**User-Centered Decision Making:
A New Model for Developing Academic Library Services
and Systems**

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Abstract:

This longitudinal study tracks US and UK participants' shifts in their motivations and forms of engagement with technology and information as they transition between four educational stages. The quantitative and qualitative methods, including ethnographic methods that devote individual attention to the subjects, yield a very rich data set enabling

multiple methods of analysis. Instead of reporting general information-seeking habits and technology use, this study explores how the subjects get their information based on the context and situation of their needs during an extended period of time, identifying if and how their behaviors change.

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1. Introduction

There are many different ways to engage in the information environment making physical and digital libraries one of many options available to the information seeker. Library resources often are not the first choice of the academic community, who often choose the more convenient, easier to use open-access sources (Beetham, McGill, and Littlejohn 2009; Centre for Information Behaviour and the Evaluation of Research [CIBER] 2008; Connaway and Dickey 2010; Warwick, Galina, Terras, Huntington, and Pappa 2008). This could be attributed to the fact that resources used to be scarce, making attention abundant. However, attention currently is scarce because resources are abundant (Dempsey 2009, 2010). This means that "library users now have many opportunities to meet their information needs, and they have many demands on their attention. No single site is the sole focus of attention and convenience is important" (Dempsey 2010).

Connaway, Dickey, and Radford (2011) identified convenience as the number one factor for individuals selecting a service or system to find information. To make it more difficult, convenience is often determined by the situation and context of the specific information need.

In order to develop library systems and services that will meet the varied needs and situations of today's information seekers, it is necessary to identify how, why, and under what circumstances individuals use the various available systems and services.

2. Objectives and Research Questions

In an attempt to identify engagement with technology and information, the Digital Visitors and Residents (V&R) study involves working with users during a 3-year period, and tracking the shifts in their motivations and forms of engagement as they transition between four identified educational stages - Emerging (Late stage secondary school – first year undergraduate); Establishing (Second/third year undergraduate); Embedding (Postgraduates, PhD students); and Experienced (Scholars). It is based on the V&R framework proposed by White and Le Cornu (2011) as a method of contextualizing participants' motivations to engage with the digital environment.

The study is based on the following key research questions:

- What are the most significant factors for novice and experienced researchers in choosing their modes of engagement with the information environment?

- Do individuals develop personal engagement strategies which evolve over time and for specific needs and goals, or are the educational contexts (or, in the context of this study, "educational stages") the primary influence on their engagement strategies?

- Are modes of engagement shifting over the course of time, influenced by emergent web culture and the availability of "new" ways to engage, or are the underlying trends and motivations relatively static within particular educational stages?

3. Methodology and Data Collection Techniques

The study is comprised of four phases.

- Phase 1: recruited and interviewed 30 individuals in the Emerging educational stage: 15 from the US and 15 from the UK. Eleven were male, 19 female. See Figure 1. Since the participants mostly were drawn from the last year of secondary/high school and first year of university, the majority of the students were aged 18 and 19, but there was a small sample of younger (17) and older (34, 36 and 57) interviewees. See Figure 2.

- Phase 2: recruited and interviewed 30 individuals from the Establishing (second/third year undergraduate), Embedding (postgraduates, PhD students), and Experienced (Scholars) stages: 5 from each of the three stages from both the US and the UK. Fourteen of the Phase 1 participants agreed to submit a monthly diary for 3 months during the summer of 2011 (8 US and 6 UK). The US participants were more faithful than the UK participants in submitting the dairies. At the end of Phase 1, there were 7 complete sets of diaries, including videos from one US participant from the Establishing educational stage. Several participants submitted intermittent monthly diaries, while others have failed to submit diaries. Although a thorough analysis of the diaries has not been completed, the team has begun to discuss whether they have been as effective a way as anticipated. The researchers are discussing several options in lieu of the diaries, which may include individual monthly conversations or IM sessions with participants or video submissions.

- Phase 3 (planned for May 2011 – May 2013): test the interview and diary results with an in-depth survey of 50 participants from each of the four educational stages (total of 400 participants – 200 each from the UK and US). Code, analyze, and compare data from the 4 educational stages to refine the emerging findings and explore possible trends across larger groupings, such as the stages themselves, discipline, and socioeconomic status.

