marton & Booth, 1997; Marton & Tsui, 2004). Others, such as Hughes (2009), adapt fundamental principles associated with that research program.

Studies by Bruce (1997b), Edwards (2006), Lupton (2008), Limberg (1998), Hughes (2009) and Maybee (2006) in particular, underpin the idea of informed learning. Each of these demonstrates the importance of simultaneous attention to information use and learning, where both information use and learning are contextualized as being about something. Somerville (Somerville, 2009, p. 11) notes the many emerging recommendations for “providing students with learning activities that simultaneously activate and extend prior information use experiences” which have emerged from such research (Feind, 2008, Lupton, 2004; Lupton, 2008; Webber, Boon, & Johnston, 2005;).

In these studies, the idea of simultaneous attention is aligned with the phenomenographic principle of *simultaneity* and the idea of contextualisation is aligned with the phenomenographic principle of *relationality*. In all of the studies the key intention is to understand effective information use from the perspective of those involved in experiencing that phenomenon, the phenomenographic principle of *second-order perspective*, and in many studies different experiences are described in terms of changes in *awareness*. These studies direct attention towards different aspects of the experience of information use for learning.

Key theoretical constructs underpinning informed learning

The key theoretical concepts of informed learning emerge partly from the adoption of the phenomenographic research principles identified above, and partly from the identification of the meaning of those concepts in learners' experience.

Phenomenography and the associated variation theory of learning, are amongst the most influential developments in educational research in the last twenty years, giving rise to now widely accepted ideas such as deep and surface, or atomistic and holistic, learning. The first four constructs described below, ‘second-order perspective’, ‘simultaneity’, ‘awareness’ and ‘relationality’, come from the application of phenomenographic principles to the informed learning agenda. The latter two constructs, focused on what constitutes information and information practice, have emerged from investigations of learners' experience.

Second-order perspective Central to informed learning is the idea of ‘second-order perspective’. It refers to looking at the world through the eyes of the people engaged with the world, rather than through the eyes of the researcher or discipline framework. In relation to informed learning, it is about understanding the experience of using information to learn, from the viewpoint of the learners. Instead of prescribing ways of learning, researchers and teachers explore learners' ways of using information to learn in order to make explicit their present experiences and draw on the experiences of the learners as a group to introduce them to previously unfamiliar experiences. Understanding the learner's perspective as a key to bringing about learning and improving the quality of learning outcomes has been a critical agenda in educational research at many levels in both Sweden and Australia (Bowden &

Marton, 1998; Marton & Booth, 1997; Marton & Tsui, 2004). In some aspects of educational research the idea of second-order perspective has also been applied to investigating the experiences of teachers. Both of these interpretations of the second-order perspective have been adopted in research underpinning the informed learning agenda, with some studies focusing on learners (for example Lupton 2008, Hughes, 2009; Maybee, 2006) and others on teachers (for example, Webber, Boon, & Johnston, 2005; Bruce, 1997b). Adopting a second-order perspective is instrumental in allowing curriculum designers and other educators focused on information and learning to adopt learner and discipline, rather than librarian or library centric, educational assumptions (Somerville, 2009,).

Simultaneity Simultaneity refers to the importance of focusing on more than one aspect of a phenomenon at the same time. It forms a central tenet of variation theory, the learning theory connected with researching experience in higher education (Marton & Tsui, 2004). Simultaneity in informed learning refers to simultaneous attention to information use and discipline content. Lupton (2008) shows the critical nature of simultaneous attention to information and content learning amongst students in different disciplines. Researching both students of tax law and music she concluded that both groups adopted linear, cyclic or simultaneous approaches to using information and learning aspects of their discipline. In the linear approach, students sought information then learned from it. In the cyclic approach, they closed the loop in the linear approach by identifying the need for further information to support their learning, seeking that information and then learning from the new information. The repetition of the linear process gave rise to a cycle of seeking and learning, where the seeking was considered to represent information use. In the simultaneous approach, however, students did not consider their use of information and learning to represent separate activities, they occurred simultaneously. Students saw themselves as engaged in learning at the same time as they were engaged in interacting with information in various ways; with the idea of interaction here representing a breath of activities, from seeking to analysis, evaluation and reflection.

