

## Student engagement with information: Applying a threshold concept approach to information literacy development.

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## **Summary**

This paper reports on a project at UNSW Library that is using a threshold concepts approach to re-think Library support for the learning and teaching. Informed by expertise gained from help desk experience, the project team used “troublesome knowledge” or “places where learners get stuck” to identify threshold concepts which enable learners to effectively engage with information in a university environment. The processes of identification included gathering data about troublesome knowledge, then categorising and abstracting this data to identify the threshold concepts. A threshold concepts approach has proved to be transformative, not only in terms of identifying new ways to inform the development of student learning opportunities, but also in widening assumptions about the types of learning experiences that are fundamentally important.

## **Threshold concepts**

The threshold concepts approach within learning and teaching emerged from a UK project focussing on the enhancement of learning and teaching environments in undergraduate courses.<sup>1</sup> Research during, and since, this project has highlighted the existence of key understandings (threshold concepts) which represent ways of knowing in particular disciplines (or contexts) that are prerequisite for progressing towards expertise. Students who are unable to “come to know” a discipline, or a process, in these identified key ways, are subsequently also unable to develop the deep understanding that expertise requires. Despite the educational significance of threshold concepts, these fundamental understandings are often not explicitly taught, particularly in learning environments focusing primarily on transmission of disciplinary content. Curriculum content is obviously important, but the continued growth of what is deemed to be essential to learn can lead to an over-stuffed curriculum. (Cousin, 2006a) The lack of time to cover this content can also reduce opportunities for developing genuine understanding. Without this underlying understanding, a student is more likely to develop surface approaches to learning about content, which can lead to “inert knowledge” (Whitehead, 1929), that is, knowledge that can be reproduced for an assessment task in university, for example, but cannot be applied outside that context. (Meyer & Land, 2003) Threshold concepts research seemed to provide a pathway through the content-based approach and around these stumbling blocks and barriers to deeper learning.

Davies (2003, p.1) has described threshold concepts as providing a “penetrating tool for analysis of the development of discipline specific learning” and early research focussed primarily on specific disciplinary areas.<sup>2</sup> Over a decade of work has now seen threshold concepts research moving into interdisciplinary areas such as studies on practitioner research (Irvine & Carmichael, 2009; Wallace, 2010), the development of academic literacies (Gourlay, 2009; Kiley, 2009; Trafford & Leshem, 2009) and, more specifically, information literacy (Yorke-Barber, et al., 2008; Brunetti, Hofer & Townsend, 2009). These recent interdisciplinary studies provided the inspiration for a practitioner-research project at the UNSW Library which has sought to re-think the ways that the Library traditionally supports learning and teaching.

## Library learning & teaching support

In the same way that disciplinary content is increasing exponentially, the variety of information tools and sources (content) provided by academic libraries for study and research also continues to increase. In addition, libraries face challenges in terms of balancing services for novice and expert researchers, with basic instruction at one end of the spectrum and assistance with management of research outcomes at the other. New services to help researchers with management and impact assessment of research outcomes are highly desired by university administrations trying to maintain prominence in a globally competitive environment. Yet ensuring undergraduate engagement with the university is similarly important, as tomorrow's researchers, they are obviously a key factor in any university's ongoing success.

The rapidly changing information landscape increases imperatives to provide undergraduates with research skills appropriate for working in 21<sup>st</sup> century global societies, (Willison & O'Regan, 2007, p. 406). Increasingly, universities are being called upon to also focus on preparing students to enter a flexible workforce, requiring the ability to "adapt to novel situations and challenges quickly and creatively." (Mehlenbacher, 2009, p.59)

University undergraduates enrolling in 2011, most with no experience of a pre-Internet world, come with expectations about immediacy and connectivity. To facilitate engagement, these expectations need to be acknowledged and provided for. Many of these students spend little time in the physical library, preferring instead to utilise online resources in their own learning spaces, outside the hours that library buildings are usually open.

A disconnect between perceived and actual skills of enrolling students can sometimes create learning difficulties. A recent ECAR study (Smith & Caruso, 2010) found that 81% of surveyed students rated themselves as "expert" or "very skilled" in their abilities to effectively and efficiently find information via the Internet. Many of them (57%) also rated their skills in evaluating information as similarly high, slightly less (48%) also rated themselves highly for their ability to recognise legal and/or ethical issues. This self rating contradicts earlier studies that have shown that incoming students are actually less technologically able than we (and they) suppose. (Kennedy, et al., 2008; Ellis & Newton, 2009) A wide, but shallow, knowledge, that has met their needs thus far, can sometimes be mistaken for expertise. When they come to university for the first time, this assumed competency by academics of the students (and by students of themselves), can often mask their need to develop deeper understanding.