- Phase 4: (planned for January 2013-May 2013): interview a second group of 6 students (3 students from each of the two types of institutions from both the US and UK) in the Emerging stage. This will help to determine if methods of engagement are changing over time as well as through the educational stages.

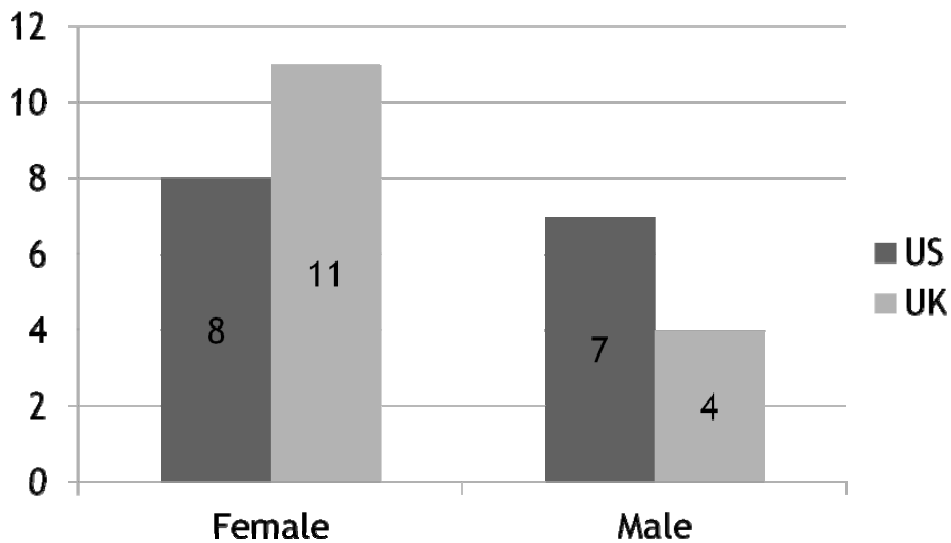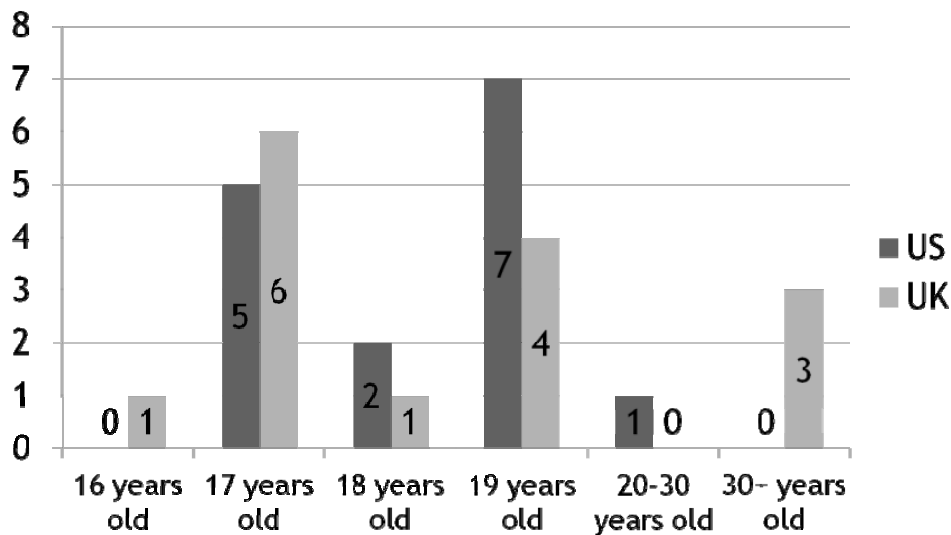**Figure 1: US vs. UK Participant**

Figure 2: US vs. UK Participant Ages

In the US the project worked in close partnership with the University of North Carolina, Charlotte (UNCC) to recruit participants, from different socio-economic groups from both private and public secondary schools as well as from the university. In the UK participants were drawn from Oxford Brooks University, Warwick University, and secondary schools in Oxford and Leicester. It was a purposive sample with the assumption that the students and scholars at these institutions were typical of other institutions (Connaway and Powell 2010). Although the subjects were a convenience sample (using contacts to connect the researchers with individuals within the 4 educational phases) and snowball sampling with participants recruiting their colleagues who fit the demographics of the 4 educational phases (Connaway and Powell 2010), they deliberately were selected to represent US and UK participants from various cultural, socio-economic, and disciplinary backgrounds. See Table 1 for the subjects' disciplinary backgrounds.

