"I still go ask someone I enjoy talking to."
The Use of Digital and Human Sources by Educational Stage and Context

Christopher Cyr[a]*, Brittany Brannon[b], Lynn Silipigni Connaway[c]

[a]OCLC, 6565 Kilgour Place, Dublin, OH 43017, United States. cyrc@oclc.org.
        ORCID: 0000-0001-5246-6900
[b]OCLC, 6565 Kilgour Place, Dublin, OH 43017, United States. brannonb@oclc.org
        ORCID: 0000-0001-7090-3342
[c]OCLC, 6565 Kilgour Place, Dublin, OH 43017, United States. connawayl@oclc.org
        ORCID: 0000-0001-9783-675X

*Corresponding author

CRediT Author Statement
Christopher Cyr: Conceptualization, Methodology, Formal Analysis, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization. **Brittany Brannon:** Conceptualization, Methodology, Writing – Original Draft, Writing – Review & Editing. **Lynn Silipigni Connaway:** Conceptualization, Methodology, Resources, Data Curation, Writing – Review & Editing, Supervision, Project Administration.

Abstract

How does educational stage affect the way people find information? In previous research using the Digital Visitors & Residents (V&R) framework for semi-structured interviews, context was a factor in how individuals behaved. This study of 145 online, open-ended surveys examines the impact that one's V&R educational stage has on the likelihood of attending to digital and human sources across four contexts. These contexts vary according to whether the search was professional or personal and successful or struggled. The impact of educational stage differs based on context. In some contexts, people at higher educational stages are more likely to attend to digital sources and less likely to attend to human sources. In other contexts, there is no statistically significant difference among educational stages. These findings provide support for previous V&R research, while also demonstrating that online surveys can be used to supplement and balance the data collected from semi-structured interviews.

Highlights
- Participants completed an open-ended online survey about their behavior in several information-seeking contexts.
- The Digital Visitors & Residents (V&R) framework was used to analyze their responses.
- Higher V&R educational stages were more likely to use digital sources, less likely to use human sources in some contexts.
- Convenience, familiarity, and credibility of source also influence the choice of digital or human sources in some contexts.

1. Introduction

The Digital Visitors and Residents (V&R) project[1] has examined what motivates individuals to engage with the digital information environment. We have discovered that age is not the determining factor in information-seeking behavior. Instead, context, situation, social factors, and educational stage influence individuals' choices and use of tools and resources, both digital and physical. During the third phase of our project, an online survey was distributed to participants from the US and UK, which measured how they engaged with technology to acquire needed information in four different contexts. The findings of that survey, which confirm differences in digital engagement according to context, situation, and educational background, are reported here.

2. Problem statement

Data collection for the V&R project occurred in four project phases. In Phase 1, semi-structured interviews with individuals from four countries were collected. In Phase 2, diaries and follow-up interviews were collected to determine how behavior changed over time (AUTHOR et al., 2013). In Phase 3, an online survey was distributed, which is discussed here. In Phase 4, mapping sessions were conducted, where individuals were asked to plot their digital engagement on an axis composed of the Visitor-Resident and Personal-Institutional continuums (AUTHOR et al., 2017).

The online survey had two purposes. The first was to validate findings from the semi-structured interviews conducted in Phase I and the diaries collected in Phase II. The second purpose was to provide multiple data collection and analysis methods to identify digital visitor

---

[1] For a full description of the Digital Visitors and Residents project, including a list of project outputs, please see our project page at https://www.oclc.org/research/themes/user-studies/vandr.html.

and resident behaviors; therefore, a mixed methods research design was used. Mixed methods research can reduce the drawbacks and enhance the benefits of each method employed (AUTHOR & Radford, 2017). It also allows for triangulation, in which findings are strengthened by demonstrating that multiple measures support a finding (Webb et al., 1966).

Previous V&R phases used qualitative data collection methods, which elicited rich data about technology use among students and scholars in different stages of their educational lifecycles. However, the participants did not constitute a representative sample of our population of interest. The online survey allowed us to gather a representative sample, which would strengthen the generalizability of our findings. The second purpose of the survey was to uncover any new or surprising phenomena not captured by other data collection and analysis methods. Those types of findings may answer lingering questions from previous study phases and lead to new implications for research and practice.

3. Literature review

3.1 Theoretical framework

The V&R project is a US/UK collaboration funded by JISC, OCLC, Oxford University, and the University of North Carolina, Charlotte. The V&R framework focuses on individuals' motivations for engaging with digital technologies—a focus initially proposed and described in the TALL blog (White, 2008)—rather than relying on assumptions about age and technological skill. Within this framework, Visitor and Resident are modes of engagement with digital technologies that constitute two ends of a continuum (AUTHOR, Lanclos, & Hood, 2013a). The Visitor mode of engagement involves the use of digital technologies as tools. People access the tool that they need, achieve their purpose, and then log off without leaving traces of themselves behind. In the Resident mode of engagement, people view the web as a place, using digital

technologies to live out a portion of their lives online. They use digital technologies to express themselves and connect with others, leaving a digital footprint or identity online even when they are not present (AUTHOR, Lanclos, & Hood, 2013a).