Traditional face-to-face ways that libraries have supported learning cannot usually be transferred seamlessly into online support. Markless (2009) asserts, for example, that the traditional information literacy frameworks which previously supported face to face interactions are less useful in a digital environment and that a "new conception of information literacy" is required.

Library support for learning and teaching has traditionally focussed on the technologies of searching, finding and managing information. The higher level cognitive processes of critical thinking *with* the information, has often been seen as being necessarily relegated to the faculty/disciplinary domain. Library & information scholars (e.g. Bruce, 2008; Kuhlthau, 2008) are challenging those

assumptions however, and see the facilitation of this more complex learning as being a key responsibility for library professionals, albeit working collaboratively with faculty teaching staff.

At UNSW Library, a threshold concepts approach was perceived to be a pragmatic path towards meeting many of these challenges and in particular, to provide a useful “tool for analysis” (Davis, 2003, p.1) which could be utilised to sharpen focus on where Library learning and teaching support development should be moving.

### **Identifying threshold concepts**

Five characteristics have been identified as being typically present in threshold concepts (Meyer & Land, 2003). These are: (1) threshold concepts are *transformative*, (doorways enabling new ways of understanding the world); (2) are typically *irreversible*, (difficult to un-learn); (3) are *integrative*, (enable connections to be made into other related areas and contexts); (4) are usually *bounded* (learned within a particular context, bordered by threshold concepts in other related contexts); and (5) usually involve coming to understand “*troublesome knowledge*” which may seem counter-intuitive to knowledge already held.

At UNSW Library, the “*troublesome knowledge*” characteristic was used to identify specific threshold concepts that students need to understand in order to most effectively engage with information. Three staff workshops were held which aimed to utilise the expert knowledge (both explicit and tacit) of librarians (with many years of experience helping undergraduate students) to discuss and identify those places where students get “stuck” when attempting to engage with information.

The first workshop set the scene of “different ways of seeing” by exploring Christine Bruce’s (2008) six frames of informed learning, discussing the pros and cons of each particular frame. The second workshop introduced the characteristics of threshold concepts, and focussed in particular, on troublesome knowledge. Working together, participants identified and agreed on particular troublesome areas which consistently generate queries from students, then sorted the types of queries into rough categories. In the third workshop, each group took one of the categories and abstracted it, using tools of metaphor or analogy. This metaphor or analogy was then used to articulate the threshold concept. Appendix 1 outlines the full list of “places where students get stuck.” The categories identified were Technology – Words – Time – Recognition - Academic rules – Emotion.

### **From Technology category to threshold concept**

The Technology category group focussed on the hidden structural aspects of information. They used the analogy of the “peek-a-boo” game adults play with infants, hiding a toy behind a pillow. Through this game the baby learns that the object has not gone forever and often miraculously reappears amidst great hilarity. This type of game is one of the processes whereby the infant develops understanding of experiences as interconnected continuums, rather than as isolated instances. Another analogy that this group used was that of “smoke and mirrors” whereby a magician performs seemingly amazing tricks that the initiated recognise as actually having an orderly, underlying explanatory structure. By gaining a holistic understanding of the underlying structure of information tools, students are better able to utilise them to their advantage.

### **Technology threshold concept - effective information engagement as “systemic thinking”**

This threshold concept involves the students coming to an understanding of information engagement from a “systemic thinking” viewpoint. Systemic thinking is meant, in this sense, as that described by Peter Senge (1990) as a “fifth discipline”. Senge describes systemic thinking as involving a “shift of the mind” (p.68) and as a “discipline for seeing the structures that underlie complex situations” (p.69). A systemic thinking viewpoint enables a holistic comprehension of information sources (i.e. as a complex whole consisting of interconnected parts). For example, the ubiquitousness of the Internet throughout student life worlds can encourage the idea of it as a solid entity, rather than as a network of interconnected parts. The common-sense meaning implied by the words “inter-net” can be largely lost through familiarity of use. Through a “systemic thinking” viewpoint students can be assisted to a deeper understanding of the information “web” and to grasp how each interrelated part is similar, yet different, and how each can be utilised to best effect within a given context, from layperson to academic research, depending on the need.