Table 1: US vs. UK Participant University Majors

US (9 of 16)	UK (7 of 16)
• 5 Engineering • 1 Political Science • 1 Pre-Business • 2 Undeclared	• 3 Teaching • 1 Chemical Biology • 1 Chemistry • 1 History • 1 Languages

Several methods of data collection are being utilized in this study: semi-structured interviews, diaries, and an online survey. The multi-method design enables triangulation, which provides a cross examination of the data analysis and results. The quantitative and qualitative methods, including ethnographic methods that devote individual attention to the subjects, yield a very rich data set enabling multiple methods of analysis.

Interviews were selected as a technique of collecting data because they allow the interviewee to take time to provide thoughtful answers and for the interviewer to probe, follow up, and ask more focused questions. "It is generally believed that the interview is better at revealing information that is complex or emotionally laden" (Connaway and Powell 2010, 172).

A set of questions was developed for the individual semi-structured interviews. The same questions were asked of all participants. These questions were developed based on the literature and prior research and addressed the participants' needs and behaviors in both personal and academic situations and contexts. See Appendix A.

Because this study is longitudinal, there needed to be follow-up with research subjects after the initial interview. Once individuals consented to be interviewed, researchers in the project asked them if they would also be interested in keeping research diaries, wherein they detailed their information-seeking behaviors month-to-month. The collection of such diaries was inspired in part by Carol Kuhlthau's (2003) work using self-reported written records from high school students. Such documents can potentially provide great depth and detail, but as Connaway and Powell (2010, 222) caution,

> "Among their obvious disadvantages are the tendency to reveal only what the participants choose to share with the researcher and the tendency to be incomplete (due to factors such as time, stress, or shame) on those points of extreme difficulty which are often most crucial to the researcher. To minimize these weaknesses, self-reported documents are often used in careful conjunction with other data-gathering techniques."

These diaries are not stand-alone, but are designed to provide time-depth as well as additional detail on the behaviors described by interviewees during Phases 1 and 2 of the project.

The diaries are a form of ethnographic data collection techniques. The goal of ethnography is to establish rapport with target communities, via a flexible toolkit of methods including participant observation, structured and unstructured interviews, reliance on selected research participants as "key informants," and keeping diaries. The analytical intellectual work of ethnography involves being able to engage in a particular way of seeing (Wolcott 2008) that is informed by the ethnographer's immersion in the reality of other people's existence. Such qualitative data must be approached and interpreted in a way that recognizes and retains this richness (Connaway and Powell 2010).

Interviewees were given a choice as to which format they wanted to use in submitting their monthly information diaries: email, follow-up face-to-face interview, blog, phone call, or video. Initially, nearly all of the diarists chose to submit via email messages (possibly

because email was characterized as "formal" communication, and all of the Phase 1 diarists were in the Emerging phase). In Phase 2, the researchers provided a Google doc form to make diary submission easier (see Appendix B), and they also started to get video-diary submissions via Vimeo from at least one participant. The diaries are a form of event sampling, which can focus participant attention on those areas which most interest researchers. Connaway and Powell (2010) point out that instruments (like diaries) that are intended to get people to describe what has just happened to them may be affected by distortions of memory and retrospection. They recommend that the question under review "center on discrete, defined events or moments so that such recording effort becomes reasonable and recall efforts are relatively straightforward" (Connaway and Powell 2010, 222).

A code book for analyzing the interview transcripts and diaries was developed. The code book emerged from the themes identified in the interview transcripts. Content analysis was used to tally mentions of the specific themes identified in the code book. All five of the researchers coded two of the same interview transcripts (1 US and 1 UK) to calculate inter-coder reliability. The US transcript received a Kappa score of 0.63 (98% agreement), while the UK transcript received a Kappa score of 0.64 (97.78% agreement).[1] The researchers then discussed any differences to reach agreement and modified the code book to better reflect the themes emerging from the interview transcripts. All of the interview transcripts and diaries from Phases 1 and 2 were coded in NVivo[2] for further analysis.

The questionnaire is another technique or instrument for collecting survey data from a large number of respondents in a relatively short period of time (Connaway and Powell 2010). In the online survey in Phase 3, the participants will be asked questions derived from the collection and analysis of data from the semi-structured interviews and diaries during the first two phases of the project. Since the longitudinal study sample is small, the online survey is a way to involve more participants to validate the results of the analysis of the semi-structured interviews and diaries.

