.

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

Digital Natives: effective information- seekers or lost in the woods.

Cheryl Claridge
Federation University Australia, Ballarat

Abstract

Tempting as it is to assume that today's student is an experienced user of internet resources with effective information-seeking skills, this assumption could be problematic. The students in this qualitative study seemed largely overconfident in their ability to seek and use information in an academic environment and either unmotivated or too time poor to take efforts to improve these skills.

The researcher used Think-Aloud Protocols to observe the information-seeking behaviours of eight undergraduate creative arts students who were seeking information for an assessment task. A constructivist approach informed the analysis and interpretation of the data and the nature of the recommendations.

While many of the participants were confident in their use of technology most demonstrated neither particularly effective search skills, nor discernment in their evaluation of search results. Furthermore, despite the majority of participants having received library skills training, there was little evidence of any impact on their information-skills.

This study highlighted the need for skills development activities that are authentic, relevant, and embedded within course-related learning and assessment activities. Librarians and academics need to collaborate in teaching information-skills in such a way that students see them as relevant to course content; and that result in effective learning for students.

Introduction

Whether subscribing to Prensky's Digital Natives and Digital Immigrants classifications (2001, pp.1, 3), viewing individuals on a continuum from Visitors to Residents (White & Le Cornu, 2011), or through other theoretical lenses it is all too easy to assume that the majority of students entering the higher education system have substantial experience using technology as a source of information. This might lead educators to expect that students possess the skills needed to effectively find, evaluate and use information for academic purposes. Furthermore it is also probable that these students may perceive themselves as skilled and 'savvy' users of technology to find and communicate information. While this may well be the case with regard to their information needs prior to entering tertiary education, the information needs and consequently the skills required by students, to address these needs in an academic environment, are somewhat different.

The skills required to source and evaluate information have in the literature of library and information studies generally been referred to as information literacy (ACRL, 1989; CAUL, 2009; CILIP, 2011; SCONUL, 2011). Information literacy encompasses the skills required to identify a need for, find, evaluate, and use information. The importance of these skills to success in a higher education environment is acknowledged by their inclusion in the graduate attributes of many institutions as identified by the National Graduate Attribute Program (Institute for Teaching and Learning, 2011). Furthermore these skills not only underpin success in the academic environment, they are a requirement for effective lifelong learning both professionally and personally (Breivik, 2000, p.1).

A study at Curtin University of Technology (Haddow, 2013) found a correlation between students' use of library resources and retention in their course of studies. In addition Haddow expressed the concern that students who are not accessing the resources provided by the library may find their course work more difficult than it could be (2013, p. 135). Another study which examined information literacy skills teaching in a first year experience program (Kim & Shumaker, 2015) found

. Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

> a positive relationship between information literacy skills and academic performance. (p.456)

These studies indicate that use of the training and information resources of the library supports students in completing their studies and that more effective information skills are reflected in better academic results for students. In light of this, it is vital that librarians and educators seek to develop an understanding of students' inherent information-seeking behaviours and how best they can be assisted to develop effective practices in seeking and using information for academic purposes. The study detailed in this paper addressed this need with regard to a group of students studying either Visual or Performing Arts at the Federation University Australia, Arts Academy.

Creative Arts students

The Camp Street, Arts Academy campus of Federation University Australia (FedUni) is home to the creative arts students and courses. In addition to a range of performing and visual arts courses some students undertake a combined Arts and Education degree. Anecdotally FedUni library staff members perceive this cohort of students as being quite different from other groups. The nature of their information needs can also be more varied with a greater need for images and multi-media items as well as texts which may not be directly related to their discipline.

An exploration of the literature relating to the information-seeking of creative arts students identified little material. In addition little of the literature is recent and therefore applicable to a contemporary setting. One of the more recent studies used surveys and focus groups with undergraduate and graduate music students and found that they were not effective users of library search tools (Dougan, 2012). This led to the Dougan's proposal that future research should examine the searching behaviours of music students (2012). Previous studies (Day & McDowell, 1985; Frank, 1999) produced similar findings; however as they predated the current prominence of online search tools and platforms they are of limited relevance. Similarly the much cited article by Pacey (1982) is not only dated but is essentially an anecdotal account of a hypothetical day in an arts college library. Broader searching encompassing the literature on academics and practitioners in these disciplines uncovered more writings; however this literature was still quite sparse and much of it was also dated. Studies of academics (Challener, 1999; Reed & Tanner, 2001) discussed their library use and Cobbledick's (1996) survey instrument for practicing artists was adapted and used by Hemmig (2009) to examine the information-seeking behaviours of visual artists.