Strategies to develop effective information engagement then starts at a more basic level, helping students to first see through a “systemic thinking” lens, to gain awareness of the complexity of the wider contextual environment and to start looking for the inter-connections. The content of information products, in this context, will be of lesser interest than how each fits and is interconnected into the larger whole.

This focus on interconnections better enables students to position academic, scholarly information within the wider information environment and develops a necessary, underlying cognisance of the ways that various information sources are structured. This cognisance enhances the ability to recognise particular information needs and to choose and utilise appropriate sources.

### **From Words category to threshold concept**

This group discussed the ways that words can be both aids and barriers to effective information engagement. Their focus was on the ways that particular words mean different things, depending on the context. Using the example of Homer Simpson “digging his food,” the group explored the ways that jargon permeates communication, both as a method of speech economy and a delineation of group membership. Although initially noticeable, jargon quickly becomes taken-for-granted and can block ideas about other, perhaps better, words to use. This enculturation into jargon can sometimes result in tunnel vision about how best to look for required information. Students do need to have some ideas about particular words to start with, but then they need to be able to “play around” or improvise with other ways of describing the same concept, i.e. words that present themselves during searching processes.

### **Words threshold concept - effective information engagement as “bricolage”**

This threshold concept involves the students coming to an understanding of information engagement as a process of *bricolage*. Bricolage in this sense is as described by Ciborra (2002, p.47)

as “a practical intelligence and ... artistic embroidery of the prescribed procedure.” Approaching information engagement from a bricolage viewpoint means that the students are aware of the structure, aware of the established procedures, but are willing to play with these to gain serendipitous results. To use Ciborra’s words again, students become able to “tinker ... through the combination of resources in hand.” (p.49). An expert practitioner, relying on the tacit knowing of possibilities, will routinely use bricolage techniques, but would probably not articulate it as such. By helping students to understand the concept of bricolage in information engagement practice they are enabled to better develop the types of intuitive information engagement behaviour that will serve them well in the various workplaces that they eventually join.

Strategies to help students develop information engagement skills using a bricolage approach would begin with established procedures for discovery and analysis but at the same time with illustrations of the ways that improvisation can lead to other, unexpected, results. The learning process may begin with exploring the many ways that the same words have been used in different contexts and how these words can be used to broaden or narrow information search and discovery. Rather than one or two true ways, however, the emphasis is on tinkering with procedures through trial and error and taking advantage of serendipitous occurrences. This means that the search & discovery phase melds into the analysis phase, just as it does within expert practice, tinkering with one set of results to find others more relevant or interesting. By taking a bricolage approach this process is made explicit. Mastering the search techniques are the by product rather than the main game. The main game is creative *bricolage*.

### **From Time category to threshold concept**

This group used an analogy of food and nutritional value to discuss the ways that students estimate the time required to effectively engage with information within educational contexts. The fundamental requirement of nutritional intake involves making choices. The time available to devote to the task is highly influential on choices made. For example, people with little time may choose to eat food prepared by others, choice being dictated by personal / cultural preferences, availability, accessibility, and how the person feels on any given day. The quick and relatively cheap choice of take-away hamburger & chips saves time and money in the short term, but in the long term may compromise nutritional value. A more expensive (money and time) option of a-la-carte restaurant fare may increase nutritional value outcomes, but the consumer is still reliant on others to provide food. Eating at the restaurant doesn’t teach you how to cook (although a pleasant eating out experience may encourage you to learn). Learning to cook takes an investment of time initially, but as skills are gained, the time involved is lessened. Trial and error processes can enable the competent production of a range of meals, at varying levels of ingredient cost and preparation time. This competence may stay at a practical level or might be developed into greater expertise through more intensive experience (or perhaps by studying nutrition). For example, the expertise of a person who has advanced knowledge of nutrition could radically increase nutritional benefits versus time invested in food preparation.

### **Time threshold concept - effective information engagement as a “time/outcome ratio”**

This threshold concept involves the students coming to an understanding of effective information engagement as a balance of time and outcomes, or as a return on wise investment. Just as with

monetary investments, time must be invested effectively to produce ongoing gains. Students with a perception of their education as an economic transaction, (as opposed to a personal transformation), may have difficulties grasping the notion of building skills through information gathering. If they are viewing their educational experience from a purely product/ consumer perspective, it is not surprising that they expect the convenience of pre-prepared information packs that save them time. Moving to a more complex awareness of time as an ongoing investment in developing their expertise (in much the same way as the fast food eater develops the ability to cook nutritionally balanced meals), requires a perceptual shift. Once this idea is grasped however, students will respond more positively to activities that push them to explore information environments for themselves, especially if these opportunities are provided in easily digestible chunks.

