A Brave New World: Threshold Concepts and First Year Student Information Literacy

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Abstract

For many years, Flinders University Library has provided a library quiz, primarily aimed at first year students. Starting life as a paper-based assignment, the quiz was moved into the University's learning management system in the 2000s. The library quiz focused purely on practical information literacy skills: how to search the catalogue, how to search databases etc.

As time went on, it became clear that the quiz was not working. The videos and screenshots quickly became obsolete with frequent database interface changes. We were constantly updating the quiz at our busiest time of the year. It just was not sustainable. More importantly, students who took the quiz would continue to struggle with basic library skills.

In late 2015, extensive research into threshold concepts for information literacy indicated that our students were struggling with practical information literacy skills, the how, because they hadn't been taught the why: why they should be using academic literature in their assignments. Why they shouldn't be using websites and blogs in their reference lists.

It was decided to completely change the focus of the quiz to teach threshold concepts based on the Association of College and Research Libraries (ACRL) Framework for Information Literacy in Higher Education.

We interviewed forty academics and students from Flinders and asked them about their information seeking practices. These interviews were distilled into eleven short videos. The assessment part of the quiz was also changed to be self-reflective rather than formal right-wrong questions.

In January 2018, the new quiz, rebranded as Library World, went live. In the past twelve months, we have had over three thousand students complete Library World. The reflective assessment has given the library a rich source of data.

This paper will discuss what information literacy trends can be discerned from the data and whether the switch to teaching threshold concepts has had a meaningful impact on students' information literacy fluency.

Keywords: information literacy, threshold concepts, university students, first year.

Introduction

Information literacy instruction is one of the cornerstones of university libraries. Librarians have always taught students how to navigate the information landscape to find information for their assignments and research projects. The information landscape today is constantly and rapidly changing. When libraries were the sole gatekeepers of information, teaching students how to find information was arguably enough to consider them information literate. The why was obvious: because the information is in the library. However, with the availability of information exploding into every aspect of our lives, the how of finding information is no longer enough. The why is just as important, if not more so. Just as the information landscape has become increasingly muddied, so has the definition of what it means to be information literate. There is still no single agreed upon definition, but information literacy is increasingly seen as an integral part of lifelong learning and social inclusion, a basic human right as defined by UNESCO in their Alexandria Proclamation (UNESCO, 2005, p. 3). In today's information society, people need to be information literate to be active participants in that society. The rise of fake news is the latest battleground that highlights the need for an information literate populace. Students need to be able to critically analyse any piece of information they find, whether it is inside the classroom or to make decisions in their everyday lives (Farkas, 2014). In short, they need to understand the theoretical concepts that underpin the nature of information. Recently, there has been a shift away from only teaching students practical information literacy skills and focusing more on these underlying principles: the threshold concepts.

Threshold Concepts

Threshold concepts were first defined by Meyer and Land as the integral core concepts of a discipline, but concepts that are so integral and so in-built into that discipline that they are often overlooked or taken for granted by practitioners (Townsend, Brunetti, & Hofer, 2011b, p. 854). The main characteristics of threshold concepts are defined as:

Transformative: they cause a significant shift in a student's understanding of a discipline or subject.

Irreversible: the shift in understanding is so significant that it cannot be forgotten.

Integrative: it highlights the connections between seemingly unrelated parts of a subject.

Bounded: help to define a discipline's boundaries.

Troublesome: they often go against a student's previous ideas of a subject and may cause the student to struggle (Meyer & Land, 2006a, p. 7).

In 2015, the Association of College & Research Libraries (ACRL) in the United States adopted their Framework for Information Literacy in Higher Education. The framework consists of six frames, one

for each of the threshold concepts for information literacy as identified by Townsend et al. (2011b). The six frames are:

Authority is Constructed and Contextual: The Information resources reflect their creators' expertise and credibility and are evaluated based on the information need and the context in which the information will be used.

Information Creation as a Process: Information in any format is produced to convey a message and is shared via a selected delivery method.