4. Emerging Findings

The preliminary analysis of the Emerging educational stage semi-structured interviews data suggest

- learners' use of technology for both their academic and personal lives can be mapped against the concepts of V&R, where each is a mode of behavior, not necessarily a kind of individual. The data have revealed particular characteristics of V&R modes of behavior:
  - Residents: significant online presence and usage; high level of collaborative activity online; contributions to the online environment in the form of uploading materials, photos, videos; high dependence on a mobile device (smart phone, laptop, etc.); more than10 hours a week spent online;
  - Visitors: functional use of technology, often linked to formal need (such as use of software for specific coursework, or organising meetings through email contact); less visible/more passive online presence, more likely to favour face- to- face interactions (even as they use the internet to organize/schedule those interactions); fewer than 6 hours spent online a week;

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[1] Cohen's kappa coefficient, a measurement method used for calculating inter-coder reliability, considers not just agreement, but what agreement may have taken place by chance.
[2] NVivo 9, a qualitative software package, is a product of QSR International Pty Ltd. Further information on NVivo can be found on their website: http://www.qsrinternational.com/products_nvivo.aspx.

- there are a number of "covert" online study habits. For example, Wikipedia is widely used but almost always with a sense of guilt or an eagerness to convey awareness of its "unreliability;" there is an assumption by students that teachers and lecturers value the authenticity of paper-based books rather than information found online through a browser, such as Google. The data also indicate that this assumption is unfounded;
- some changes are made when transitioning from one stage of academic life to another. For example, one interviewee cleared his Facebook site of his previous high school friends when he went to University, where he replaced them with new contacts; and
- a number of interviewees spoke about the way they evaluated information and sites from the internet. A typical way of doing this was to judge sites by their popularity (as shown by their placement in the Google results list), i.e., popular = correct.

The V&R theory has developed over a period of years, finding formal expression in a recent publication by White and Le Cornu (2011). The paper suggests the following characteristics.

Visitors	Residents
• See web as untidy garden tool shed	• See web as place (park, building) where clusters of friends and colleagues meet
• Defined goal or task	• Live out a proportion of their life online
• Select most appropriate tool for task	• Distinction between online and offline increasingly blurred
• Need to see concrete benefit from use of platform	• Sense of belonging to a community
• No persistent online profile	• Have a profile in social networking platforms
• Anonymous	• Comfortable expressing their identity using SN platforms
• Actively reject creation of digital identity	• Web is a place to express opinions, to form and extend relationships, maintain and develop a digital identity
• Caution: identity theft, privacy	
• Sense that online social networking is banal and egotistical	
• Will use technology to maintain relationships	• Aspect of their persona remains once logged off
• Web offers set of tools to deliver or manipulate content (including conversations)	• See web as networks or clusters of individuals who generate content
• Tendency to respect (and seek out) authoritative sources	• No clear distinction between concepts of persona and content
• Thinking takes place offline	• Popularity as one important measure of reliability
• Users, not members, of the web	
• See no value of belonging online	

During the past year the researchers have been able to add characteristics which seem to accompany or elucidate each of the V&R approaches, as outlined in the table below.

Visitors	Residents
• Unseen	• Visible
• Instrumental	• Networked
• Functional	• Communicative
• Individual	• Communal

Convenience is a major factor in the decisions made by students in the Emerging educational stage. This is similar to findings of Connaway, Dickey, and Radford (2011), in which convenience was the primary factor in choosing or getting information. Convenience was determined by the specific context or situation, so the solution students identified as "convenient" did not always look the same.

Analysis of the diaries is just beginning. However, they appear to confirm tendencies identified in the interviews that participants look for convenient digital sources first and use a wide variety of digital sources in both their academic and everyday lives. Convenience and authority are not always mutually exclusive in the data set. Some of the student participants choose the most convenient option out of a set of "legitimate" sources (those they have been directed to by their tutors or by library staff). It also is the case that students were generally positive about syllabus-based websites that had been recommended to them by tutors or were being used directly as part of the curriculum.

Convenience may be why the data indicate that Google and Wikipedia are the most popular search engine and information source respectively. While much of the discussion below specifically refers to Google and/or Wikipedia, these are exemplars of a search engine, and a form of crowd-sourced[3] information.

