A new paradigm for reference librarians in the on-line world: developing relationships around research and learning with library users.

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Abstract
This paper examines the dilemmas around personal information retrieval and the role of the reference librarian in the era readily available information sources. Research by Bilal and Kuhlthau informs the paradigm of information retrieval for learning. The paper proposes that users of on-line information, particularly students of all ages, create a new dimension of information use, where the librarian as guide and intermediary needs to assume a greater role. In an environment of increasing personalisation of information retrieval and a broader base of data sources, librarians can play a role in assisting learners with synthesis and understanding.

Introduction

This paper draws on the research currently undertaken at Wesley College, and will draw on other contemporary research exploring the behaviours of middle years students and senior school students on-line, and students' feelings and attitudes about on-line information. It will also refer to long-standing work by library educators Carol Kuhlthau and Ross Todd and the Information Search Process model (ISP), which informs the practice of many school librarians. The picture which emerges will illustrate some of the dilemmas in working with students aged 10 to 20 in an educational setting, and what practices we can and need to develop to support learning and inquiry.

Background

Wesley College is an independent Uniting Church school, and our current enrolment is around 2,800 students from Prep to year 12. We have had a computer laptop program in place since 1994, and have provided on-line library services since 1999 via our college-wide intranet. The services include reading programs, up to 90 on-line research guides, databases, encyclopaedias, e-texts and on-line newspapers. Ninety percent of our on-line services are available to our families at home. Generous data access points have been standard service provision in our library, which is now augmented by wireless access.

In 1999, when I first became the College Head Librarian, my principal was David Loader, known to the education community for his stance on information technology, and his constructivist philosophy of education. Even early on in the 1980s, David saw inherent connections between the two, and again in his most recent book, David restates his case for connecting with where the younger generation is, and for encouraging educators to be bold, to enable students to take risks in learning and to extend themselves. He sees this taking place in a learning environment that respects the learners, and has implicit belief in their capacity to generate new knowledge. (Loader, 2007)

Constructivism as David sees it is not new and is hardly revolutionary, yet it is not readily embraced in the education paradigm of 2007. Increasing accountability of schools to national and state education bodies, testing and benchmarking and standardisation of results, particularly in the senior years of secondary school result in a dilemma for educators. In short educators wish to develop independent learners, capable of inquiry and research but, but they are working within frameworks that are not designed to support it.

Under the leadership of our current principal, Dr Helen Drennen, we are fortunate that our college has implemented programs such as the International Baccalaureate Organization's (IBO's) Primary Years Program, which has a strong inquiry based curriculum, and where students' intellectual and social growth is accompanied by expectations of social and global responsibility and a strong values base. Our middle years programs also are based around a personal, social and intellectual growth model. Our curriculum is informed by an inquiry and thinking model derived from the

work of Jay McTighe and Grant Wiggins (2001). The underlying assumptions to this curriculum model are that the learner needs to make personal and cognitive meanings before real understanding takes place.

In our senior curriculum, critical thinking will take centre place in a revived year 10 program, and in year 11 and 12 students can choose between the Victorian Certificate of Education (VCE) model and the IBO diploma course. In such a rich pedagogical environment our library team has invested strongly in an ongoing professional development program in order to contribute to the curriculum development, implementation and, where appropriate, curriculum delivery.

School libraries are in a unique position to engage with their communities, and our Wesley College library team has, over the past 7 years, engaged with our community in the debates around ICT, electronic forms of information, multimedia texts and the information searching process. Our Library intranet and on-line interfaces are well used, and we have successful take up of our services and products. They are designed to improve learning, and students' capacity for independent inquiry.

Questions around practice

In our seven years of program implementation, we have used an evaluative practice model to test the efficacy of what we do. Hence, our teams regularly meet to review. We examine our premises and assumptions against what actually happens with a program or initiative. Questioning is implicit in this process, as is openly working with the data. We assume that things don't fail so much as they don't "go to plan". Our learning will inform the modifications we might make as a consequence of the data we gathered.

In 2005, we found ourselves looking closely again at our current practice, the way students were using information, and examined recent publications and research in our field, which helped us frame our questions. Our first concern was the increasing use and preference for the search engine Google by our students, and that more conventional library tools on our intranet were being bypassed. This was disappointing, given we had radically improved our intranet interface, and, in particular, our on-line catalogue. This was done with the assistance of focus groups made up of students and staff.