Strategies to help students to develop an awareness of effective information engagement equating to improvements in time/outcome ratios would emphasise the accumulative benefits of ongoing experiential learning via trying new ways of finding and using information. Ways of managing information (e.g. bibliographic management software, information tagging, etc.), to enable ease of re-use also bolsters this concept of capitalising on ongoing accrued benefits from the investment of time. This entails a shift in emphasis from the student as a passive consumer/learner to the student undergoing a “cognitive apprenticeship” through which research skill levels and expectations are gradually increased, with guidance of teaching staff and other students.

#### **From Recognition category to threshold concept**

This group discussed the ways that engaging effectively with information involves developing pattern recognition skills. Using (K1, SL, PSSO, K1, P1)<sup>3</sup> as an example, they considered the ways that data patterns, so instructive to the initiated, can seem impenetrable to “outsiders.” For example, the first stumbling block many new students encounter involves interpreting reading lists. Typically these lists include citations from different types of information sources (journal articles, book chapters, conference papers, etc.) further complicated by different citation styles and abbreviations used (sometimes more than one style on the same list). Many students have limited awareness of different ways of presenting information, having seen it previously as an amorphous mass, differentiated only by subject matter. At university, perhaps for the first time, they need to quickly develop skills of citation recognition so that they are able to find, recognise and present information in required ways. The group discussed ways that librarians assist students to gain pattern recognition skills by comparing new patterns with those that are already familiar.

#### **Recognition threshold concept - effective information engagement as “pattern perception”**

This threshold concept involves students developing an awareness of effective information engagement as a process of pattern perception. Looking at information in terms of recurring patterns and learning to recognise salient features within these patterns not only reorients students to comprehend the familiar in different ways, but also, through practice, provides an experiential foundation for the development of other pattern recognition requirements associated with higher order thinking. Learning to interpret a reading list is a mundane example of what is in fact a highly useful skill, leading to the more complex skill of interpreting patterns in database structures, and the even more complex skill of interpreting research data patterns.

Strategies to help students to develop an awareness of information as consisting of discernable data patterns would encourage students to step back from their immediate focus on the content of the information source. It opens possibilities for dialogue into the reasons behind the different forms of presentation and enables a wider comprehension of the situated nature of the information selected, who produced it, who the intended audience is, where or when it is most appropriate.

### **From Academic rules category to threshold concept**

The group looking at the academic rules category discussed the ways that effective information engagement in a university context involves understanding organisational rules, both governance and epistemic. Sometimes this involves a clash of previous beliefs and expectations. A group participant illustrated this by recalling a newspaper report of an Indian sceptic who had volunteered to “help” a tantric guru prove an alleged ability to “kill with his mind.” (Page, 2010) Millions watched the televised demonstration where, as expected by the sceptic, the guru was unable to realise his claim. This example provided a backdrop for discussing the contextual nature of rules, i.e. that the same rule can be “correct” in one context and “incorrect” in another. Rules can be explicit or tacit, with governance rules leaning towards the explicit (although sometimes open to interpretation), and disciplinary, epistemic rules tending to be largely tacit (or taken-for-granted).

### **Academic rules threshold concept – effective information engagement as “cultural understanding”**

This threshold concept involves developing awareness of effective information engagement as “cultural understanding.” Exemplified by Becher & Trowler’s (2001) “academic tribes,” this calls for a somewhat anthropological viewpoint of the university and subcultures within it. Even academics not agreeing with the concept of “academic tribes”, would freely admit to some disciplinary specific “cultural norms.” Such norms are usually tacit and can be difficult for newcomers to uncover, or to understand. Wherever possible, the existence of, and reasons for, such rules should be made explicit to students to decrease the likelihood that unspoken conventions are accidentally transgressed. In some ways, by functioning in interdisciplinary spaces, the librarian is well placed to identify otherwise tacit disciplinary rules that influence information engagement.

Using a mundane (interdisciplinary) example of citation styles, the reasons behind the different styles are often not explained. Yet once a student comprehends the reasons behind placement of dates and arrangement of authors, he or she is better placed to interpret and follow these rules.