The literature identified was however inadequate to the task of informing the development of effective evidence based programs to foster information-literacy skills in today's creative arts students. To this end this research set out to identify the information-seeking approaches of Arts Academy students and develop recommendations for programs and resources to support the development of information literacy skills for these students to apply in their studies and professional lives.

Research Framework

A constructivist approach informed all stages of the reported study from the selection of the methods employed, through the analysis of the data gathered, and the formulation of the resulting recommendations. Learning, as seen within a constructivist paradigm is an adaptive process whereby new knowledge and indeed skills are built by the interaction of new experiences with an individual's current beliefs, knowledge, and skills enabling the development of a new 'revised' view or approach (Fosnot & Perry, 2005; Howe & Berv, 2009, p. 30; Winch & Gingell, 2008). This philosophy has implications for students, educators and researchers. Certain underlying assumptions are inherent in this approach to education and should be considered in examining this study.

As new knowledge and skills are only acquired in relation to the students existing framework it is important that educators consider their students current competence and understandings in developing

. Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

learning activities to support their skills development. In developing learning activities library and teaching staff need to focus on the actions of students (Biggs & Tang, 2011, p.20), providing experiences to engage the student and build on existing skills and knowledge to meet the learning objectives for the activity. This requires teachers to provide clear and specific learning objectives, motivation, a safe environment and tasks which are active and collaborative in nature (Biggs & Tang, 2011, Chapter 2).

This project aimed to contribute to more effective learning activities by building a clearer picture of student's skills and understandings about information-seeking, informing better practices for information literacy skills development classes and resources. The influence of past experience and existing beliefs is not only an issue for students but must be acknowledged and addressed by researchers. An awareness of the possibility that a researcher's beliefs and views can influence the outcomes of a research project led to the adoption of a relatively unstructured approach for this study. Methods such as structured interviews or surveys can limit the scope of issues which can be identified in the course of a study. In developing the questions for such an instrument the researcher will be focusing on the areas and issues which they believe are pertinent and may neglect potentially relevant issues which they are not aware of or do not wish to acknowledge. To limit this possible bias this study used Think Aloud Protocols and a semi-structured interview to gather qualitative data, while reducing the risk of biased results.

Think Aloud Protocol (TAP)

TAP is a technique which can be used for a variety of purposes to gather either quantitative or qualitative data. Also known as verbal reports, current verbal reports, verbal protocols (Nielsen, Clemmensen & Yssing, 2002) and thought listing (Cacioppo, von Hippel & Ernst, 1997) TAP involves having an individual undertake a task while verbalizing their thought processes. This process is commonly used for usability testing (Alling & Naismith, 2007) including the testing of library search tools (George, 2008; Gibbs, 2001). The examination of cognitive behaviours can also be addressed with TAP which has been utilized to research reading skills and strategies (Katalin, 2000; McTavish, 2008) and, as in this study, information-seeking skills and behaviours (Branch, 2006; George, 2008; Griffiths, Hartley & Willson, 2002; Hess, 1999; Novotny, 2004; Sullivan & Seiden, 1985; Yang, 1997).

A number of authors have published guidelines for using the TAP technique with variations to suit the varied uses to which it is put. Ericsson and Simon (1993, 1998) focus on using TAP to examine individuals' thought processes in undertaking various activities and emphasize the need to avoid any processes which might take a participant's focus away from the task at hand. To this end they recommend that the researcher and any recording equipment be out of sight and that the researcher not interact with the participant during the activity. The only permissible exception to this is to ask the subject to 'keep talking' if they should stop verbalising their thoughts. It is also suggested that participants practice 'thinking aloud' prior to undertaking the task to be examined. Use of TAP for usability testing was the focus of Boren and Ramey (2000) who expressed concerns about a lack of consistency in the application of Ericsson and Simon's (1993, 1998) recommendations and suggested more pragmatically that it is not always practical to avoid all interaction with the participant as they may at times seek a response from the researcher and not continue with the task until they have received one.

The literature also highlights potential disadvantages to this technique, which while effective at uncovering conscious thought processes, TAP is not able to access thought processes which are automatic or subconscious (Branch, 2006; Ericsson, 2002), or nonverbal in nature (Wilson, 1994). Concerns have been expressed that having to verbalise thought processes may impact on task performance as formulating the verbal expression of their though processes may distract participants from the task being examined (McTavish, 2008; Young, 2005). For this reason this technique would not be suitable where the participants are asked to undertake a task which is very difficult for them

. Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

(Branch, 2006; Young, 2005), however with an appropriate task TAP is considered to have little impact on task completion (Ericsson & Simon, 1998). Van Someren, Barnard and Sandberg (1994) point out that as individuals can generally think faster than they can verbalise their thoughts TAPs will generally be to some degree incomplete. This issue can however be to a large degree compensated for by interviewing participants soon after the protocol to seek information from them to fill these gaps; as has been done in this study.