Almost without exception, the participants use Google as a starting point to seek information when they do not already know much about a topic. Many go no further, and it was not uncommon for them simply to accept the first Google site listed.

> *I always stick with the first thing that comes up on Google because I think that's the most popular site which means that's the most correct.* **(USS1)[4]**

> *Go to Google first thing. I mean, it's so easy; internet, Google, type in book about or, you know, type in the author and the title and see if it comes up.* **(USU4)**

Wikipedia would often be one of the top results returned by Google:

> *My friends and I wanted to know the history of bloody Mary. I searched "the history of bloody Mary" in the Google search box and the first website was Wikipedia.* **(USU7)**

Google's "convenience" had other effects, since it presented students with a huge number of potential avenues to pursue. Faced with the challenges of available time and evaluative skills, a number of interviewees, when asked about what would be an "ideal" way to seek information, expressed a deep desire for an easier and more reliable way to ascertain quickly what is "right" and "wrong": in other words, to validate efficiently and effectively. There was a desire amongst participants for Google search and similar services to be more accurate and always to return a "correct" answer at the required academic level and length. In essence, many students were hoping that technology would evolve to become capable of returning the perfect answer and that they would not have to critically evaluate. This notion is very much in tension with academic notions of what it means to "learn" and how this differs from simply providing a "correct" answer.

> *Like at first it was just Google and just research papers. And then, I don't have all the time, I just want a direct answer, I don't want to read about everyone's problems and symptoms.* **(USU2)**

> *Well I'd probably be like running like something like magic laptop, that had all the answers to the world. I could just punch in, that would be amazing.* **(USU2)**

The web itself and all the information available on it may be branded as "suspect" unless created and managed by a trusted source. In the case of our Emerging interviewees, trusted sources were generally specifically-designed discipline and exam sites, together with reputable and well-known sites such as that of the BBC, and specialist sites such as those of a university.

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[3] The term crowd—sourced implies "free for all" when in fact Wikipedia has stringent "verifiability" rules (http://en.wikipedia.org/wiki/Wikipedia:Verifiability) which are closely policed, especially on the types of articles that are likely to relate to academic assignments.

[4] For anonymity, participants are designated with tags which indicate their country (UK or US), their educational stage (S for Secondary school/High school, U for University, G for Grads, or F for Faculty), and then an individual number.

One of the US participants in the Emerging educational stage discussed that his tutor thought that Wikipedia was "too convenient."

> *The problem with Wikipedia is it's too easy. You can go to Wikipedia, you can get an answer, you don't actually learn anything, you just get an answer. Whereas if you have to do the rest of the research and, especially, when the reason you have to have three sources, even though the three sources may have the same sets of information, they may have different analysis of it, and they may have somewhat conflicting information, or information that appears to be conflicting until you do more research, and that's how you come to the understanding. (USU6)*

The student thinks that the reason his lecturer doesn't like Wikipedia is that the convenience of Wikipedia reduces students' ability to conduct other important academic searching and evaluation activities. US participants, in particular, seemed to consider Wikipedia at worst as invalid, and at best as a suspect source of information. Some students believe that their instructors think that Wikipedia is untrustworthy because it is crowd-sourced.

There is evidence to suggest that on the whole Wikipedia is a high quality resource[5] and useful for what has been described as "presearch."[6] For many students in the Emerging educational stage the academic level of Wikipedia seems appropriate. It is frequently used for school and assessment purposes and provides the student interviewees not only with useful factual information, but also with an initial introduction to a topic, together with further references.

> *Probably not the best, but I think it's the simplest and easiest way to get going. So if I needed to produce a much more detailed and developed essay I would probably explore further on the internet. (**UKS1-addressing using Wikipedia to start**)*

The data suggest something similar to a "learning black market" (or "grey" market) as students make regular use of Wikipedia but are often uncomfortable about revealing this to their teachers.[7] One US interviewee expressed bluntly what their reaction would be.

> *They don't fail you but you get ridiculed in front of everyone for sourcing Wikipedia. (USS3)*

Some participants used the references cited in a Wikipedia article, without citing the article itself, as a way of taking advantage of the online encyclopaedia without mentioning it directly, and some teachers seemed to authorize their students' use of Wikipedia in this way. However, it needs to be further investigated whether students' perceptions that instructors' disregard Wikipedia and similar sites is encouraging students to hide their successful and often sophisticated approaches towards information gathering using non-traditional online sources.