We also found that students using Google were impatient with our standard tools, such as on-line encyclopaedias, E-Library, and similar tools. Products like our on-line videos in Marcom were popular, but even this was easily overlooked when a Google search was already on its way. This change had happened rapidly, and we found ourselves wondering and puzzled.

Around this time a team approached us from ITNR - Information and Telecommunications Needs Research (ITNR), a joint venture of Monash and Charles Sturt Universities, to join a study across 4 schools on what is perceived as an increase in plagiarism in work that students submit as assessment tasks (2005). Workshops we had attended in the IBO Australian national network also indicated that increasing plagiarism was a concern in the diploma course, and assumptions

were made as to the causes linking plagiarism to increased availability of text on-line, and ability to copy texts easily. Moreover, early and anecdotal data suggested that students who had difficulty with language tasks, or who were designated as students whose first language was not English (English as a Second Language: ESL) might more easily fall into plagiarism.

Plagiarism is also a consequence of what Dr Ross Todd refers to a “transport of information instead of transformation of information” (Todd 2005). Dr Ross Todd joined Dr Carol Kuhlthau at Rutgers University in 2002 and is the Director of CISSL, the Centre for International Scholarship in School Libraries. Both Ross and Carol are active proponents of constructivist learning philosophy and teaching models in library settings.

Our outlook, our work practices, and our methodology are constructivist, and we are in a school that advocated student based learning practices, and is supported by a rich ICT environment. However, we were finding that the students, using their laptop computers both in and outside the libraries were increasingly working without reference to librarians and teaching staff. They preferred what we euphemistically refer to as working in the privacy of their own screen. Anecdotally, as later confirmed in our research program with Charles Sturt and Monash University over 2006 and 2007, student work involving Internet browsing and searching does not show evidence of deeper learning, of synthesis or higher order thinking skills. More often the work demonstrates students ability to re-organise existing texts, copied from the web, often paraphrased, and only when directed do students attempt synthesis.

It could be argued that this kind of student output reflects more on task design- “Find out about” a topic requires little more that regurgitation at best. In an on-line environment where copying and downloading are widespread, we could understand that students may see little purpose in synthesis when another author has already done it. What would be the point of repeating the exercise?

Research informing our questions

Younger students

Interesting research informs this paradigm of information use. The work by Dania Bilal (Bilal 2002) is worth considering in this context. Her research involves a detailed study of children and young adults skills in the on-line environment, confirms what many of us observe in our day to day work with middle years students; that they lose their way in on-line research. In her study of children and teenagers, the research indicated vast differences between the on-line results of older students compared with younger ones. Eighty nine percent of the graduate students found the correct answer to the search task as opposed to 50% of the children who were aged 10 – 12 yrs. The major difference between the older college students 17 and over, and the younger children was that the older students could make judgements on weighted *effectiveness*, efficiency, and the older students were much more able to determine the quality of the Web moves they made. The younger students were using Yahooligans!, and the researchers identified that the search engine had poor

structure of keyword searching and was a major factor that contributed to the "breakdowns" children and older students experienced. Researchers looked at the ways in which older and younger students were able to recover from these breakdowns.

Bilal's work demonstrates what many librarians and also parents relate to us anecdotally: that young students struggle to find pertinent information on the web. Less than 50% success rates are indeed poor, and represent a one in two chance. It would appear that these younger students lacked strategies for keywords, when approximating how to locate the information. Younger students often lack contextual information and have limited keyword vocabulary, which could lower chances of finding relevant information.

This is confirmed in the results of older students, who have presumably greater experience in searching, but also have greater general knowledge and perhaps more extensive knowledge of the disciplines they are searching in. It helps to know something of your subject to make the links within it. Bilal's further research (Bilal 2005) looks at the affective states that may influence the learning of children and older students on-line, and examines the ways in which children experienced their on-line searches and the interfaces that they were using. She draws on earlier work by Carol Kuhlthau in emphasising the connection between affective domains and learning (Kuhlthau). Carol's work on the Information Search Process (ISP) was largely undertaken with college students, and Bilal suggests that the feelings and motivation of younger students need special consideration and a different model or thinking about. While Kuhlthau (2006) recently furthered her research on the ISP to include a detailed examination of the affective domain of learners and the Information Search Process, Bilal undertakes her own query with reference to students feelings of success and confidence in undertaking inquiry learning. And it would appear from Bilal's work that there are many states for young children, ranging from pleasure, excitement and enjoyment, particularly the visual, colour, and speed at which results can be had on-line, through to frustration, feelings of helplessness and failure when the searching "breaks down". Bilal tracks the students' every movement on the screen, whereas in our daily work we not in a position to view the students' work this closely. Staff report feeling that interrupting a student's intense and personal interaction on the computer was potentially breaking concentration. Other thoughts expressed by library staff, and parents, were around feelings that they might be violating a personal space and intruding.