Despite these potential difficulties this technique is useful for the collection of data on the thought processes of participants. Unlike reports of past behavior the immediacy of reporting allows little time for participants to 'forget' (Hoppman, 2009) or to self-edit responses (Young, 2005). It tends to produce large quantities of data which can be examined in isolation or in conjunction with data acquired through other techniques such as interviews, surveys or log data (Alling & Naismith, 2007; Branch, 2006; George, 2008; Gibbs, 2001; Payne, 1994). While the large quantities of data generated can make processing and analysis a time consuming process, this is somewhat offset by the fact that good results can be achieved with relatively few participants. Nielsen (2000) suggests that an effective examination can be undertaken with as few as five participants. Being less directed that interviews or surveys TAP is a useful exploratory approach when no hypothesis has yet been formed (Alling & Naismith, 2007; Wilson, 1994) and has the advantage of highlighting affective elements of a situation (Afflerback, 2001; Novotny, 2004) as participants are likely to verbalise emotional as well as cognitive responses.

Study outline

This study was focused on students studying in the visual and performing arts, who were in the early stages of their studies. In order to provide context to the teaching of information-seeking skills to this group the research questions addressed in this study included

- What steps do participants take to address their assessment task related information needs?
- Do the participants effectively utilize the search tools and resources that are available to them?
- Do some methods and avenues of searching seem to be more intuitive for this group? (Claridge, 2015).

In the recruitment phase of this study the researcher, with permission from lecturers, attended the library information session during O'week and tutorials to speak to students about this study and seek participants. Participants were required to undertake a search using the library search tools to identify information resources to use in an assessment task they were currently working on. This search was video recorded to capture the PC screen and the students' verbalisation of their thinking as they searched. Immediately after this search the researcher and participant viewed this footage as part of a semi-structured interview to clarify anything that was not clear from the video and allow the students to make any comments they wished to. At this point participants also received searching advice and coaching from the researcher.

The recordings of the TAP and interview were then transcribed and the transcripts analysed for information pertinent to the purpose of the study and any recurring themes or issues. A flowchart style map was also created to visually represent the searching process of each student. While twelve participants undertook a TAP and interview only eight transcripts were analysed and reported on. This action was taken in order to balance the representation of the different cohorts in the study (first year performing arts, first year visual arts, first year visual arts/education, and second year visual arts/education) with the data of two participants' from each group being included and to keep the researchers workload to a manageable level.

.

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

The participants

In addition to being from different streams of study in the Arts Academy the student participants were varied in terms of their age and previous study experience. The two first year visual arts students were mature age students, one male and one female. While one of these students had a history of previous studies the other had commenced studies on completion of a bridging course. These two individuals provided quite a contrast with one being confident in her approach, even though she had difficulty reading the search results and did not understand some of the terminology involved. The second participant was less confident and found searching to be a frustrating experience, changing his topic when he failed to identify appropriate resources.

The four dual degree students were also studying in visual arts in addition to education. The first year dual degree students were both female mature age students with one having undertaken university studies prior to her current course. The assessment tasks these participants were searching for information to address were for education subjects. Once again these participants showed quite a contrast in their approaches to and success in their searching. While the student with previous study experience was generally confident in the system and willing to seek the functionalities she required from the search tools she was frustrated when the tools failed to behave as she expected and she had difficulty reading the search results. While experiencing less success in her searching (at least partly due to technical difficulties) the other student in this group did adapt her searching in light of the results retrieved and utilize synonyms as she developed her search. In evaluating results she seemed to be rejecting items which she felt were too academic or which did not align with her own views and beliefs. In contrast the second year dual degree students were working on an art related assessment task. These two female participants didn't identify as having undertaken previous studies. While both participants appeared confident in using online systems and one stated that she liked computers, they did express a preference for sourcing information from books.

Confidence in an online environment was also a characteristic of the two first year performing arts participants. These students (one male, one female) were very much influenced by their sense of their lecturers as an audience for their work and their choice of topic and resources was influenced by this. In evaluating resources the two participants took different approaches with one concerned with the balance of viewpoints included in resources while the other was attracted by items that seemed interesting even if the link to her task was quite tenuous.

Discussion of Results

In describing the information-seeking behaviours of the participants in this study the data showed that they performed simple keyword searches in the prominent search box on the library webpage; much as they would in Google. Other studies (Lown, Sierra & Boyer, 2013; Rowlands et al., 2008; Swanson & Green, 2011) produced similar findings. Google was in fact used or mentioned by most of the participants with one explaining this by saying,

> Its habit now - just Google it, it's so natural to do that these days (Claridge, 2015, p. 97).