Plagiarism is another cultural rule requiring explanation. Citing the source of ideas is a deeply embedded “given” within academic culture, and as such, may not be critically deconstructed for students. Consequently, many students have only a surface (quasi-legal interpretation) understanding of what plagiarism involves. Coming to an awareness of information as a cultural product and positioning their information engagement within this context allows students to develop a deeper understanding of academic requirements. Entering university could be compared to students travelling overseas and adapting to ways of living in the countries visited. Some overseas travellers never return home, but if they do, they have a deeper awareness of cultural differences. They may retain enjoyable, or useful, aspects of the overseas culture and will forget about the others. Similarly, students need to navigate the various cultures within a university,



abiding by those mores deemed academically important & retaining these, if applicable, for future careers.

Strategies to help students to develop an awareness of information as being governed by cultural requirements would begin, wherever possible, by making the tacit explicit. To enable this, teaching staff need to reflect on their own cultural understandings around what constitutes effective information engagement and seek ways to incorporate this into student learning opportunities. By emphasising the cultural and contextual relevance of these rules, (as opposed to a strict legal/governance interpretation), students are more likely able to thrive, whether they come to university as a cultural tourist (who will eventually move on to other cultural / professional places) or as a cultural apprentice (who will stay as an academic researcher).

### **From Emotion category to threshold concept**

Some of the troublesome knowledge identified through the Threshold Concepts workshops were categorised as involving emotion. This category was not abstracted in the final workshop. Due to time restrictions and participant numbers on the day, the emotions category was set aside for later discussion. However, it is possible to consider some possibilities in advance of this discussion. Exploring emotional aspects of the learning process can be tricky due to adjacency with personal realms, considered by some to be outside the university domain. Yet all learning involves a commitment, a tacit decision to accept or reject, or even to just consider a new concept, or new way of thinking. This is especially true for concepts that seem counterintuitive to previous understandings. The threshold concepts literature (e.g. Thesen, 2009; Gourley, 2009; McCartney, et al., 2009; Wisker & Robinson, 2009) discusses the “liminal space” which precedes expanded awareness. This space can be uncomfortable, as learners tentatively question previous understandings, without fully accepting the new. But emotional responses are not always negative. In fact, learning to be excited by this liminal space, comprehending it as a prelude to new awareness, is perhaps a threshold concept in itself. Consideration of an emotional dimension is also not new to LIS studies, Carol Kuhlthau<sup>4</sup> for example, includes an “affective dimension” in her six stage information search process model, and Brenda Dervin<sup>5</sup> highlighted the need to “bring emotions out of the closet” more than a decade ago. Considerations of emotions are also not new in the academic world, Michael Polanyi (1958) introduced his ideas about “Intellectual passions” as early as the 1950s, and more recently, ideas around “emotional capital” in learning (Gendron, 2008; Cousin, 2006) and “emotional intelligence” (Golman, 2004) have been explored, to name but a few. Despite this range of evidence however, emotions can still be considered to be outside the academic domain.

Librarians involved in information skills learning and teaching routinely encounter emotional responses from students, ranging from anger, anxiety, frustration, confusion and sometimes real joy (when a student realises a giant leap in understanding). Anticipating and acknowledging emotions as a valid aspect of any learning process is likely to decrease the risk of either learners or teachers disengaging when emotions arise.

## Conclusion

Each of the identified threshold concepts (systemic thinking, bricolage, time / outcome ratio, pattern perception, cultural understanding, emotion) (Figure 1.) are lenses that provide access to differing dimensions of the same phenomenon. In some ways unique, each lens provides an overlapping perspective for understanding information engagement. In specific contexts, one or more of these dimensions could assume greater importance, however both individually and together, each provides a useful vantage point for informing the thinking and planning for learning and teaching support.

Figure 1. Dimensions of engagement with information.



The challenges to learning and teaching support as identified in the introduction to this paper are associated with changes and tensions. 21<sup>st</sup> century students represent changing expectations and skills which can lead to unproductive tensions between traditional and new ways of learning and teaching. By focussing on dimensions of awareness, the threshold concept approach is well placed to help those students who assume their experience thus far has prepared them for all possible information engagement needs. Instead of the traditional information literacy approach of teaching new searching skills or introducing new sources, the threshold concepts approach focusses on increasing student understanding of how they are already engaging with information and how they need to build on that to succeed in an academic context. Helping students to develop this contextual awareness enhances their ability to build on what they already know and prepares them for future contextual shifts when they move into professional lives.