Awareness Awareness in the informed learning agenda may refer to either learners being aware of different aspects of their use of information to learn, or to learners being differently aware of the same aspect of their use of information to learn. Clarence Maybee (2006), for example, shows how using information may be experienced as finding information, initiating a process or building a personal knowledge base for a particular purpose. In each of these experiences learners are aware of different aspects of using information to learn. In the first, finding information, they are aware of the need for information location and they direct their awareness to information sources. In the second, initiating a process, learners are aware of themselves initiating and implementing a process, and they direct their awareness towards their process. In the third, building a personal knowledge base for a particular purpose, students are aware of themselves as knowers and they direct their awareness towards the purpose of their information use, such as forming personal perspectives or sharing information. In each of these cases learners are also shown to be aware of some aspect differently, for example information is thought of as objective in the first two ways of experiencing and subjective in the third.

Relationality Learning and information use are both relational. Learning is about coming to be aware of *something* in a different way, or in multiple ways (Marton & Booth, 1997). Information is also always about something, or used in relation to some purpose. In relation to information literacy education, this might mean for example that learning has occurred not when a learner is able to describe, define or search an electronic database, but rather when the

learner has come to interact with, understand or interpret that database differently. In investigating the experience of searching the internet for information on specified topics, Edwards (2006) was able to identify that some people experience searching as looking for a needle in a haystack, being unaware of the structure of the internet and its various sources; whilst others experienced their searching as panning for gold, being aware not only of the structure of the database but of the varying qualities of the content they encountered. The essence of relationality is the ‘internal relation’ between subjects (people) and objects (such as information), internal relations which vary in qualitatively different experiences of phenomena (Bruce, 1997b). In Edwards’ example above the idea of looking for a needle in a haystack and panning for gold represent the different internal relations between the learners and their data sources.

The nature of information In the informed learning agenda, information is understood from the perspective of users and learners. User oriented information research has consistently shown that what constitutes information takes different forms and varies with the discipline or community of practice involved (Lupton & Bruce, 2010). For example, Lloyd and Somerville (2006) note that fire fighters consider their bodies, and the fire itself, to be information; and Cheuk (2000) concludes that for auditors what constitutes information is not homogenous, indeed it can be different for each individual. While academics might consider books, journals, newspapers, archives and broadcasts to constitute information (Webber, Boon, & Johnston, 2005), construction workers identify drawings, email correspondence, minutes of meetings, workflow and contracts (Magub, 2006); and school principals identify interviews, student behaviour, feedback from parents, dress, extra-curricular activity and community involvement as appropriate information when reviewing staff performance (Ballantyne, Thompson, & Taylor, 1994). Not only does the nature of what constitutes information differ in different disciplines and contexts, but the same information may also appear differently to different learners. A simple example being that an assignment is likely to be interpreted in multiple ways by different learners.

Essentially, information is that which is informing and can be experienced as subjective, objective or transformational. Information is purposeful and intentional. It is not passive; it has an active role to play in the subject-object relations which constitute the experience of effective information use (Bruce, 1997b). Such an approach “Fuses traditional separations between data, information and knowledge; recorded and unrecorded knowledge or information. ... In informing, information makes a contribution to something larger – it becomes part of a process that determines action, enables insights, creates a work of art” (Bruce, 2008, p.101).

Information practices Information practices in the informed learning agenda are those academic, workplace, professional or community practices which form a context for information use; such as problem-solving, inquiry, decision-making, essay writing or presentation, as people go about learning. Each of three aspects, the information practice, the information interaction or use and what is being learned, are vital elements of informed learning. (This is another example of simultaneity). Mandy Lupton (2004) for example, shows how students engage with information as they go about writing an essay, through which they learn about resource management. She contrasts learners who conceptualise their essay as being a topic to be learned, information as being sought to provide answers to questions and learning as being about coming to know. Learners who conceptualise their essay as representing an opportunity for professional or disciplinary enculturation see information as a vehicle for making connections between ideas at different levels and

learning as being about contributing to social change. She concludes that there is a strong relationship between the essay (the information practice), information and learning. Similarly, Limberg (2000) connects learners' approaches to assignment completion (the information practice) with their ways of engaging with information and subsequent learning outcomes.