This acceptance of Google as the search tool of choice has implications not just for students' choice of search tools but also for the way in which they search. The simplicity of the Google search page with its single search box for natural language searching and somewhat limited possibilities for refining a search or results list shapes user expectations (Lown, Sierra & Boyer, 2013) and practices. Users have come to expect the same lack of complication (and consequently of functionality) in other search tools. Libraries have responded to this demand by attempting to replicate this experience in their search tools; moving towards discovery layers which search across most of the libraries resources in a single search. These tools reproduce the single box for a simple keyword search and many students don't move beyond this to access the more sophisticated functionalities which are available (Denison & Montgomery, 2012; Holman, 2011; Rowlands et al., 2008; Swanson & Green, 2011). The participants

. Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

in this study were no exception to this, making little if any use of options to limit results or refine their search. The use of advanced search functionalities or Boolean logic was also not displayed in these students' searching.

The searches conducted in QuickSearch (FedUni Libraries name for the Primo discovery tool) were only one aspect of what was for the participants of this study, a multi staged information-seeking process. For these students the process started with their selection of a topic or focus for their assessment task. For at least two of the eight participants this was a strategic decision based on the perceived ease of finding the required resources to address the topic. This sense of strategy was demonstrated by the participant, who said,

> The smart kids... would jump on to the library first and find who's got the most written about them (Claridge, 2015, p. 81),

before choosing an artist to write on. Consistent with the findings of Colón-Aguirre and Fleming-May (2012), and Mizrachi (2010) most of the student participants then undertook some preliminary 'quick and dirty' searching using internet search tools, such as Google, About.com or Wikipedia, or reference books to provide themselves with sufficient context to develop a search for citable materials to use in their tasks. They then undertook their search using QuickSearch on the library website. For the most part this process was not actually carried out in the linear fashion in which it has been described. In practice participants would often loop back to previous stages as they adapted their strategies, this non-linear progression thought the search process was also observed in Yang's (1997) research and is consistent with Wilson's (1999) model of information-seeking behavior. While most participants exhibited various degrees of this 'backtracking' one actually restarted the process completely; changing his topic choice in light of the difficulty he experienced in identifying information. Another participant actually conducted multiple searches in parallel; switching between various internet search tools and QuickSearch as she used the information sourced on the internet to develop searches for library resources. Even within a session in QuickSearch the participants would often loop back to view previous search results or would repeat a search using terms they had used previously in the session. One participant searched with the same terms on three different occasions during the protocol approaching the results in a different way each time as her understandings and focus developed in the course of her searching.

Although the participants in the study were using online resources they exhibited a preference for books as sources of information and seemed largely reticent to use the libraries online resources for assessment tasks. This seemed surprising given the statements which some made about the convenience of the libraries online resources, and with their intolerance for waiting to access physical resources from other campus libraries. It is possible that this reliance on the libraries physical collections for assessable work is an unintended by-product of their lecturer's injunctions against using information from the internet for these tasks. While the students observed understood that the information sourced from Wikipedia and similar sources on the internet was not suitable for referencing in an assessment task they seem to be using these tools for background information and in at least one case, for tasks such as oral presentations which were seen as less formal. A reference made by one student to items identified when using the library search tools as 'books found on the internet' raises the concern that students are not making a distinction between the credible online resources supplied by the library and other resources openly available via the internet (Claridge, 2015, p.93).

This lack of discrimination is consistent with the general lack of discernment in evaluating both search results, and the relevance and credibility of information resources found. Half of the students in this study experienced difficulty interpreting the results returned by their searches. The participants lacked an understanding of terms such as 'Full Text', with two students assuming this meant physically available in the library and another simply saying

> I don't know what full text available even means (Claridge, 2015, p. 222).

. Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

These students also had difficulty finding basic information about items (e.g. the location of physical items) from the details displayed.

With only one exception the participants did not address issues of the credibility of the information they found. This lack of critical analysis may have been the result of an assumption that the resources supplied by the library were credible. Indeed this level of trust seemed to extend to their faith in the relevance ranking of results provided by QuickSearch with only three participants at any stage looking beyond the first page of ten results and one participant commenting that if the system saw those items as relevant that was good enough for her. This ineffectiveness in evaluating results has been noted elsewhere in the literature (Holman, 2011; Swanson & Green, 2011; Warwick, Rimmer, Blandford, Gow & Buchanan, 2009). The evaluation criteria used by the participants of this study were recency (this was a particular focus for three of the eight participants), convenience and speed of access, readability and, for one participant, compatibility with her own views.