Information has Value: Information possesses several dimensions of value, including as a commodity, as a means of education, as a means to influence, and as a means of negotiating and understanding the world.

Research as Inquiry: Research is iterative and depends upon asking increasingly complex or new questions whose answers in turn develop additional questions or lines of inquiry in any field.

Scholarship as Conversation: Communities of scholars, researchers, or professionals engage in sustained discourse with new insights and discoveries occurring over time as a result of varied perspectives and interpretations.

Searching as Strategic Exploration: Searching for information is often nonlinear and iterative, requiring the evaluation of a range of information sources and the mental flexibility to pursue alternate avenues as new understanding develops (taken from (ACRL, 2015)).

Under each frame is a list of *Knowledge Practices* and *Dispositions* which are described by ACRL as ways that students can demonstrate their understanding of each threshold concept. The framework represents a deliberate shift away from practical information seeking skills, instead addressing the need for understanding the foundational ideas of the information landscape students now face.

Library World

Like many university libraries, Flinders University Library in Adelaide, South Australia, had a library quiz aimed at first year students. The quiz started life as a physical, paper assignment in the 1990s before being moved online into the University's Learning Management Software (LMS) in the 2000s. The quiz underwent a significant redesign in 2014 that changed the focus from text to multimedia how-to videos. Students had to answer a series of questions that focused purely on practical information seeking skills. However, even with this redesign, it became clear that the quiz was not working. Even after completing it, students were still struggling with information basics.

In 2015 the manager of the quiz, Veronica Ghee, began reading about threshold concepts in information literacy. It became clear that our students were struggling with practical information literacy skills, the how, because they hadn't been taught the why: why they should be using academic literature in their assignments, why they shouldn't be using websites and blogs. Students are information novices: they are yet to cross any information threshold concepts. Whereas librarians, as information experts, have crossed those thresholds. With threshold concepts being so transformative and so irreversible, it can be difficult to remember what it was like as a novice. This expert blind spot is common in many disciplines and can make it hard to understand why students are struggling. We often expect them to use academic sources simply because we tell them to, without really explaining why. Novices, used fulfilling information needs through the internet and not truly understanding the information landscape, are less likely to change their information seeking practices.

And so the idea of what would become Library World, was born. The goal of the project was to develop a replacement for the library quiz using threshold concepts to teach students the nature of academic literature. But what form should the replacement take? Duke and Asher's Ethnographic Research in Illinois Academic Libraries (ERIAL) project used an ethnographic approach to discover how students complete their academic research and the expectations of teaching staff for that research (Duke & Asher, 2012, p. 12). This method was used as a basis for Library World. It was decided to interview Flinders students and academics to discover their information seeking practices. Academics would also be asked where they publish their own research and what they expect from their students.

From the outset, the goal was to make a professional grade product, so funding was sought to hire a film maker and an animator. To ensure Library World was pedagogically sound, an educational designer was also engaged.

The interviews were conducted in September 2016. They often went off-script and tended to be more conversational in tone. This resulted in more candid and sometimes surprising answers and allowed for a more authentic student voice being recorded. In total, 40 interviews were recorded, totalling 13.5 hours of raw footage.

For the next three months, the footage was poured over with a fine-toothed comb endlessly and the themes of what was said extracted. This allowed for the recordings to be clipped into short videos, each centred on part of the ACRL framework. Getting the final cut of the videos, the animations, the voiceovers and the design of the Moodle site completed was a long and gruelling task. The release date constantly had to be pushed back.

Library World finally went live in January 2018. The final product consists of eleven short videos totalling thirty minutes in length, divided between four modules. Before accessing the content,

students are required to complete a short, formative assessment where they are asked what tools they currently use for information seeking, as well as how confident they are in finding information for assignments. After watching the videos, the students are again asked how confident they are, as well as what they will do differently after watching Library World. This reflective form of assessment was deemed to be more appropriate for the conceptual nature of Library World's content. Using formative-summative assessment can help to gauge any increase in students' conceptual knowledge (Seel, Lehmann, Blumschein, & Podolskiy, 2017, p. 72).