The role of reflection in informed learning

Reflection has been earlier identified as one of three critical elements of learning to be information literate:

- Experiencing information literacy (learning);
- Reflection on experience (being aware of learning); and
- Application of experience to novel contexts (transfer of learning) (Bruce, 2002, p. 14).

Somerville (2009, p. vii) reinforces the importance of the proposal that "individuals learn from experience with and reflection on a wide variety of information situations".

Reflection is vital to making informed learning possible. Research shows (Andretta, 2008; Johnston and Webber, 2003) that the curriculum design process needs to ensure that learners reflect on their engagement with information and how that has influenced their learning. Reflection on experience is required to make learners aware of both *what* they have learned and *how* they have learned (Hughes, Bruce, & Edwards, 2007; Jacobs, 2008). In informed learning, it is especially required to raise learners' awareness of the roles information and information use has played in the process. Reflection is intended to direct the attention of learners towards important dimensions of their information use experiences.

The emergence of inclusive informed learning

The idea of informed learning is subject to ongoing development with regard to learners from varied cultural contexts. The remainder of the paper will discuss how the informed learning concepts described above influenced recent research (Hughes, 2009) and the development and implementation of inclusive informed learning in a unit of study¹ for international students undertaking Master of Education in Teaching English as a Second Language (TESOL) and Teaching English as a First Language (TEFL). The study investigated the experiences of 25 international students using online information resources to learn at two Australian universities. In addition to providing real-life insights about the students' study related information use, this research identified significant informed learning needs.

Conceptually, the study viewed international students as information-using learners, through the lens of the *relational* model of information literacy (Bruce, 1997a,b; 2008). Thus, the research design built on the concept that *using information to learn is a multifaceted experience*. The influence of the *relational* model is also evident in the study's concern with the international students' context and the what, how and why of their online information use. In other words, the study investigated the different types of *information* the students needed for assignments and their *information practices*, or interactions with online information resources, within a culturally diverse online intensive educational environment.

The findings present a *second-order perspective* of international students' information using experiences. Interviews and observations of the international students focussed on *critical incidents* that they experienced whilst using online resources for assignments. The study's findings reveal that the international students' experience of using online information resources to learn is complex and involves an *interplay* of eight inter-related elements which are: *the students*, their *information-learning environment*, their *interactions* (or active engagement) with online resources; their information-using *strengths-challenges*; their *information-learning*, their *affective responses* to using online resources; the *linguistic-cultural dimensions* of their online resource use, and their *reflections* on the whole experience of using online resources for study. In this way, the findings reflect the experience of *simultaneously* interacting with online resources and learning about a specific topic. They also *relate* international students' real-life information use and their informed learning needs.

Reflection played an important part in the development and implementation of the research. The researcher adopted a reflective approach to data collection, analysis and interpretation. The international students provided rich insights by reflecting back over their whole experience of using online resources. They also 'reflected forwards' in considering ways the experience could be improved for international students.

The study found that the international students experienced a variety of information use strengths and challenges. Their strengths included linguistic and cultural knowledge pertaining to varied contexts, as well as computer-using and Internet-searching skills. Their challenges related in various ways to limited *awareness*, or *unfamiliarity* with online resources and the learning environment. For example, many students reported that they had not previously encountered journal databases; they were often unused to independent research-based learning approaches, referencing conventions, and discipline-specific and bibliographic jargon. In addition, students were frequently unfamiliar with the academic style and cultural references contained in online resources. The effects of unfamiliarity were evident in an *information literacy imbalance* between the individuals' generally well developed digital skills and use of Internet applications, and their less developed information use approaches, which showed limited critical or strategic engagement with online resources. In this respect the international students' experience mirrors that of the wider student population (Lorenzo & Dziuban, 2006).

In response to the complex needs associated with engaging with information when learning identified by this research, Hughes proposed an *inclusive informed learning approach*, which would enable international students to build on existing strengths, whilst developing critical, ethical and creative information use for learning at their host university. She suggested that this approach would draw international students into the academic mainstream and offer an alternative to deficit models of information literacy education based on student differences and difficulties. Moreover, although the inclusive informed learning approach grew from research about international students, it has the potential to promote learning across the wider, culturally diverse student population.