There were situations where the 'success' or otherwise of these students searches was influenced by factors other than their skills. The two performing arts students who participated in this study were required to write a reflective piece using quotations from individuals involved in the performing arts to support or challenge the case they were making. While both of these students were quite confident in their searching, the nature of the task made judging the relevance of the information found particularly challenging. In the case of one of the performing arts students her natural enthusiasm resulted in the selection of items that she found interesting but which were unlikely to contribute to successfully addressing the task requirements. Similarly one of the first-year dual degree students had been unable to source sufficient relevant resources by the end of her search session as technical difficulties prevented her accessing many potentially useful items. These types of scenarios are not conducive to students attributing the effectiveness of the information-seeking to their skills and being consequently motivated to improve these skills.

The limited information skill set demonstrated by the majority of participants existed in spite of the fact that they were being taught by academic staff who value and promote the library. Library staff presented to first year Arts Academy students in class time at the lecturer's invitation. At least 75% of the student participants had attended the library presentation during O'week and/or at least one library skills class. The participants did not however demonstrate the knowledge or behaviours these classes are intended to promote, a situation also noted by Boger, Dybvik and Norheim (2015, p.43). While three of the student participants confessed to a lack of confidence in their skills using the library tools, others were quite confident and did not seem to feel any need to improve their skills. Time constraints were clearly an issue for some students and would limit their ability to attend skills development classes. In keeping with the findings in other studies (Boger et al., 2015; Warwick et al., 2009) many seemed to feel that they are doing ok and either did not realise, or chose not to act on the knowledge, that improving these skills would assist them to achieve better results in their assessment tasks.

Having second year students participate in the study did allow a comparison between the approaches of these slightly more experienced students and the first years. Consistent with the findings of Novotny (2004) while these students seemed more successful in their searches they showed no more sophistication in their information-seeking behaviours. If anything the first year students searching an education topic exhibited a more thoughtful approach to their searching and were more inclined to utilize search strategies such as the use of synonyms and phrase searching. The second years were undertaking an art appreciation presentation task and the less considered way they undertook their searching may have been influenced by the nature of this assessment task. As such it is possible that the differences in their searching approaches were related to discipline characteristics rather than their skills and experience.

The participants of this study did not demonstrate advanced search skills, they were not effective in reading and interpreting the results of their searches and they were largely uncritical in their assessment of the credibility and relevance of the information resources they identified. A comparison

. Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

of the protocols of the first and second year students did not show a significant difference in their information skills. The individuals observed in this study would benefit from improving their information-seeking skills, skills in reading search results and evaluating the relevance and credibility of information. In light of these results it would appear that the current practice of one-shot, often generic library sessions is not effectively addressing this need. However of greater concern is the possibility that the results are not anomalies, but rather are typical of the larger body of students from which this cohort was drawn. This in turn raises questions about current library approaches to Information Literacy and their value to students.

The recommendations given below are made with the understanding that the small size and discipline specific focus of this study precludes the generalization of these findings to other cohorts. There are however, aspects of the data which suggest areas worthy of reflection and further study with a view to better informing the provision of library skills training.

Recommendations

For the library

The data from this study suggests that the current programs in place at the FedUni library may not be fully effective in developing an appropriate level of information literacy in first and second year Arts Academy students. The generic introductory presentations conducted in forums such as O'week and the subject specific sessions in class time occur early in the year. At this time new students often seem unaware of the relevance of this information to their future studies. Unfortunately by the time students are working on assessment tasks and realise the need for these skills and knowledge they are so busy that they feel unable to prioritise time for skills development. With so little access to students there is also a tendency for 'one shot' library skills sessions to be very much in the chalk and talk vein with little opportunity for hands on activities as librarians attempt to cover a wide range of resources, services and skills in the one session.

Applying the principles of effective teaching outline by Biggs and Tang (2011) may be an approach more conducive to improvements in the information-skills of students. The principles of learning suggest that to engage students in active, effective learning the objectives and resulting activities must be relevant to students' needs, perceived as such by the students and, where possible discipline specific. Ideally such training should be provided at the students' point of need; at the very least support resources in the form of online tutorials, help guides, or similar need to be readily accessible and students must be aware of them.