In 2018, over 3,000 students completed Library World. It has been embedded into over thirty Moodle class pages and linked to in at least twenty more. As Library World represents a significant investment in Library staff time and money and having taken such a different approach to information literacy instruction, we wanted to evaluate the effectiveness of those changes. Specifically, we wanted to know:

- The impact that previous library training has had on student information seeking practices.
- How confident are students in finding information after watching Library World?
- How are student information seeking practices different after completing Library World.
- Are students' responses indicative of their understanding the threshold concepts presented to them?

The student responses from Library World have given the Library a rich source of data. These responses were analysed to attempt to answer the above questions as well as any other trends we could find out about our students' information seeking practices.

Methodology

It was decided to use a grounded theory approach to analyse the data. Teaching information literacy through threshold concepts is still an emerging field, and there is only a relatively small number of papers dealing with impacts of threshold concepts on student information literacy. Grounded theory is very well suited for analysing data in such fields (Urquhart, 2013, p. 68).

All student responses from both the formative and the summative assessments for 2018 were exported from Moodle to Excel spreadsheets, where the two sets of records were reconciled based on student ID number. Any records where the summative questions had not been answered were filtered out, leaving only complete records. As one of the main aims was to compare student responses pre and post Library World, this was done to ensure that the results would not be biased towards the formative questions.

The complete records were then imported into an nVivo 12 database. The student responses in each record were manually coded. The codes were created dynamically during the coding process based on the student responses, rather than using a predetermined set of categories. The codes

were then analysed and grouped based on the underlying concepts being expressed. This included categorising the responses to the frames in the ACRL framework. To do so, the *Knowledge Practices and Dispositions* listed for each frame was used. They are not an exhaustive list, but they do provide a schema to evaluate the student responses.

Results

A total of 4383 responses were recorded for Library World in 2018. Of those, 3165 had completed the summative questions. The completed records formed the basis of the analysis.

Of these 3165 students, 36% (1128) had received some form of library training prior to undertaking Library World. 64% (2037) said they had received no prior training. Of those with no prior training, 78% (1585) said they use Google or other web resources to find information. If other resources were used alongside the internet by these students, the majority used books (24%) and textbooks (10%). 7% said they used the library's Primo system (branded FindIt@Flinders). By contrast, only 29% of students with previous library training mentioned using Google as an information source (see Figure 1).
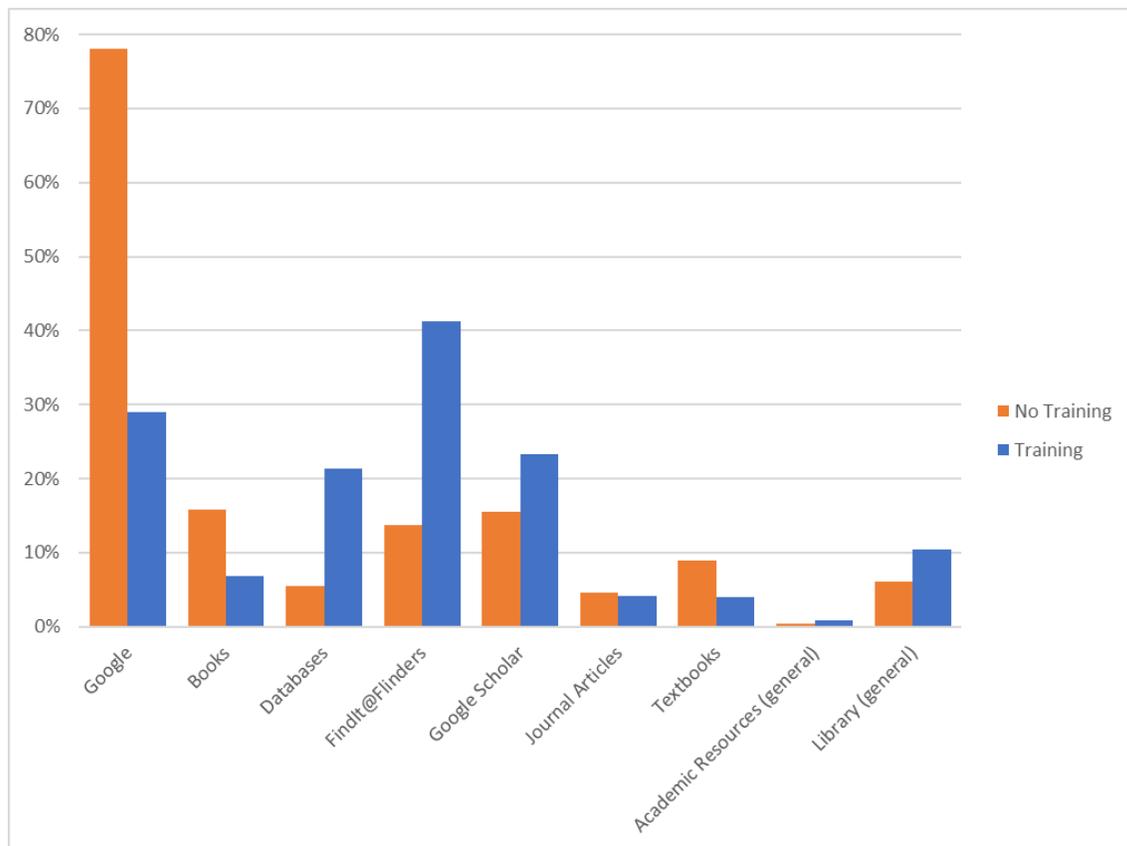