The question arises as to why the students do not readily ask for assistance, given that the potential success rate for searching is low. Our librarians are involved with students in many programs, and our own surveys indicate that students feel welcome in the libraries and feel that library staff are friendly and helpful. Reluctance therefore may have little to do with how helpful or skilful the librarians are.

So, if there was a possibility of intervention, to assist with a "broken down" search or to help with selection of a choice of sources, how might we broker this? And what may be preventing our students from identifying that there are problems with the quality of their work? Namely

- That their results are not adequate
- Identifying that they may not have adequate search strategies.

Older students

In a revealing study, “Student Searching Behaviour and the Web: Use of Academic Resources and Google”, Jillian Griffiths and Peter Brophy identify a number of behaviours and patterns in students information seeking behaviours. This research focuses on student web searching behaviour and is linked to related studies conducted at the Centre for Research in Library & Information Management (CERLIM) at the Manchester Metropolitan University and at the Centre for Studies in Advanced Learning Technologies (CSALT) at Lancaster University. Here are some major findings from the research.

“One of the significant findings was that students’ use of search engines dominates their information-seeking strategy”. (Brophy, Griffiths 2005)

The study found that forty five percent of students used Google as their first port of call when locating information. The second most highly used starting point was the university OPAC, used by 10 percent of the sample. Next came Yahoo, used by 9 percent of the students as the first source. In researching how students thought, felt and behaved in searching, these results raise a number of important and interesting issues:

- Students prefer to locate information or resources via a search engine above all other options, and Google is the search engine of choice.
- Students’ use of academic resources is low.
- Students find it difficult to locate information and resources.
- Students may trade quality of results for effort and time spent searching.
- Students’ use of Search Engines now influences their perception and expectations of other electronic resources.

Other significant findings indicate changes in student attitudes to information, and that students limit themselves to a narrow range of experiences in the search. “Students either have little awareness of alternative ways of finding information to the search engine route or have tried other methods and still prefer to use Google—a situation we now refer to as the “Googling phenomenon” (Brophy, Griffiths 2005, p546). And students are not very successful at this level despite their confidence in the search engine. “Beyond this, even when students are able to locate information it is not always easy (even when using Google), and with a third of participants failing to find information”(Brophy, Griffiths 2005, p550).

The research identifies other significant issues for librarians endeavouring to create on-line environments that help our learners. Griffiths and Brophy refer to earlier work undertaken by D. Cmor & K. Lippold, (2001), who identify that students have poorly developed ideas and vague constructs about what constitutes information quality: Seventy four percent of students disagreed that a peer reviewed article constituted “quality information”. Moreover, there appears to a connection between students’ use of search engines like Google and other information interfaces.

“Students’ use of ISEs (internet search engines) now influences their perception and expectations of other electronic resources. While the preference for very simple search engine approaches is prevalent, it is important to note that this does not mean that students are necessarily best served by this approach. Indeed, it may be that students would get better results using specialist subject gateways, but most students do not take this approach” (Brophy, Griffiths 2005, p551).

This study was a funded research program to develop standards for information environments for the tertiary sector in the UK, and the team’s findings can be readily applied in our local contexts. The Wesley experience shows that students *feel confident in their continued use of Google*. It appears that the combination of a simple interface, the rapidity, and guaranteed number of hits potentially inspire both confidence and complacency, as there is no overt ranking or contextualising of search results, merely a listing of results. In addition to this, Google’s algorithms ensure that the searcher will generally get the same results, and the most popular results. Griffiths’ and Brophy’s research suggests that the students’ responses to Google are not generally rational if students are trading quality off for speediness. It would seem that feelings and affective domains that relate to searching play a part in students’ searching behaviours.

Carol Kuhlthau’s studies demonstrate a clear case for using the process (ISP) model. The Kuhlthau model links the affective states with the searching process, selection, exploration, formulation, collection and presentation and she contends that without the shifting states of confidence, uncertainty, optimism and satisfaction at the end of the ISP, real cognition and learning does not take place. The value in this work for information professionals and educators is without parallel, as it describes the shifting planes for learners as they are immersed in the information searching process. Kuhlthau’s work around the ISP was developed from the 1980s on, and many librarians would have been aware of the model and its influence was felt in many support programs in libraries. Kuhlthau identifies how the model can be used for deeper student learning. Her model supports questioning and inquiry, and goes well beyond the support for simple fact finding assignments.