This shift in focus from “teaching the use of” to “promoting understanding of” information products may at first seem very subtle, but can potentially lead to a major shift in developmental direction. For example, through their participative efforts, the staff at UNSW Library have begun to reconceptualise many of the ways that they perceive the information engagement process. Whilst

not necessarily the goal, this is a valuable byproduct of the process of identifying threshold concepts. By stepping away from, and by abstracting, the troublesome knowledge, workshop participants are better positioned to see the familiar in different ways. Like the student experience, it focusses on building on what is already known, thus honouring library staff expertise. Rather than replacing the old with the new, it is a case of adding value to the tried and true. Cousin (2010, p.6) highlights this when she remarks that despite the threshold concepts approach being inherently student centred, it successfully avoids “the symbolic erasure of teacher expertise.” As threshold concepts are content related, ( i.e. informs *what* is taught), the *how* of the teaching can be fashioned to best fit the particular needs of given contexts and student groups.

The threshold concepts approach also provide a solid basis for dialogue with faculty staff, who can help the Library to identify other related concepts that are specific to effective information engagement within particular disciplines. One of the first tasks however, is for UNSW librarians to use these threshold concepts to re-analyse the support resources already provided by the UNSW Library. We are looking at how each of the learning objects help students to develop understanding in the ways highlighted by systemic thinking, pattern perception, time/outcome ratio, bricolage and cultural awareness, sometimes with surprising results. This work, and other work to identify possible new learning resources, is already demonstrating that the threshold concepts theory segues well into the practice. This ongoing work will be reported at future conferences.

“May you live in interesting times” is an oft quoted Chinese curse. In many ways it describes that exciting/uncomfortable liminal space preceding increased awareness. It is an ongoing journey, new challenges, as always, bringing new opportunities. Interesting times indeed.

## Endnotes

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<sup>1</sup> See <http://www.etl.tla.ed.ac.uk/>

<sup>2</sup> For example see: Disciplinary areas in Threshold Concepts bibliography at: <http://www.ee.ucl.ac.uk/~mflanaga/thresholds.html#gen>

<sup>3</sup> For the uninitiated – these patterns describe knitting processes.

<sup>4</sup> For example see: Kuhlthau, C. (2008). From information to meaning: Confronting challenges of the twenty-first century. *Libri*, 58, 66-73.

<sup>5</sup> For example see: Dervin, B. (1998). Sense-making theory and practice: An overview of user interests in knowledge seeking and use. *Journal of Knowledge Management*, 2(2), 36-46.

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## Appendix 1.

### Troublesome knowledge - Places where students get stuck when engaging with information.

The following points were generated at a UNSW Library L&T workshops, attended (April 2010 ) by UNSW reference librarians who were asked to consider common questions frequently asked at Library reference desks & use these to identify the places where students get stuck whilst attempting to engage with information.

#### Words category

Unable to understand library / scholarly jargon.

- Inability to make sense of academic or library instructions.
- Unable to understand disciplinary terminology or jargon (e.g. deciphering a legal citation)
- Becoming blinkered by disciplinary terminology and expectations.
- Not understanding that a given word will have a variety of meanings
- Not understanding that a particular word can be disciplinary specific so will not appear except in disciplinary publications / databases.
- Not understanding that sometimes, same concept might be being discussed in different ways in other disciplinary areas, so missing important connections.

Expressing a topic.

- Unable to analyse concepts within an assignment question
- Unable to understand why it is necessary to describe the topic using a variety of different words or terms & inability to think of, or find, alternative words or terms.
- Unable to articulate questions about the information they need, i.e. when they ask for one thing but actually want something else.
- Unable to comprehend the need to identify significant key words and to look for narrower or broader synonyms, (as in a thesaurus structure).
- Unable to understand the need for (and inability to find) online dictionaries or thesauri to verify understanding of word/phrase definitions or terms.
- Unable to understand the importance of particular concepts (i.e. the gravity of concepts.)
- Begins to narrowly or too broadly.

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## Technology category

Computers know what I want.

- Unable to understand either the limitations of, or opportunities in, computer search algorithms.

Unfamiliar systems.

- Unable to make sense of call number sequences (e.g Dewey or Moys) see these as barriers, not aids, to understanding.
- Unable to identify the scope of particular search tools; unable to comprehend “scope.”
- How do I find this? Inability to identify most appropriate search tools.
- Unaware of alternate information sources, stick to what is already known.
- New & different processes of study required, (as compared to high school).