Figure 1: Internet and academic sources: formative responses

Figure 1 also shows the difference that library training has had on student information seeking. Here we can see that students that had no previous training were much less likely to use academic sources of any kind. Where they were mentioned, the most commonly used were Books (16%), Google Scholar (16%) and FindIt@Flinders (14%). The most commonly used academic resources of students with previous training were FindIt@Flinders (41%), Google Scholar (23%) and databases (21%). Figure 2 shows that after viewing Library World, these differences are virtually eliminated.
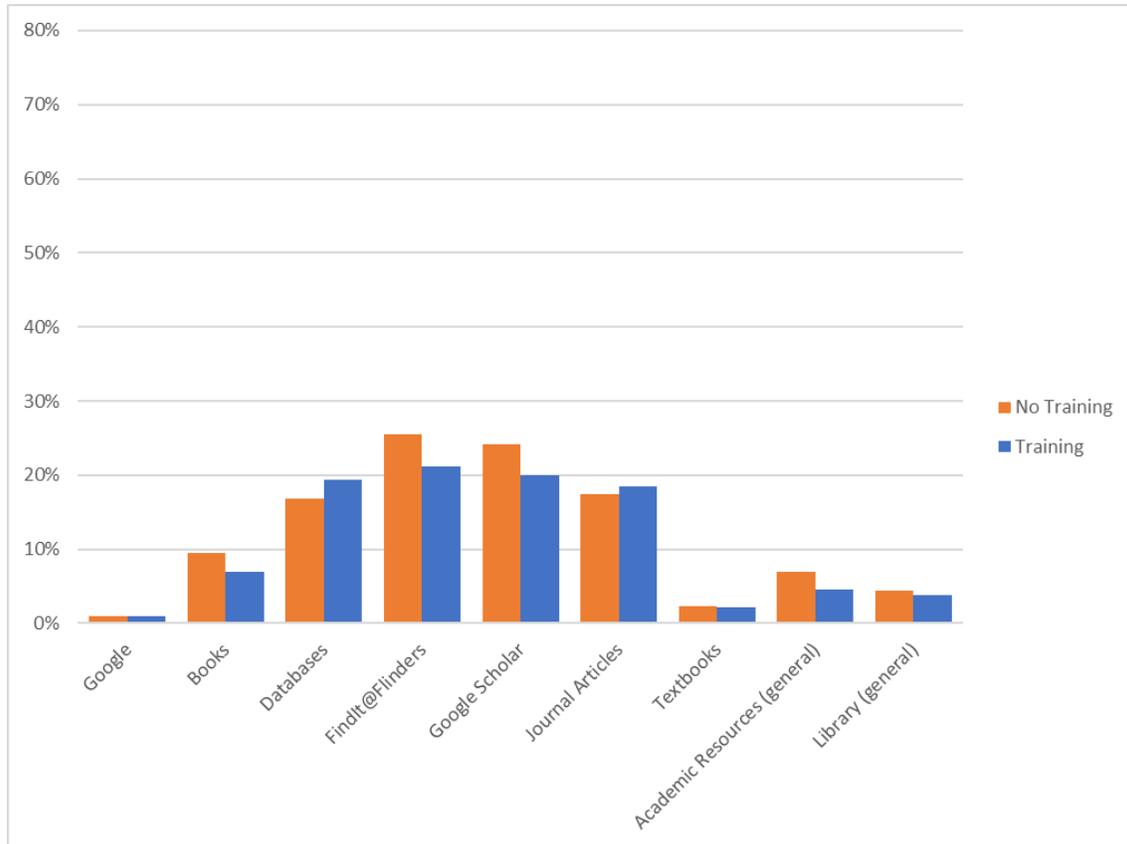