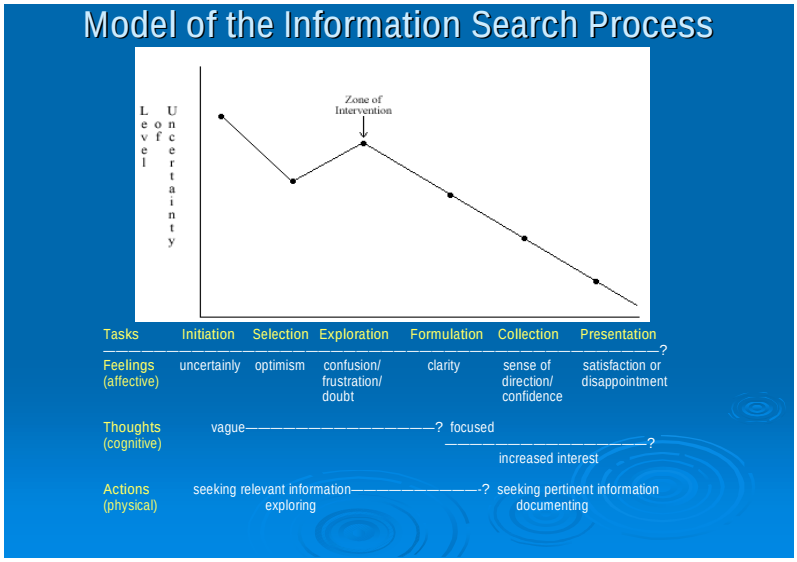

Fig 1 (PPT Slide Kuhlthau 2006)

Hence, Kuhlthau's most recent work in connecting the affective domain clearly within the model and the consequence of it has implications for interface design. It offers a way for interpreting how users may be behaving when interacting with interfaces, and how they may be feeling during searching processes. The models unique tension point – the "Zone of Intervention" is of particular interest to us. Kuhlthau's work suggests that this particular time is when the students' confidence is low, and the feelings accompanying this could be confusion, anxiety, and a sense of being overwhelmed.

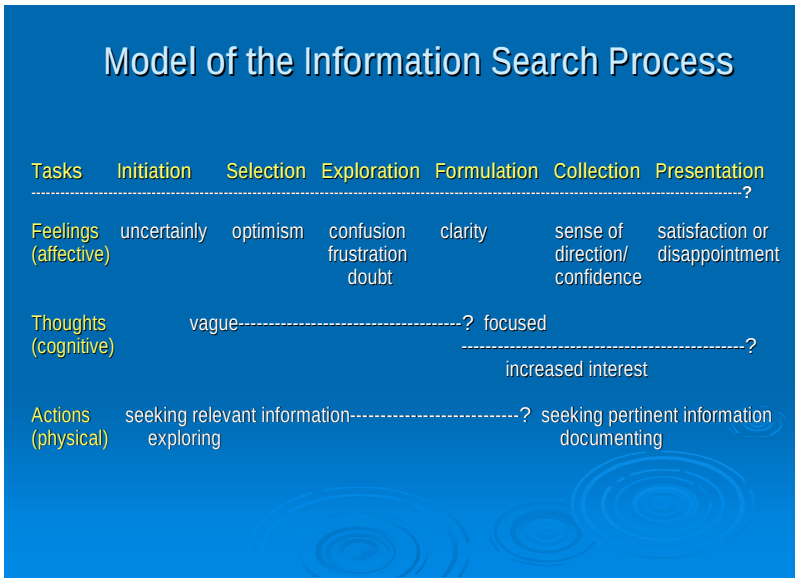

Fig 2 (Kuhlthau PPT 2006)

This point in the information process occurs when information is located, and students are in the process of immersing in the texts and sources of information. Learning theory supports the notion that students are engaged in transformative processes, and that questioning and making connections, are necessary to a process that is holistic. Kuhlthau's research indicates that integrative personal processes are necessary for students to learn and as she writes to "make meaning" of the information, in order to create knowledge.

An unexpected finding of Kuhlthau's work, which resonated with us, was seeing a clearer pathway to support student learning in the library environment. Namely, many students will set out to write up the material they have researched well before they have a clear focus.