At FedUni a 3Rs program (Researching, wRiting and Referencing) was developed by library and learning skills staff as a way to overcome these issues. The program involved a series of three workshops where students receive skills training, and work on an assessment task they are currently undertaking with guidance and assistance from library and learning skills staff. These sessions can be run as generic sessions with interested students self-enrolling or students can access online videos of these sessions. More effectively course specific sessions can be requested by an academic in the lead up to the submission date of an assessment task. Linking library skills training with an assessment task provides an authentic context for the learning to take place. Having students work on their own task creates active, problem based learning activities with tangible links to discipline content and study outcomes. This alignment of information skills training with course content and requirements is most readily achieved through close collaboration between library and teaching staff. At FedUni staffing levels in the library would make collaborating at this level across of all of the schools and faculty somewhat impractical. In the current economic environment in higher education the same restrictions are likely to apply at many institutions so it is necessary to look for other ways to achieve these ends. Strategic use of staff resources to target 'foundation courses' undertaken by all first year students within a given degree would be an effective way to address information literacy skills with the majority of students. Taking on a consulting role with academic staff and developing teaching and

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

support resources which can be accessed by teachers and students are other effective ways to expand the reach of library staff.

For academics

The collaborative measures detailed above cannot be implemented without the cooperation and engagement of academic staff. The effectiveness of library skills training can be much improved by coordinating with librarians to establish appropriate timing and content of library skills training in relation to assessment tasks. Having these sessions in class time also demonstrates to students that these skills are integral to their discipline and studies, and not an optional extra. These activities are no doubt a further demand on already time poor teachers and one more thing to be accommodated within the limited contact hours they have with students. The benefits of spending some time in the early stages should ensure that students have the necessary skills for finding and evaluating the information they need during their studies, with consequent savings in the time spent in remedial actions later.

The difficulties experienced by the two performing arts students in this study also highlight the need for teaching staff to maintain a good working knowledge of the resources which are available to their students. When setting assessment tasks this knowledge will enable teachers to anticipate what information students will use and how they will source it, to ensure that the expectations of the task are realistic given the students' current skills and knowledge. It could also be beneficial in setting assessment tasks to specify the use of credible internet sources in addition to books and journal articles. When supported with learning activities to develop skills in making judgments about the validity and credibility of information (your library can probably help). This approach would support students in becoming more critical and discerning users of information regardless of its source.

Further Research

Similar studies of other cohorts of creative art students would test the findings of this study, building a more complete picture of the students in these disciplines. Comparative studies with students from other disciplines could highlight similarities and differences and be useful in informing the practice of librarians and educators. Issues regarding the effectiveness of current practice in developing information skills in students could be further explored by means of a longitudinal study examining students' information-seeking behaviours over the course of their studies.

Conclusion

This small scale study has provided some insight into the use of library resources by undergraduate creative arts students at Federation University Australia. The participants in this study were in general, neither particularly skilled as seekers of information, nor discerning in their evaluation of the information found. While further studies will be required to test these findings they do raise potential issues with regard to the effectiveness of stand-alone library instruction in developing students as effective and discerning seekers and users of information. The need to motivate students to engage in skills development activities when they may not recognize a need for this is highlighted. Collaboration between librarians and teaching staff seems the most promising way to address this issue.

.

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

References

Afflerbach, P. (2001). Verbal reports and protocol analysis. In M. Kamil, P. Mosenthal, P. Pearson & R. Barr (Eds.), *Methods of literacy research* (pp. 87-103). Hoboken: Taylor and Francis.

Alling, E., & Naismith, R. (2007). Protocol analysis of a federated search tool: Designing for users. *Internet Reference Services Quarterly, 12*(1), 195-210. doi:10.1300/J136v12n01_10

Association of College and Research Libraries. (1989). *Presidential committee on information literacy: Final report.* (White paper). Retrieved from http://www.ala.org/ala/mgrps/divs/acrl/publications/whitepapers/presidential.cfm

Biggs, J. B., & Tang, C. (2011). *Teaching for quality learning at university: What the student does*. Maidenhead, England: McGraw-Hill Education.

Boger, T. S., Dybvik, H. E. A., & Norheim, E. H. (2015). The impact of library information literacy classes on first-year undergraduate students' search behaviour. *Journal of Information Literacy, 9*(1), 34-46. doi:10.11645/9.1.1979

Boren, T., & Ramey, J. (2000). Thinking aloud: Reconciling theory and practice. *IEEE Transactions on Professional Communication, 43*(3), 261-278.

Branch, J. L. (2006). Using think alouds, think afters, and think togethers to research adolescents' inquiry experiences. *Alberta Journal of Educational Research, 52*(3), 148-159.

Breivik, P. S. (2000). Information literacy and lifelong learning: The magical partnership. *Lifelong Learning Conference July 2000,* Yeppoon, Queensland. 1-6.