Figure 2: Summative responses: Google and academic sources

In the formative responses, the most commonly used academic resource regardless of previous training or not was FindIt@Flinders (24%). This was followed by Google Scholar (18%) and Books (13%). In the summative responses, FindIt@Flinders was again the most commonly stated resource (24%) but this now was almost equal to Google Scholar (23%, an increase of 7%). Databases (18%, an increase of 7%) and journal articles (18%, an increase of 14%) were the next prevalent resources. Mentions of Google and internet resources also dropped dramatically.

Figure 2 also shows that the percentage of summative responses citing any academic resource dropped dramatically compared to the formative. This is because many responses centred on information seeking practices rather than resources (see Table 1). 25% of students mentioned

making sure they use credible sources in their assignments or critically analysing the information they find from now on. 9% of responses said they would use a wider range of resources than previously and 9% mentioned they would use better search techniques (i.e. filters, Boolean, phrase searching, advanced search options etc.). 6% would follow the citation trail of the resources they found and 4% would use Google or Wikipedia to do a background search first to get a basic understanding of a topic. 16% of students also said they would now seek help when they were having trouble finding information.

Information seeking practice	#	%
Use credible sources/evaluate sources	778	25%
Ask for help	499	16%
Search techniques	297	9%
Use a wider range of resources	272	9%
Following citation trail	180	6%
Conducting background search on Google/Wikipedia	120	4%

Table 1: Summative responses: Information seeking practices

The responses on information seeking practices were also categorised under one or more of the six frames of the ACRL Framework (see Table 2). The responses to the formative questions had only 5% of responses that could be related to any of the six frames. 68% of the summative responses could be listed under at least one frame. The most prevalent frames were Searching as Strategic Exploration (32%), Research as Inquiry (27%) and Authority is Constructed and Contextual (25%) and Scholarship as Conversation (6%).

ACRL Framework threshold concept	#	%
Searching as strategic exploration	1022	32%
Research as Inquiry	843	27%
Authority is Constructed	780	25%
Scholarship as Conversation	195	6%
Information has Value	60	2%
Information Creation as a process	6	0%

Table 2: Summative responses classifications to the ACRL Framework

As well as their information seeking practices, students were asked both before and after Library World how confident they were in finding information for assignments on a scale of 0-5. After completing Library World, 49% of students experienced zero increase or a loss of confidence. However, the overall average change in confidence was 0.6.