> "In addition, half of the users in academic, public, and secondary school libraries studied did not show evidence of reaching a focused perspective of their topic at any time during the search process. Although a significant change in thoughts was found, only 50% of the participants made focused statements of their topic at the close of their search. Furthermore, while most participants were seeking background information at initiation and information relevant to the general topic at midpoint, at closure only 25% reported that they were seeking information on a focused perspective of the topic. These findings lead to the assumption that many people may enter the presentation or writing phase without clearly focused topics" (Kuhlthau 1991, p365).

Allowing for the fact that a number of the information seeking tasks may not require a "focus statement" or central idea, it is striking that numbers of students speed up the process and begin the writing without a clear focus. It may be that the student expects the focus to take shape in the writing process, but still remains an important consideration for us in supporting information seeking, and contemplating design of search interfaces.

Undertaking our own research

In our own research program with Monash and Charles Sturt University, we were encouraged to develop tool kits that would ensure that students avoided plagiarism. We were working with the humanities department and were given the opportunity to design a task for the year 7 students with the library as the primary setting. We built our model around the creation of a rich inquiry task.

The student's task was to develop a hypothesis around the following question "What caused the break up of the Roman Empire?" The class was divided into 6 groups who all received a subtopic relating to the empire, and the groups were asked to create a short report of 300-500 words, and make a presentation to the class. Each student would receive a copy of the reports, and later, discussion forums would be set up with representation of the topics to discuss the findings and determine the likely causes.

Finally, we would require the students to write an essay in class, under test conditions in which they would outline their own hypothesis supported by evidence and by the writer's interpretation of events and causality.

A kit that was assembled by the team of the campus librarians for each of the groups and they included

- Three to four secondary texts
- A video or DVD on the topic
- Some choice websites
- Copies of maps
- Instruction sheets with requirements, and with guiding (essential) questions

Pedagogy: to design for learning

At Wesley College, the pedagogy for the middle years was derived from the "Understanding by Design" curriculum model. Developed by internationally recognised educators Grant Wiggins and Jay McTighe, and published by the Association for Supervision and Curriculum Development (ASCD), Understanding by Design is based on the following key ideas:

- A primary goal of education should be the development and deepening of student understanding.

- Students reveal their understanding most effectively when they are provided with complex, authentic opportunities to explain, interpret, apply, shift perspective, empathise, and self-assess. When applied to complex tasks, these "six facets" provide a conceptual lens through which teachers can better assess student understanding.
- Curriculum is formulated around “Enduring understandings” and students engage in “essential questions” to make connections and engage in higher order thinking.

It is a compatible model with Carol Kuhlthau’s ISP and our library team worked with both models to inform them of appropriate support during the 3 weeks that students were involved with the project. We have now completed this project with all of the year 7 students, but it is still a little early to report on our findings in detail. At the time of writing, the team from Charles Sturt and Monash Universities is to send a second assessment team to run focus groups in October 2007. However, initial results show

- Students’ searching time on-line was limited as the starting point was with books; despite this, some students still wanted to begin with a search on Google, and typed the “essential” research questions into it
- The presentations in MS Photo Story and PowerPoint frequently contained images, which were lacking in substance to support the students' report. In some instances students selected images that were products of completely different eras, for example David’s painting of the “Oath of the Horatii,” from 1789, but did not make connections with ideas of relevance or quality. Many images were included by the students without consideration to accuracy or relevance.
- Students identified websites as quicker to locate information in.
- Some students reported a preference for the books as sources of information, as it was easier to relocate information on another day. They identified that books provided a different kind of continuity for them compared with websites. Books also laid information out in ways that they found easier to work from.
- Students were still actively but perhaps not consciously synthesising information, expressing ideas and building thoughts during presentations. The work had not finished when they had written the report, in fact it would appear that for students synthesis continued on as they presented, and watched each other’s presentation.
- Students’ written individual work was highly original. It was not polished, often thinking was expressed in personal and unconventional ways, and the striking aspect of the work was that students wrote in personal voice. This personal voice is often lacking in student assignment work.
- Students’ expressed thinking was often inferential - students enjoyed making connections but would not necessarily back this with evidence
- Students enjoyed the task premise as expressed by the teacher: “there is no right or wrong answer; what matters is what you are thinking and what evidence you use to back your case.” Students identified that this enabled them to work differently: to take more risk than usual in that they were not searching for “the right answer”, but were able to explore a topic. This may have changed their searching behaviour.

- Students were able to draw on each other's work in devising and writing the final writing task. Some students made clear attributions to the work of other students in their writing.
- A number of students with special learning needs were also able to contribute to the reports, and participate on an equal footing with the other students in the class. They all wrote individual pieces and were able to express thinking around a complex question.