Cacioppo, J. T., von Hippel, W., & Ernst, J. M. (1997). Mapping cognitive structures and processes through verbal content: The thought-listing technique. *Journal of Consulting and Clinical Psychology, 65*(6), 928-940. doi:10.1037/0022-006X.65.6.928

.

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

Challener, J. (1999). *Information-seeking behavior of professors of art history and studio art.* (Unpublished Master's). Kent State University School of Library and Information Science,

CILIP (Chartered Institute of Library and Information Professionals). (2011). Information literacy: Definition. Retrieved from http://www.cilip.org.uk/get-involved/advocacy/learning/information-literacy/Pages/definition.aspx

Claridge, C. (2015). *"So what I do is bang in the search term and see how I go: The information-seeking approaches of arts academy students.* (Unpublished Masters). Federation University Australia, Ballarat.

Cobbledick, S. (1996). The information-seeking behavior of artists: Exploratory interviews. *The Library Quarterly, 66*(4), 343-372.

Colón-Aguirre, M., & Fleming-May, R. A. (2012). "You just type in what you are looking for": Undergraduates' use of library resources vs. wikipedia. *The Journal of Academic Librarianship, 38*(6), 391-399. doi:10.1016/j.acalib.2012.09.013

Council of Australian University Librarians. (2009). Information literacy. Retrieved from http://www.caul.edu.au/caul-programs/information-literacy.html;

Day, J., & McDowell, E. (1985). Information needs and use of art and design students. *Education Libraries Bulletin, 28*(3), 31-41.

Denison, D. R., & Montgomery, D. (2012). Annoyance or delight? college students' perspectives on looking for information. *The Journal of Academic Librarianship, 38*(6), 380-390. doi:10.1016/j.acalib.2012.08.007

Dougan, K. (2012). Information seeking behaviour of music students. *Reference Services Review, 40*(4), 558-573. doi:10.1108/00907321211277369

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: Verbal reports as data* (Rev. ed.). Cambridge, MA: Bradford Books.

Ericsson, K. A., & Simon, H. A. (1998). How to study thinking in everyday life: Contrasting think-aloud protocols with descriptions and explanations of thinking. *Mind, Culture, and Activity, 5*(3), 178-186. doi:10.1207/s15327884mca0503_3

Fosnot, C. T., & Perry, R. S. (2005). Constructivism: A psychological theory or learning. In C. T. Fosnot (Ed.), *Constructivism: Theory, perspectives and practice* (2nd ed., pp. 8-38). New York: Teachers College Press.

Frank, P. (1999). Student artists in the library: An investigation of how they use general academic libraries for their creative needs. *Journal of Academic Librarianship, 25*(6), 445-455.

George, C., A. (2008). Lessons learned: Usability testing a federated search product. *The Electronic Library, 26*(1), 5-20. doi:10.01108/02640470810851707

Gibbs, W. J. (2001). Structured observation and protocol analysis: Using video split-screen technology for evaluating web site usability. In N. Campbell (Ed.), *Usability assessment of library- related web sites : Methods and case studies.* (pp. 49-59). Chicago: American Library Association.

Griffiths, J. R., Hartley, R. J., & Willson, J. P. (2002). An improved method of studying user-system interaction by combining transaction log analysis and protocol analysis. *Information Research, 7*(4), 139

Haddow, G. (2013). Academic library use and student retention: A quantitative analysis. *Library & Information Science Research, 35*(2), 127-136. doi:10.1016/j.lisr.2012.12.002

Hemmig, W. (2009). An empirical study of the information-seeking behavior of practicing visual artists. *Journal of Documentation, 65*(4), 682-703. doi:10.1108/00220410910970302

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

Hess, B. (1999). Graduate student cognition during information retrieval using the world wide web: A pilot study. *Computers & Education, 33*(1), 1-13. doi:10.1016/S0360-1315(99)00011-1

Holman, L. (2011). Millenial students' mental models of search: Implications for academic librarians and database developers. *The Journal of Academic Librarianship, 37*(1), 19-27.

Hoppmann, T. (2009). Examining the 'point of frustration'. the think-aloud method applied to online search tasks. *Quality & Quantity, 43*(2), 211-224. doi:10.1007/s11135-007-9116-0

Howe, K. R., & Berv, J. (2000). Constructing constructivism, epistemological and pedagogical. In D. C. Phillips (Ed.), *Constructivism in education: Opinions and second opinions on controversial issues.* (pp. 19-40). Chicago: The National Society for the study of education.

Institute for Teaching & Learning. (2011). Introduction to mapped universities' statements of graduate attributes. Retrieved from http://www.itl.usyd.edu.au/projects/nationalgap/resources/gamap/introduction.htm

Katalin, E. (2000). "Please, keep talking": The 'think-aloud' method in second language research. *Novelty, 7*(3), 7.