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[5] Jimmy Wales recently claimed that the decline in Wikipedia editors was due to the fact that many entries were now so accurate that only "experts" could contribute to them (http://midea.nmc.org/2011/08/wikimania-recap/). Sir Harry Kroto, Nobel laureate in chemistry was recently quoted as saying that in his field Wikipedia was more accurate than the textbooks (http://twitter.com/#!/jimmy_wales/status/132464444235186176).
[6] See a reference to "presearch" relating to Wikipedia and Google Scholar at: http://blogs.ubc.ca/googlescholar/2009/02/wikipedia-google-scholar-as-pre-search/
[7] This concept of "The Learning Black Market" has been well received through blogging and presentations at events such as NetSkills seminars and the JISC online conference. These events have been used as opportunities to refine our thinking as well as to disseminate the project's activity.

The ways in which sources such as Wikipedia and search engines such as Google are used could be taken into account as a part of students' information-seeking approaches. Librarians could consider how to advise students on how to position these types of information sources and tools within larger information-seeking strategies, which include more traditional sources. Those who are certain they have identified inaccuracies in Wikipedia articles (or in similar sites) could be encouraged to correct them to develop editorial skills and a part of the process of becoming "legitimate participants" in the generation of knowledge online.[8] It also will develop their realization that knowledge is not (or no longer) a fixed, black-and-white, right-or-wrong entity.

Attention needs to be given to searching techniques. If students generally accept Google's first recommended source because of the source's popularity, librarians need to equip them with ways of evaluating these sources *before* the link is followed. Information about how search engines operate (accompanied potentially by comparative exercises) also will be necessary. Calhoun, Cantrell, Gallagher, and Hawk (2009) report that when individuals were discussing library online catalogues, they were concerned that they had no idea how the system ranked their retrieval results and wanted this information provided to them. However, this was not mentioned when discussing Google's ranking system. There seems to be an innate trust of Google.

Institutions need to be better informed about the range of critical evaluation skills that students need to access and acquire information and sources regardless of format. This will enable them to adapt these literacies to any technologies or formats that may become available in the future. "Don't trust Wikipedia" or the US tendency to warn students not "to trust anything on a .com site" is probably unlikely to change students' practices. The quotes below suggest that these behaviors only may push the students' practices underground.

> *I fell really guilty about it. If I have absolutely nowhere else to go I have scoured Google, there is nothing in the library then I will have a quick look at Wikipedia and see what Wikipedia has to say about it. Then use maybe some of its other links or how it links onto other articles a bit like that.* **(UKU3)**

Librarians could consider teaching online critical evaluation skills to students very early (possibly earlier than was typical when the institutional library was the key source of information) in their education. The comparative information "safety" of the institutional library has been superseded by the web, leaving students nervous as to which sources are valid.

The extent to which students successfully can complete assignments without engaging with institutionally-provided information sources is not yet clear. However, there are indications that the majority of information (and the learning that supports students' use) is drawn from sources from the open web. In the Emerging group this is heavily influenced by Wikipedia and by syllabus-based sites recommended by their tutors. One implication of this is that institutionally-provided information services could consider how to position themselves and what services are most needed when they are more often than not second to the open web in students' information-seeking practices.

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[8] This already is happening in some institutions. At Davidson College in North Carolina, a psychology professor partnered with Wikipedia as a part of their Education Program (http://outreach.wikimedia.org/wiki/Wikipedia_Education_Program), and had her students edit Wikipedia articles as a part of her capstone senior class (Munger, http://www.psychologicalscience.org/index.php/members/aps-wikipedia-initiative/having-undergraduates-write-for-wikipedia). At University College London, for example, one lecturer requires his students to compose and post Wikipedia articles. In so doing it would seem that Wikipedia has been lifted from black-market territory into a "teachable moment." This is the sort of initiative which could usefully be developed and expanded.

The students in the study perceive institutionally-provided information as having a level of authority or validity above and beyond sources from the open web. They regularly check the URL of a source to assess its potential validity and often will imply that physical books from the library are the most valid of all sources (even if for convenience they choose not to use them). This indicates that the expert curation of links and media (whether locally produced or not) by institutions under a trusted URL is of great value.