Data structure.

- Unable to comprehend a structure to information, because Google experience is primarily unstructured.
- Unable to comprehend the concept of a disciplinary or multidisciplinary database.
- Unable to understand that not everything will be available in full text digital formats, e.g. Why would a database only supply a citation? (Seems counter intuitive).
- Unable to comprehend different types of sources e.g. databases and library catalogues and the strengths & weaknesses of each.
- Inability to understand Boolean logic of database searches

## Academic rules category

Plagiarism.

- Unable to understand what plagiarism is, or what it looks like.
- Unable to understand the need to reference / cite sources.

Scholarly / non-scholarly.

- Unable to understand the difference between scholarly & non-scholarly information & why it matters.
- Unable to understand the peer review process & why it is used in academic contexts.

Scholarly citing.

- Unable to comprehend the existence of different citing rules or why this is required or necessary.

Evaluation.

- Inability to choose appropriate sources for a given context
- Inability to judge appropriateness of information found.

**Recognition category.**

Article understanding.

- Lack of article level understanding. (e.g. article title versus book title.)
- Unable to recognise different information sources, e.g. book, conference paper, report, etc., cannot identify what each looks like, in structure or form.

Connections.

- Myopic searching. Inability to recognise other potential information sources, due to fixation caused by reliance on reading lists.
- Inability to understand / look for conflicting views on same concepts.
- Unable to comprehend the need to research
- Unable to comprehend the idea of more than one “right” answer, (used to “concrete” knowledge, just give me the facts.)

**Time category.**

Allocation of time to information engagement.

- Impatience with any process that doesn't supply instant results, according to preconceived idea of time required.
- Students time poor, often means information seeking is rushed. Leads to reluctance in trying new ways of accessing & utilising information.
- Lack of any information experience except Google leads to misconception that this is always faster & easier route to appropriate information.
- Inability to identify appropriate sources & to narrow searches, leading to too many inappropriate hits, seen as too time consuming.

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- Inability to understand the benefit of persistence, give up too soon.
  - Lack of time encourages surface learning about databases (i.e. which button do I click?) means that experience and skills cannot be transferred to other information sources
  - Procrastination – inability to correctly estimate the time required.
  - Laziness. Easier & faster to let (someone else) do it for them, (not worth learning).
  - Time management skills and the need to be self reliant.

**Emotion category.**

Looking silly.

- Afraid to fail or to ask a “silly” question, so don’t try & don’t ask.
- If I ask a question, I protect my ego by pretending to know more than I actually do.
- Information engagement skills are not valued, so given low priority.
- Information engagement skills are nerdy, (have to consider my street cred).
- I am too important to look for information so someone else should do it for me.
- The academic expects me to be able to do this, I can’t admit that I don’t know how.
- This is counter to my previous experience, i.e. not as I know learning to be & not as I think it should be. I don’t know the rules. Scary.

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### Works cited.

- Becher, T., & Trowler, P. (2001). *Academic tribes and territories: Intellectual enquiry and the culture of disciplines* (2nd ed.). Buckingham: Open University Press.
- Bruce, C. (2008). *Informed learning*. Chicago: ACRL.
- Brunetti, K., Hofer, A. R., & Townsend, L. (2009). *Through the looking glass: Teaching IL with threshold concepts*. Paper presented at the WILU Annual Conference: "Reflections" Concordia University, Montreal.
- Ciborra, C. (2002). *The labyrinths of information: Challenging the wisdom of systems*. Oxford: Oxford University Press.
- Cousin, G. (2006). Threshold concepts, troublesome knowledge and emotional capital: An exploration into learning about others. In J. Meyer & R. Land (Eds.), *Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge* (pp. 134-147). New York, NY: Routledge.
- Cousin, G. (2006a). *An introduction to threshold concepts*. Planet, 17, 4-5.
- Davies, P. (2003). *Threshold concepts: How can we recognise them?* Paper presented at the EARLI Conference, August 26 – 30, Padova. Retrieved from <http://www.staffs.ac.uk/schools/business/iepr/etc/WorkingPapers/etcworkingpaper1.pdf>
- Dervin, B. (1998). Sense-making theory and practice: An overview of user interests in knowledge seeking and use. *Journal of Knowledge Management*, 2(2), 36-46.
- Ellis, A., & Newton, D. (2009). First year university students' access, usage and expectations of technology: An Australian pilot study. In T. Bastiaens (Ed.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2009, Vancouver, BC, Canada, 26 October*. Chesapeake, VA: AACE.
- Gendron, B. (2008). Emotional capital and emotional work: Emotional competencies as teacher professional competencies to teach for learning. In L. Deitmer, P. Kämäräinen & S. Manning (Eds.), *Proceedings of the ECER VETNET Conference. Gothenburg*. Retrieved from <http://www.b.shuttle.de/wifo/abstract/!ecer08.htm>
- Goleman, D. (2004). *Emotional intelligence: Why it can matter more than IQ: & Working with emotional intelligence*. London: Bloomsbury.
- Gourlay, L. (2009). Threshold practices: Becoming a student through academic literacies. *London Review of Education*, 7(2), 181 - 192.
- Irvine, N., & Carmichael, P. (2009). Threshold concepts: A point of focus for practitioner research. *Active Learning in Higher Education*, 10(2), 103-119.
- Kiley, M. (2009). Identifying threshold concepts and proposing strategies to support doctoral candidates. *Innovations in Education and Teaching International*, 46(3), 293-304.
- Kennedy, G. E., Judd, T. S., Churchward, A., Gray, K., & Krause, K.-L. (2008). First year students' experiences with technology: Are they really digital natives? *Australasian Journal of Educational Technology*, 24(1), 108-122.