Identifying the ISP at work

We were able to identify the Kuhlthau ISP model at work while observing and working with the students in the classes. Even though the team was fully aware that the ISP implied that students would feel a range of emotions and this was necessary for learning, the actual experience of this was challenging. Early on, we found that the team was distracted by the tensions students were experiencing in the first lessons. Even though we all knew that the task was going to involve difficulty, the actual experience of the students learning process could not be fully anticipated by the staff. In the first lessons, some of the students seemed confused, frustrated and even lost. We wondered if students were experiencing what Kuhlthau identifies as the "zone of intervention". Initially library staff had responded to students' feelings of anxiety by trying to reduce them.

As we were working with an action research process, we actively evaluated our actions and checked our inferences in our regular meetings. One librarian reflected that she had spent most of her professional life providing answers to people, or leading them to the "right" answers. She had been accustomed to "stepping in and taking over" a user search, and had felt helpful and professional in this. this was not now actually a useful strategy and she needed to find more effective ways of assisting. Another reflected that the students' "lost-like" behaviour led her to feel anxious herself. She also worried that if our students' results were poor, our project would not succeed. Yet another librarian had a strong negative response to *any* student anxiety, and her reaction was to minimise it! It was important to surface the tensions and responses in the team. To allow discussion and exploration of these issues allowed us to stay true to our intent, not to negate our feelings and together find new ways to assist students' inquiry and learning.

Focussing student inquiry

The most impressive finding we made was the need to help students with focus, as identified by Kuhlthau (1991). Librarians reported spending considerable time on the essential questions, which helped students define the focus in greater detail. We found a direct correlation between student efficacy in determining hypothesis with the availability **and** amount of support students received in the library while researching, developing and writing their report.

One of the major shifts for our library team was the notion of supporting at the zone of intervention. The model of enduring understandings for learning certainly helps us to support student inquiry- not by directing research, but by clarifying questions, and helping students frame their own questions. We found that many students in the groups benefited from being able to “talk through” their understandings. For instance, in being able to tell the story of the “gothic tribes” as they had understood it, they were able to identify strands of thought, to ask each other questions, and to frame their thinking. From narrow focus, we could expand to include factors such as why things happened and what consequences there might have been. Working with essential questions in the zone of intervention focussed the library team more readily on ways to extend student learning. Librarians were able to pull students out of dead end searches, by asking them how it helped answer an essential question. A subtle shift from *finding answers* with students *into exploring questions* also improved with time and opportunity, and gave librarians affirmation to continue this practice with other students in other domains of the school.

Identifying the zone of intervention was a useful way of identifying where students may be on their affective and cognitive pathway. Perhaps it is another way of thinking about the frustrations students experienced with searching breakdown. Certainly, the on-line library interfaces are under challenge, if what the research tells us is true: that students expect our controlled language products to behave as search engines do. Our early findings suggest that human intervention may be more necessary rather than less, and that interfaces and search engines, by compressing the time in locating sources of data may cause greater intensity around the tension point in the zone of intervention that Kuhlthau identifies.

Our research project deliberately created specific opportunities and times for synthesis. This was time and space for thinking, imagining and exploring. In designing this, we have started defining what the best practice might be in assisting learners with their inquiry. What we are beginning to understand is the link between with synthesis and essential questions in working with our students. In practice, this means our librarians must be reflective and active listeners, who are prepared to take the time to accompany the journey of discovery. Librarians must be educators who help illuminate the topic with careful questions and prompts. We also have come away with some sense of modelling questioning, and how we might model the questioning process without affecting students' own agency to ask questions. These are all exciting areas for learning for our team.

Conclusion

In conclusion, our own research correlates with the findings of other studies on the changes in student behaviours in information seeking. The changes relate to student expectations of searching and information environments. Compelling data affirms the roles that affect plays in student searching behaviours, and the vital role it plays in student learning. Working with the ISP model, and with research data, means that new avenues can be explored for supporting learners. In constructivist learning settings, a significant role for educators and librarians can be played in interacting with learners at key stages of the ISP process. Even so, as Kuhlthau observed, there is no single linearity in the way the model can be reflected in observation of students'

work. If students writing work is often undertaken without a focus, and student synthesis is taking place during the writing task we have still to explore other flexible models in our profession to support learning and inquiry. It suggests that this is a rich area for further research, and a rich area too for developing models of practice for teachers, and librarians.

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