There is little evidence of Emerging educational stage students seeking out librarians and other support staff specifically for advice on critically evaluating sources. Students appear not to see staff in these roles as a route to information. One useful response might be to suggest that staff attempt to convene an open discussion around students' actual information-seeking habits so that they can indicate where they will be of help.

5. Next Steps

The researchers will continue to collect and analyze the diaries. They also will administer the online survey, and analyze these data as well as the data collected from the semi-structured interviews with the other three educational stage participants. Semi-structured interviews with a new group of Emerging educational stage participants will be the final data collection activity. All of the collected data will be analyzed and compared to portray the engagement of students and faculty with technology and information over a 3-year period.

6. Conclusion

Instead of reporting general information-seeking habits and technology use, this study explores how the subjects get their information based on the context and situation of their needs during an extended period of time, identifying if and how their behaviors change. The study uses both quantitative and qualitative data collection techniques that enable triangulation of the data analysis results.

The findings from this research can inform libraries of current and perspective users' expectations of services and systems based on their engagement and motivation with technology. The findings also can be used to develop options for designing and delivering digital platforms and services, which will enable educators and service providers to make informed decisions relative to engagement and motivation for individuals as they progress through the educational stages. The project will position the role of the library within emergent information-seeking patterns of both students and faculty by investigating and describing user- owned digital literacies.

References

Beetham, Helen, Lou McGill, and Allison Littlejohn. 2009. *Thriving in the 21st century: Learning literacies for the digital age (LLiDA Project).* Glasgow: The Caledonian Academy, Glasgow Caledonian University.
http://www.academy.gcal.ac.uk/llida/LLiDAReportJune2009.pdf.

Calhoun, Karen, Joanne Cantrell, Peggy Callagher, and Janet Hawk. 2009. *Online catalogs: What users and librarians want: An OCLC report.* Dublin, OH: OCLC Online Computer Library Center.

Centre for Information Behaviour and the Evaluation of Research [CIBER]. 2008. *Information behaviour of the researcher of the future: A CIBER briefing paper.* London: CIBER. http://www.jisc.ac.uk/media/documents/programmes/reppres/gg_final_keynote_11012008.pdf.

Connaway, Lynn Silipigni, and Timothy J. Dickey. 2010. *The Digital Information Seeker: Report of the findings from selected OCLC, RIN, and JISC user behaviour projects.* http://www.jisc.ac.uk/media/documents/publications/reports/2010/digitalinformationseekerreport.pdf.

Connaway, Lynn Silipigni, Timothy J. Dickey, and Marie L. Radford. 2011. "If it is too inconvenient I'm not going after it:" Convenience as a critical factor in information-seeking behaviors. *Library & Information Science Research* 33, no. 3: 179-90.

Connaway, Lynn Silipigni, and Ronald R. Powell. 2010. *Basic research methods for librarians.* Fifth edition. Littleton, CO: Libraries Unlimited.

Dempsey, Lorcan. 2009. Always on: Libraries in a world of permanent connectivity. *First Monday* 14, no. 1 (January 5), http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2291/2070.

Dempsey, Lorcan. 2010. 3 switches. *Lorcan Dempsey's Weblog* (blog), June 13, 2010. http://orweblog.oclc.org/archives/002104.html.

Kuhltahu, Carol C. 2003. Rethinking libraries for the Information Age school: Vital roles in inquiry learning. *School Libraries in Canada* 22, no. 4: 3-5.

Warwick, Claire, Isabel Galina, Melissa Terras, Paul Huntington, and Nikoleta Pappa. 2008. The master builders: LAIRAH research on good practice in the construction of digital humanities projects. *Literary and Linguistic Computing* 23, *no.* 3, 383-96. http://discovery.ucl.ac.uk/13810/.

White, David S., and Alison Le Cornu. 2011. Visitors and Residents: A new typology for online engagement. *First Monday* 16, no. 9, http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/3171/3049.

Wolcott, Harry F. 2008. *Ethnography: A way of seeing*. Lanham, MD: Altamira Press.