Inclusivity

Inclusive informed learning adds the qualitative dimension of *inclusivity* to the informed learning construct. *Inclusive* (Biggs, 2003) describes a learning approach that embraces

learner *diversity*, rather than promote different or ‘special’ treatment for international students. *Inclusivity* applies to both conceptual and practical aspects of informed learning. For example, on a conceptual level, inclusivity implies *awareness* of the diversity of learners and their educational and cultural experiences. On a practical level, *inclusivity* implies pedagogical responses that respond to the learners’ similarly diverse learning needs.

Inclusive informed learning explicitly addresses the identified *information literacy imbalance* (Hughes, Bruce & Edwards, 2007) by fostering strategic, critical, ethical and creative information use. It supports contextualised learning about and with information, in ways that are discipline or course-specific, rather than generic. It situates learning to use information within the wider learning context of students’ course requirements, graduate attributes (Barrie, 2006) and personal development. It is applicable to different learning contexts and across disciplines. Thus, for example, it could be applied to an education assignment, or to an IT unit of study, or across a whole MBA course. In this way, the inclusive informed learning approach supports curriculum-based information literacy learning and collaborative teaching by lecturers, librarians, and language and academic learning specialists, supporting integrative trends already underway (for example, Elmborg & Hook, 2005; Peacock 2008).

Whilst attending to the disciplinary and information needs of students, inclusive informed learning simultaneously raises students’ awareness of the cultural and social dimensions of their learning context. It encourages students to share their varied knowledge and experiences, contributing Australian and international perspectives. Throughout, students are encouraged to reflect on their developing understandings, knowledge and practices, to assist them make sense of their expanding information-learning environment.

Implementation of inclusive informed learning

In practice, *inclusive informed learning* has proved successful in a unit of study for international students in the field of English language teaching. As described below, concepts of informed learning and inclusivity underpinned the unit’s re-design and implementation with two classes during Semester 2, 2009 at QUT.

Personalised Language Development, is an elective subject for students undertaking the Master of Teaching English as a Second Language (TESOL) and Master of Teaching English as a First Language (TEFL). Its stated aim is to enable learners, teachers and researchers of English as a second or foreign language to develop their English language fluency in academic language, and conventions and scholarly use of research literature for learning, teaching and research. In 2009 the unit attracted students from the People’s Republic of China, Taiwan, Thailand, South Korea, Finland and Saudi Arabia. English was a common, but additional language for all the students. As a Masters unit, it was necessary to engage the students at an advanced academic level. Learning and assessment activities needed to be relevant to the students’ current needs and future professional contexts as English language teachers. Whilst enhancing the students’ linguistic fluency and information literacy, the unit needed to go beyond the mechanics of writing and information seeking skills, to developing critical thinking, ethical information use and informed discussion about complex issues. The unit also needed to be relevant to students with varied knowledge and experience of teaching English, and to extend the understanding and practices of novice and experienced teachers, as well as seasoned academics.

The unit's distinctly informed learning flavour is reflected by its simultaneous emphasis on learning content and information processes. Its key learning outcomes were to conduct and present a literature review on a self-selected topic relevant to English language teaching. This provided a scenario for guided interactions with information, whilst developing disciplinary knowledge. By engaging with scholarly literature, the students simultaneously developed critical and creative information using practices whilst learning about their disciplinary area. Through investigation, discussion and practical activities the students developed understandings about the varied nature and sources of information on their topic. They came to understand and develop a scholarly approach through critically analysing their findings, communicating them in writing and orally, applying them to a practical teaching context and reflecting on the whole process.

The metaphor of an "informed learning journey" provided a continuing focus for learning activities and reflection throughout the unit. At the outset, students were introduced to the notion of informed learning. Their learning schedule stated: "this week you will plan and start out on your informed learning journey". They shared informed learning experiences and goals in a discussion entitled: "Where we've come and where we're going", before exploring key information concepts and summarising an academic article. Week by week, they came to understand different aspects informed learning, sharing their "travelers" tales in class and small group discussions, and contributing questions and suggestions to an online "Travel chest". Gradually an "informed learners" community formed, allowing the exchange of 'surprises', problems and helpful hints relating both to the unit content and wider experiences of living and studying in Australia. They also formed small "informed learner" teams of critical friends to provide support and critical feedback to each other.