- 
- Kuhlthau, C. (2008). From information to meaning: Confronting challenges of the twenty-first century. *Libri*, 58, 66-73.
- Markless, S. (2009). A new conception of information literacy for the digital learning environment in higher education. *Nordic Journal of Information Literacy in Higher Education*, 1(1), 25-40.
- McCartney, R., Boustedt, J., Eckerdal, A., Moström, J., Sanders, K., Thomas, L., et al. (2009). Liminal spaces and learning computing. *European Journal of Engineering Education*, 34(4), 383-391.
- Mehlenbacher, B. (2009). Multidisciplinarity and 21st century communication design. In B. Mehlenbacher & A. Protopsaltis (Eds.), *Proceedings of the 27th ACM International Conference on Design of Communication, Bloomington, Indiana* (pp. 59-66). New York, NY: Association for Computing Machinery (ACM).
- Meyer, J. H. F., & Land, R. (2003). Threshold concepts and troublesome knowledge (1): Linkages to ways of thinking and practising. In C. Rust (Ed.), *Improving student learning: Ten years on*. (pp. 1-16). Oxford: Oxford Centre for Staff and Learning Development.
- Page, J. (2010). Sceptic challenges guru to kill him live on TV. *The Sunday Times*. Retrieved from <http://www.timesonline.co.uk/tol/news/world/asia/article7067989.ece>
- Polanyi, M. (1958). *Personal Knowledge: Towards a post-critical philosophy*. London: Routledge & Kegan Paul.
- Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization*. Sydney: Random House.
- Smith, S. D., & Caruso, J.B. (2010). *The ECAR study of undergraduate students and information technology, 2010. Key findings*. Retrieved from <http://net.educause.edu/ir/library/pdf/EKF/EKF1006.pdf>
- Thesen, L. (2009). Researching 'ideological becoming' in lectures: Challenges for knowing differently. *Studies in Higher Education*, 34(4), 391-402.
- Trafford, V., & Leshem, S. (2009). Doctorateness as a threshold concept. *Innovations in Education and Teaching International*, 46 (3), 305-316.
- Wallace, D. (2010). The grit in the oyster: Does an appreciation of threshold concepts in an adult literacies teaching qualification result in pearls of practice? *Literacy and Numeracy Studies*, 18(1), 3-18.
- Whitehead, A. N. (1929). *The aims of education & other essays*. New York: Macmillan.
- Willison, J., & Kerry, O. R. (2007). Commonly known, commonly not known, totally unknown: A framework for students becoming researchers. *Higher Education Research and Development*, 26(4), 393-409.
- Wisker, G., & Robinson, G. (2009). Encouraging postgraduate students of literature and art to cross conceptual thresholds. *Innovations in Education and Teaching International*, 46(3), 317-330.
- Yorke-Barber, P., Atkinson, L., Possin, G., & Woodall, L. (2008). *Light bulb moments: Identifying information research threshold concepts for fourth year engineering students*. Paper presented at the 2008 AAEE Conference, Yeppoon, Qld. 7-10 December 2008.