Discussion

It is perhaps unsurprising that students with no previous library training were nearly 50% more likely to use Google as an information source than those who have had training. When they did use academic sources, it was predominantly books and textbooks. These students are demonstrating a

shallow engagement with information: they use only resources that they are either given (textbooks) or that they are already familiar with (Google, books). This is an indication of novice learners yet to cross information literacy thresholds, as expert searchers will use a wider range of resources and search more deeply (ACRL, 2015). Librarians have long struggled with getting students to understand that simply Googling for information is not acceptable at university.

It was somewhat reassuring that students with previous library training were much less likely to use Google and internet sources. This training would almost exclusively have been in one-shot instruction sessions given by a librarian who focused on practical information literacy skills. It shows that such training has been beneficial, as the students are using more appropriate sources.

After having watched Library World, the gap between students who had and hadn't received library training previously were eliminated in terms of academic sources used. For students who hadn't had training, this was possibly the first time they had been exposed to the idea of academic information. The third Library World module contains short videos on different types of academic sources so it makes sense that these students would start to use them after Library World.

But this doesn't necessarily denote a crossing of a threshold concept. Using only appropriate sources in an assignment is not an indication that the student has internalised the underlying concepts of why they need to do so (Farkas, 2014). Students will be motivated to do something if a teacher or a librarian says they will get better grades. However, the responses of students post-Library World also seem to indicate a shift in their conceptual thinking. Prior to watching Library World, only 5% of responses could be considered to fall under the ACRL framework. By comparison, 68% of post-Library World responses could be classified into one or more of the ACRL frames. After watching Library World, these students are starting to engage with information on a deeper, more meaningful level than previously. However, it can be very difficult to gauge the extent of a student's conceptual learning (Hofer, Lin Hanick, & Townsend, 2018, p. 179). This is the main limitation of this study. Crossing a threshold and fully understanding the underlying concept can take time and won't necessarily show up in any single assessment (Meyer & Land, 2010, p. 62). Nevertheless, nearly seventy percent of students' responses relating directly to one or more threshold concepts shows that these students have at least started their journey across the threshold. Most would now be in a liminal state. This is where learners are in a transitional state: they have been exposed to a threshold concept but are uncertain and yet to fully comprehend it. They are considered to be "in the threshold" (Meyer & Land, 2006b, p. 22). This is borne out by the decrease in confidence of many students after watching Library World. One of the characteristics of threshold concepts is that they are troublesome. They often go against students' existing knowledge and are often where they struggle (Townsend, Brunetti, & Hofer, 2011a, p. 117). After completing Library World, half of the students were no more confident or experienced a decrease in information seeking confidence. While on the surface this would appear to be a negative outcome

for Library World, it indicates that students are starting to engage more deeply with the information landscape. They are starting to move outside of their comfort zones and while they may not have necessarily crossed the threshold, they are at least in the liminal state of progressing towards that threshold. Not all these students will end up fully understanding the concepts: it stands to reason that some will regress. But the important thing is that Library World has started them on a journey to a deeper understanding of the information they engage with at university and, in the wider society that they live in.

Conclusion

Library World was designed to educate students about the nature of academic literature. The old Library Quiz focused purely on practical information literacy skills and yet, students still struggled with the basics. Instead, we hoped that shifting the teaching focus to information literacy threshold concepts would help them to understand where academic literature comes from, how it is published and why their assignments require them to use it in their reference lists. While it cannot be conclusively said that the students who completed Library World have fully crossed those thresholds, the data shows that over two-thirds have at least started that journey. What is needed now is to develop further information literacy instruction for post-Library World students to continue to push them through their liminal states. Ideally, this should cover information literacy beyond the university classroom, to make them see the need for being information literate in their everyday lives. The goal should be to create information literate citizens of society that can engage with information meaningfully in any context. As this can be a long journey, it would require the co-operation of faculty staff to embed information literacy instruction throughout the curriculum. One benefit of involving academics in the production of Library World is that is has given the Library faculty buy-in where we may not have previously. It is hoped that this will help the Library to persuade academics of the value of teaching threshold concepts and move away from the traditional, one-shot practical information literacy skills classes.

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