Simultaneously, the students actively developed information practices which in different ways contributed to their literature review. For example, the second week of learning involved identifying "essential resources for your informed learning journey". Activities included a discussion about "What is information? Where do you find information? Who helps you find information?" During a hands-on "Journey through your online learning environment", guided by a librarian, they identified a scholarly reference on their chosen literature review topic. They then skimmed the article searching for 'critical clues' about its content and usefulness.

Reflective writing was an integral part of the students' informed learning experience. They were encouraged to contribute to a personal online blog, prompted by two or three weekly focus questions. For example, in their ninth week of learning students were invited to reflect on the following points:

- What are the main things I learned in Week 9 for CLN617?
- What are my thoughts and feelings about completing Assignment 1?
- What are the main things that are puzzling me at the moment?

In addition, their assignments included reflective writing based around "critical incidents" that students had experienced during the course. For example, these students often wrote about the impact of different kinds of information, such as visual images and shared experiences, on their learning.

Learning activities and assessment were inter-related with each other, and aligned with specified learning outcomes (Biggs, 2003). The first assignment involved writing an initial descriptive literature review. This enabled students to demonstrate their learning about their chosen topic, whilst applying what they had learned so far about information and its scholarly uses. In addition, the assignment gave the students an opportunity to practice writing scholarly prose, following models previously considered in class of cohesive structure and logical argument. Building on the first assignment and further developmental learning, the second assignment required students to critically evaluate the literature previously reviewed, as well as offer and apply recommendations for a practical learning context. The second assignment included a written component and also oral briefings.

In this way, the students gradually developed a strategic and critical approach to using and writing about academic information. They became familiar with academic conventions prevailing in Australia. For example, in addition to learning the purpose and rules of referencing, the students came to understand rights and responsibilities of intellectual property. In presenting their literature reviews both as written critiques and oral briefings, they learned how to communicate academic findings critically and creatively. They also became familiar with the differing written genres, formal academic prose and personal reflection. Students' reflective writing demonstrated that they grasped the concept of being an informed learner and had become aware of how their information and content learning processes interrelated.

Revisiting informed learning concepts in context

The unit described above demonstrates the practical application of the informed learning concepts introduced at the start of this paper. These concepts were implicit in the unit design and explicit in the teaching approach. The students were encouraged to view the unit both as learners and as educators and to critique informed learning as a pedagogical model that they might in turn adopt.

The whole unit revolved around the *nature of information* and *information practices*, in a general sense, in the students' learning and their professional contexts. To varying degrees, they came to understand information as "anything that we experience as informing" (Bruce, 2008, p. 53) and the role of academic literature in research, learning and professional practice. Attention to this concept throughout the unit supported ongoing learning, for example about alternative ways to communicate information and concerns about intellectual property.

The unit promoted active engagement with information resources and critical, ethical and creative information practices. For example, through an experiential learning approach, students became familiar with different information resources and communication media by interacting with them. They were later requested to offer critical commentary about some aspect of the process, its outcomes, or ethical implications. In addition, students acted as critical friends, providing feedback on each other's creative use of information in their writing and oral briefings.

The unit enabled students to develop *awareness* in several areas and ways, which included: information using and learning approaches appropriate to their current learning context; scholarly writing; applying this new knowledge successfully, as scholarly learners, thinkers

and writers. In a broader sense, the unit supported students' transition to life and study in Australia by creating a supportive learning community and making them aware of avenues of information and help, for example via the university library or an online directory.

The unit incorporated the *relationality* between information use and learning. Thus for example, when the students were learning to use a new journal database they were also actively researching a topic. They applied search terms which they had already identified in the initial planning of their literature review strategy. They came to recognize that having mastered a particular technique in one database they could transfer this learning to another. In addition, learning and assessment activities were related to authentic language learning contexts, to assist students understand concepts and apply new knowledge to their professional practice. Moreover, there was a conscious effort to provide examples and activities that would extend students' awareness of Australian and international contexts

The unit also reflected *simultaneity*. The students were learning to use online resources whilst simultaneously researching and communicating about authentic topics on second language learning. They then extended this learning by sharing their discoveries about online resources and their topic with their peers, via class discussion and an online wiki. At the same time, they were developing a scholarly writing approach.