Kim, S. U., & Shumaker, D. (2015). Student, librarian, and instructor perceptions of information literacy instruction and skills in a first year experience program: A case study. *The Journal of Academic Librarianship, 41*(4), 449-456. doi:10.1016/j.acalib.2015.04.005

Lown, C., Sierra, T., & Boyer, J. (2013). How users search the library from a single search box. *College & Research Libraries, 74*(3), 227-241.

McTavish, M. (2008). “What were you thinking?”: The use of metacognitive strategy during engagement with reading narrative and informational genres. *Canadian Journal of Education, 31*(2), 415-430.

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

Mizrachi, D. (2010). Undergraduates' academic information and library behaviors: Preliminary results. *Reference Services Review, 38*(4), 571-580. doi:10.1108/00907321011090737

Nielsen, J. (2000). Why you only need to test with 5 users. *Jakob Nielsen's Alertbox,* (March 19), 31 August, 2011.

Nielsen, J., Clemmensen, T., & Yssing, C. (2002). Getting access to what goes on in people's heads?-reflections on the think-aloud technique. *Proceedings of the Second Nordic Conference on Human-Computer Interaction,* Asrhus, Denmark. *, 19*(23) 101-110.

Novotny, E. (2004). I don't think I click: A protocol analysis study of use of a library online catalog in the internet age. *College & Research Libraries, 65*(6), 525-537. doi:10.5860/crl.65.6.525

Pacey, P. K. R. (1982). How art students use libraries---if they do. *Art Libraries Journal, 7*(1), 33-38.

Payne, J. W. (1994). Thinking aloud: Insights into information processing. *Psychological Science, 5*(5), 241-248.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon, 9*(5), 1-6. doi:10.1108/10748120110424816

Reed, B., & Tanner, D. R. (2001). Information needs and library services for the fine arts faculty. *The Journal of Academic Librarianship, 27*(3), 229-233.

Rowlands, I., Nicholas, D., Williams, P., Huntington, P., Fieldhouse, M., Gunter, B., . . . Tenopir, C. (2008). The google generation: The information behaviour of the researcher of the future. *Aslib Proceedings: New Information Perspectives, 60*(4) 290-310. doi:10.1108/00012530810887953

SCONUL Working Group on Information Literacy. (2011). *The SCONUL seven pillars of information literacy: Core model, for higher education*. London, UK: SCONUL. Retrieved from http://www.sconul.ac.uk/groups/information_literacy/publications/coremodel.pdf

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

Sullivan, P., & Seiden, P. (1985). Educating online catalog users: The protocol assessment of needs. *Library Hi Tech, 3*(2), 11-19.

Swanson, T. A., & Green, J. (2011). Why we are not google: Lessons from a library web site usability study. *The Journal of Academic Librarianship, 37*(3), 222-229. doi:10.1016/j.acalib.2011.02.014

van Someren, M., W., Barnard, Y. F., & Sandberg, J. A. (1994). *The think aloud method: A practical guide to modelling cognitive processes*. London: Academic Press.

Warwick, C., Rimmer, J., Blandford, A., Gow, J., & Buchanan, G. (2009). Cognitive economy and satisficing in information seeking: A longitudinal study of undergraduate information behavior. *Journal of the American Society for Information Science and Technology, 60*(12), 2402-2415. doi:10.1002/asi.21179

White, D. S., & Le Cornu, A. (2011). Visitors and residents: A new typology for online engagement. *First Monday, 16*(9). doi:10.5210/fm.v16i9.3171.

Wilson, T. D. (1994). The proper protocol: Validity and completeness of verbal reports. *Psychological Science, 5*(5), 249-252.

Wilson, T. (1999). Exploring models of information behaviour: The 'uncertainty' project. *Information Processing & Management, 35*(6), 839-849. doi:10.1016/S0306-4573(99)00029-1

Winch, C., & Gingell, J. (2008). *Philosophy of education: The key concepts.* London: Routledge

Yang, S. C. (1997). Information seeking as problem-solving using a qualitative approach to uncover the novice learners' information-seeking processes in a perseus hypertext system. *Library & Information Science Research, 19*(1), 71-94. doi:10.1016/S0740-8188(97)90006-2

.

Author Name: Cheryl Claridge
Contact Email:c.claridge@federation.edu.au

Young, K. A. (2005). Direct from the source: The value of 'think-aloud' data in understanding learning. *Journal of Educational Enquiry*, *6*(1), 19-31. Retrieved from http://www.ojs.unisa.edu.au/index.php/EDEQ/article/view/499/368