Appendix A:
Participant interview questions – Secondary/High school and University level

1. Describe the things you enjoy doing with technology and the web each week.
This is a conversational start in order to put the interviewees at their ease. We are trying to get a sense of their overall digital literacy so that we can set their information seeking behaviors within a broader context. Do they socialize online? (See probe.) Do they "contribute" online in the form of pictures, video, blogs, etc.?
[PROBES: How important is the web for your social life, do you use it to keep in touch with your friends? What gadgets/devices/things do you use the most, is there anything you "couldn't live without"? How much time on average do you spend online each week? Is there anything that bothers you about being online?]

2. Think of the ways you have used technology and the web for your studies. Describe a typical week.
We are looking at interviewees' use of educational technologies more specifically for study. We hope they will start to introduce informal learning, self-directed study, peer to peer learning, etc. We anticipate they will (or may not) mention Facebook, MySpace, etc.
[PROBES: How do you keep track of things? What systems for learning online do you have? Can you give us any examples of when you've asked your friends for help on assignments/homework online? What kind of online resources have you found that help you with your studies? How did you find them? What other gadgets or devices do you use for your studies?]

3. Think about the next stage of your education. Tell me what you think this will be like.
[Alternative University Student Interviews: What did you think university studies would be like when you were in high school? How is your experience different from what you thought it would be? Describe what you think the next stage of your education will be. Tell me what you think this will be like.]
This will hopefully encourage them to reflect on what they envisage their role will be in the next stage. What they imagine the next educational-stage to be like will be something we can cross check as we follow them through the project.
[PROBES: How do you think you will use technology in the next part of your education? If you think you will need to adapt the way you use technology, what sort of changes do you think you'll make?]

4. Think of a time when you had a situation where you needed answers or solutions and you did a quick search and made do with it. You knew there were other sources but you decided not to use them. Please include sources such as friends, family, teachers, TAs, tutors, coaches, etc. Prompt for both academic and informal (domestic, personal…) examples.
[PROBES: Did you simply take the first answer/solution you were able to find? What was the situation? What sources did you use? What led you to use them...and not others? Did they help? How? What sources did you decide not to use? What led to this/these decision/s? What did source A give you that you thought source B could not? Are there situations where source B would be a better choice for you? How did you decide when it was time to stop looking? How did you assess what was good enough?]

5. Have there been times when you were told to use a library or virtual learning environment (or learning platform), and used other source(s) instead?

[PROBE: What made you decide not to use what you were asked to use? What kinds of things do your instructors want you to do when you're looking for information? Does what you do look like that, and if not, what does it look like?]

6. If you had a magic wand, what would your ideal way of getting information be? How would you go about using the systems and services? When? Where? How?

7. What comments or questions do you have for me? Is there anything you would like me to explain? What would you like to tell me that you've thought about during this interview?

Appendix B:
Google diary questions

1. In your general use of technology for your coursework/research over the past weeks what would you say has gone particularly well? Why?

2. What would you say has not gone as well as you'd hoped or anticipated?

3. Have you any examples of when you used technology to help you with something that wasn't directly to do with your studies?

4. Have you got any examples where you didn't use technology to help with a problem or a project?

5. Have you picked up any new ways of doing things with technology?

6. Have you found that an approach to doing something that you've used in the past no longer works?

7. Have you found any new sources of useful information?

8. Is there anything else that you think would be useful for us to know about?

Biography

Lynn Silipigni Connaway, Ph.D., is a Senior Research Scientist at OCLC Research. She has experience in academic, public, and school libraries, as well as library and information science education. She was a Visiting Researcher at the University of Sheffield, Information Studies Department, and completed several UK projects funded by JISC to investigate users' behaviors, including virtual research environments and digital repositories. Dr. Connaway currently is collaborating with JISC and the University of Oxford to study digital visitors and residents. Other current research projects include studying bibliographic issues related to how people look for and get their information and mining WorldCat bibliographic and use data to facilitate library decision making. She is the co-author of the 5th ed. of *Basic Research Methods for Librarians* published in October 2010, has published numerous papers in refereed journals, and presents her research in both national and international venues. Connaway was the co-principal investigator of an IMLS-funded project to study and evaluate the sustainability and relevance of virtual reference services (VRS), and a co-investigator on another IMLS-funded study to investigate the information-seeking behaviors of faculty, graduate students, and undergraduates. Prior to joining OCLC Research, she was the Vice-President of Research and Library Systems at NetLibrary, the director of the Library and Information Services Department at the University of Denver, and on the faculty of the Library and Informational Science program at the University of Missouri, Columbia.