The unit design adopted a *second-order perspective*, by relating learning activities to students' real-life experiences. For example, one early discussion focused students 'surprises' about life and study at an Australia university. This discussion helped establish a sense of shared experience among the students and a relatively 'safe' environment for them to express concerns. The comparison of previous and current experiences enabled the educator to identify and subsequently address particular learning needs.

The unit encouraged students to *reflect* on their information using and learning on an ongoing basis, through personal blogging and as an assessment item. In addition, students were encouraged to share thoughts and feelings about any aspect of the unit or more general learning experiences during class discussion.

The unit was inherently *inclusive*, as was apparent in many ways. For example, learning activities encouraged students to share their varied information using and learning experiences. Issues, such as intellectual property, were compared from different cultural viewpoints. Australian and international perspectives were interspersed in unit content and invited in discussions. Students were introduced formally and informally to a range of Australian heritage, popular culture, classroom and library practices, as well as scholarly conventions, information sources and academic English appropriate to their educational context. As a result the unit took advantage of the rich learning potential offered by the students' diversity.

Informed Learning Research In the Future

While the concept of informed learning is very new, some early developments in associated research are already beginning to appear. The Academy of Finland has funded two projects on the collaborative construction of knowledge and identities in school and teacher education, one of which specifically investigates informed learning in schools. The over arching goal of that work is to "reveal, describe and understand student processes of building their identities and constructing knowledge in information rich, collaborative environments" (Know- Id Research Project, 2010, para 1.). In Australia, the Australian Research Council has funded a

collaborative project between university researchers and health professionals to investigate the process of using information to learn to stay healthy. An initial report into a pilot study of this work is already available (Yates, Partridge and Bruce, 2009). Dr Hilary Hughes has also been awarded a Fulbright scholarship to develop the inclusive informed learning approach (The Fulbrighter, 2010). In the United States, Mary Somerville has brought the concept of informed learning together with soft systems methodologies for organisational learning to create models for 'working together' (Somerville, 2009). These projects provide an early foundation for developing informed learning research in each of the three key contexts, education, community and workplace.

For the future, Bruce (2008) establishes future directions including an agenda for informed learning research.

Researching informed learning must take us across a wide range of spaces, understanding the rich and the poor, the digitally enabled and the digitally disabled, the psychologically empowered, and the psychologically disempowered. How do people use information to learn in their many and varied circumstances and contexts(p. 187).

Important spaces for exploration noted include:

- Researching people's experience of informed learning in different contexts;
- Researching teaching and learning for informed learning;
- Researching information practices;
- Researching informed learning in the community;
- Researching informed learning in the workplace;
- Researching what constitutes information and how it is experienced; and
- Researching informed learning in the research community.

Conclusions

This paper has provided a broad overview of the emergence of informed learning as a pedagogical construct, the key theoretical constructs underpinning informed learning and the development and implementation of inclusive informed learning. It represents key research presently being undertaken in the Information Studies Group at the Queensland University of Technology, collaboratively across the Faculties of Science and Technology and the Faculty of Education; both theorizing the relationship between information use and learning as well as exploring practical application. The idea of informed learning and its theoretical constructs have been presented here as applicable across academic, workplace and community contexts, while the idea of inclusive informed learning has been discussed with specific application to tertiary learning. Ongoing research will ensure further conceptual and practical development of informed learning.

Acknowledgements.

The writing of this paper is supported by an ARC Linkage Grant on using information to learn about health. Special thanks to David Kent, Reference and instruction librarian, Peninsula college library, Port Angeles, Washington, USA for directing us to Webster's interpretation of *inform*. Special thanks also to Dr Mary Somerville, University Librarian/Director, University of Colorado at Denver, sponsor for Hilary Hughes's Fulbright scholarship, which will enable further development of informed learning in the US context. Early critical reviewers of this paper Helen Partridge, Christine Yates and Ian Stoodley provided us with insightful comments on many details. The idea of informed learning was initially developed in *Informed Learning*, by Christine Bruce, published in 2008 by the College and Research Libraries division of the American Library Association

References

- Ahorony, N. (2010). Information literacy in the professional literature: an exploratory analysis. *Aslib Proceedings: New Information Perspectives*, 62(3), 261-282.
- Andretta, S. (2008). Facilitating information literacy education (FILE). In A. Brine, *Handbook of Library and Training Practice and Development, Vol. 3*, Farnham: Ashgate Publishing, pp. 49-78.
- Ballantyne, R., Thompson, R., & Taylor, P. (1994). Principals' conceptions of competent beginning teachers. In R. Ballantyne, & C. Bruce, *Phenomenography: Philosophy and Practice. Proceedings, Brisbane, Australia, QUT, 7-9 November* (pp. 23-45). Brisbane: Queensland University of Technology.
- Barrie, S. (2006). Understanding what we mean by the generic attributes of graduates. *Higher Education*, 51, 215-241.
- Biggs, J. (2003). *Teaching for quality learning at university: What the student does*. (2nd. ed.). Maidenhead: Open University Press/McGraw-Hill.
- Boon, S., Johnston, B., & Webber, S. (2007) A phenomenographic study of English faculty's conceptions of information literacy. *Journal of Documentation*. 63(2), 204-228.
- Bowden, J., & Marton, F. (1998). *The university of learning*. London: Kogan Page.
- Bruce, C. (2002). *Information literacy as a catalyst for educational change: A background paper*. National Commission for Library and Information Science.
- Bruce, C.S. (1997a). The relational approach: a new model for information literacy. *New Review of Information and Library Research*. 3.1-22.
- Bruce, C. S. (1997b). *The seven faces of information literacy*. Blackwood, South Australia: Auslib Press.
- Bruce, C.S. (1998). The phenomenon of information literacy. *Higher Education Research and Development*, 17, (1), 25-43.
- Bruce, C. S. (2008). *Informed Learning*. Chicago: College and Research Libraries, American Library Association.
- Bruce, C., Edwards, S., & Lupton, M. (2006). Six frames for information literacy education. *ITALICS*, 5 (1), Retrieved April 22, 2010, from <http://www.ics.heacademy.ac.uk/italics/vol5iss1.htm>.
- Cheuk, B. (2000). Exploring information literacy in the workplace: A process approach. In C. Bruce, & P. Candy, *Information literacy around the world: Advances in programs and research* (pp. 177-192). Riverina: Charles Sturt University, Centre for Information Studies.
- Edwards, S. (2006). *Panning for gold: Information literacy and the net lenses model*. Adelaide: Auslib Press.
- Elmborg, J. K., & Hook, S. (Eds.). (2005). *Centers for learning: Writing centers and libraries in collaboration*. Chicago: Association of College and Research Libraries

- Feind, R. (2008). Results of a phenomenographic investigation of how faculty and staff perceive, engage in, and view information literacy. *The International Journal of Learning*, 14 (12), 167-70.
- The fulbrighter - Australia. (2010) Dr Hilary Hughes, 23(1), April 2010, p. 4. <http://www.fulbright.com.au/publications/documents/53618FulbrightApr-2010forweb.pdf> Retrieved 6 June 2010
- Hughes, H. (2009). *International students using online information to learn*. (Doctoral dissertation, Queensland University of Technology. Retrieved 31 May 2010 <http://eprints.qut.edu.au/29348/>
- Hughes, H., Bruce, C.S., & Edwards, S.L. (2007). Models for reflection and learning: A culturally inclusive response to the information literacy imbalance. In S. Andretta (Ed.). *Change and challenge: Information literacy for the 21st century* (pp. 59-84). Adelaide: Auslib Press.
- Jacobs, H. L. (2008). Information literacy and reflective pedagogical praxis. *The Journal of Academic Librarianship*, 34 (3), 256-262.
- Johnston, B., & Webber, S. (2003). Information literacy in higher education: A review and case study. *Studies in Higher Education*, 28, 335-352.
- Kautto, V. & Talja, S. (2007). Disciplinary socialization: Learning to evaluate the quality of scholarly literature. *Advances in Library Administration and Organisation*, 25, 33-59.
- Know- Id Research Project. *Collaborative construction of knowledge and identities in schools and teacher education*. Retrieved June 1, 2010 from <https://www12.uta.fi/blogs/know-id/>
- Kulthau, C. (2004). *Seeking meaning: A process approach to library and information services* (2nd ed.). Westport, CT: Libraries Unlimited.
- Limberg, L. (1998). *Att soka information for att lara (Experiencing information seeking and learning)*. Boras: Valfrid
- Limberg, L. (1998). *Att soka information for att lara (Experiencing information seeking and learning)*. Boras: Valfrid.
- Limberg, L. (1999). Experiencing information seeking and learning: A study of the interaction between two phenomena. *Information Research*, 5(1). Retrieved 31 May 2010 <http://informationr.net/ir/5-1/paper68.html>
- Limberg, L. (2000). Phenomenography: A relational approach to research on information needs, seeking and use. *The New Review of Information Behaviour Research*, 1, 35-50.
- Limberg, L. & Alexandersson, M.A. (2010). Learning and information seeking. In M. Bates and M.N. Maack (eds) *Encyclopedia of Library and Information Science*, 3rd edition. London: Taylor and Francis, pp. 3252-3262.
- Lloyd, A. (2006). Information literacy landscapes: An emerging picture. *Journal of Documentation*, 62(5), 570-583.
- Lloyd, A. (2007) Learning to put out the red stuff: becoming information literate through discursive practice. *Library Quarterly*, 77(2), 181-198.
- Lloyd, A., & Somerville, M. (2006). Working information. *Journal of Workplace Learning*, 18 (3), 186-198.
- Lorenzo, G. & Dziuban, C. (2006). *Ensuring the Net Generation is Net Savvy*. Educause Learning Initiative, September 2006, ID: ELI3006. <http://www.educause.edu/ir/library/pdf/ELI3006.pdf>
- Lupton, M. (2004). *The learning connection: Information literacy and the student experience*. Adelaide: Auslib Press.
- Lupton, M. (2008). *Information and learning*. Adelaide: Auslib Press.

- Lupton, M., & Bruce, C. (2010). Windows on information literacy worlds: Generic, situated and transformative perspectives. In S. Talja, & A. Lloyd, *Practicing information literacy: Bringing theories of learning, practice and information literacy together*. Riverina: Charles Sturt University, Centre for Information Studies, 1-27..
- Magub, A. (2006). *Experiences of the phenomenon of internet use for information sharing on construction projects and skill set identification for effective project participation*. Brisbane, Australia: Queensland University of Technology.
- Marton, F., & Booth, S. (1997). *Learning and awareness*. Mahwah, N.J: Lawrence Erlbaum.
- Marton, F., & Tsui, A. (2004). *Classroom discourse and the space of learning*. Mahwah, N.J.: Lawrence Erlbaum.
- Maybee, C. (2006). Undergraduate perceptions of information use: The basis for creating user-centred students information literacy instruction. *The Journal of Academic Librarianship*, 32 (1), 79-85.
- Peacock, J. (2008) Not yours, not mine... but ours: integrating learning skills for integrated learning. *Proceedings of the Australian Library and Information Association (ALIA) Biennial Conference: Dreaming 08*, 2-5 September, Alice Springs, Australia, 2008. Retrieved 30 May 2010 <http://conferences.alia.org.au/alia2008/pdfs/311.pdf>
- Somerville, M. (2009). *Working together: Collaborative information practices for organisational learning*. Chicago: College and Research Libraries: a division of the American Library Association.
- Tuominen, K., Savolainen, R., & Talja, S. (2005). Information literacy as a sociotechnical practice. *The Library Quarterly*, 75(3), 329–45.
- Wang, L. (2007). Sociocultural learning theories and information literacy teaching activities in higher education. *Reference and User Services Quarterly*, 47 (2),149-158.
- Webber, S., Boon, S., & Johnston, B. (2005). A comparison of UK academics' conceptions of information literacy in two disciplines: English and marketing. *Library and Information Research*, 29 (93), 4-15.
- Webster, N. (1913). *Webster's revised unabridged dictionary of the English language*. London: G & C Merriam. <http://www.webster-dictionary.net/definition/inform>
Retrieved 6 June 2010
- Williams, D. (2007) Secondary school teachers' conceptions of information literacy. *Journal of Librarianship and Information Science*, 39(4), 199-212.
- Yates, C., Partridge, H. and Bruce, C. (2009) Community health information literacy, *Australian Library Journal*, 58 (3), 269-285.

¹ The term 'unit' refers to a semester-long credit-bearing component of a degree program; elsewhere may be designated as 'course' or 'subject'.