An individual will occupy different locations on this continuum when using different technologies and when in different situations (AUTHOR, Lanclos, & Hood 2013b). Data from early V&R project phases also indicated a second continuum between Personal and Institutional contexts that was significant in how individuals chose to engage with a particular technology (AUTHOR et al., 2017). Many participants reported engaging with the same technology or platform in different modes when using it in Personal and Institutional contexts (AUTHOR et al., 2017).

V&R also distinguishes among four different educational stages that are better predictors of online engagement of age (AUTHOR et al., 2017; AUTHOR, Lanclos, & Hood, 2013b). The emerging educational stage is made up of late stage secondary school and first-year undergraduate students (AUTHOR et al., 2017). The establishing stage comprises upper-level undergraduate students. The embedding stage is composed of graduate and postgraduate students, including students seeking master's degrees and doctorates. The experiencing stage includes faculty, researchers, and scholars. Individuals' information behaviors change as they transition from one stage to another, although many of their behaviors persist across stages (AUTHOR et al., 2017).

3.2 Previous V&R findings

Overall, prior V&R phases found that participants' mentions of different source types were similar when they discussed both successful and unsuccessful searches, suggesting that their strategies and the sources they used didn't change significantly (AUTHOR et al., 2017). Instead, participants seemed to have a repertoire of sources that they used consistently (AUTHOR et al., 2017).

3.2.1 Digital sources

Digital sources were mentioned almost universally at every educational stage (AUTHOR, Lanclos, & Hood, 2013b). The main differences among stages were found in the type of digital sources mentioned (AUTHOR, Lanclos, & Hood, 2013b). Open web sources were mentioned far more often overall than closed web sources such as university databases or course management systems (AUTHOR, Lanclos, & Hood, 2013a). Both search engines and Wikipedia were heavily mentioned at all educational stages (AUTHOR et al., 2017). Participants at several stages also mentioned using social media in academic contexts (AUTHOR, Lanclos, & Hood, 2013a).

Mentions of university databases were low among emerging and establishing participants, but high for both embedding and experiencing participants (AUTHOR, Lanclos, & Hood, 2013b). Emerging participants didn't specifically mention databases, but they did mention digital resources at the library, indicating that they may not have realized that the resources they were using were databases (AUTHOR, Lanclos, & Hood, 2013a).

Other research on student use of open versus closed web sources is mixed. Salisbury, Laincz, and Smith (2012) found that 190 undergraduate students most preferred Google Scholar for finding scholarly information, followed by Google, library databases, and then the library catalog. Seventy-four graduate students, by contrast, reported their order of preference to be

library databases, Google Scholar, and then the library catalog (Salisbury, Laincz, & Smith, 2012). A different study of 15 undergraduate and graduate students found that most began their research with library websites or databases and only a third began on the open web (Thomas, Tewell, & Willson, 2017).

A longitudinal study found that as freshman the majority of students started their research on Google while a smaller percentage started with library resources (Perruso, 2016). As the students progressed, the percentage who reported starting with Google decreased and the percentage who reported starting with library resources increased (Perruso, 2016). A study of 282 students recruited from introductory communication classes found that students preferred different types of resources for different academic purposes; for studying, they prefer the open web, but for projects, they prefer the library (Biddix, Chung, Park, 2013).

In the prior phases of the V&R study, Wikipedia mentions were highest for the lower educational stages and lower for the higher educational stages (AUTHOR, Lanclos, & Hood, 2013b). It was often used, particularly by emerging participants, to get background information for assignments (AUTHOR et al., 2017). Those in the earlier educational stages, while they used Wikipedia, considered it a banned source and often did not admit that they were using it, bowing to the pressure of Wikipedia shaming (AUTHOR et al., 2017; Valenza, 2019).

Wikipedia is one of the most common open web resources that students use as part of the Learning Black Market (White, 2011). The Learning Black Market consists of open web strategies students have developed from personal internet use that they apply to academic endeavors but are afraid of admitting to (White, 2011). Head's (2013) study of almost 2,000 freshman students found that they struggle to utilize library resources and instead rely on Google-centric search strategies that they developed in high school. Biddix, Chung, and Park

(2011) found that students do start with the open web, but they use open web resources as ways of orienting themselves or developing strategies that they can then pursue using course and library websites. There has been some interest in recognizing the validity of these practices and helping students learn to use them more effectively, rather than shaming students for employing them (White, 2011; Valenza, 2019).

3.2.2 Human sources

As with digital sources, almost all participants in every educational stage mentioned contacting human sources (AUTHOR, Lanclos, & Hood, 2013b). Almost every type of human source was mentioned most often by emerging and establishing participants (AUTHOR et al., 2013b). The notable exception is librarians, who were mentioned most by experiencing participants (AUTHOR, Lanclos, & Hood, 2013b). Of all types of human sources, however, librarians were mentioned by the fewest participants (AUTHOR et al., 2017). Established relationships played a large part in determining how participants got information and who they chose to approach for an information need (AUTHOR, Lanclos, & Hood, 2013a). Participants in all stages most often mentioned family or friends, but rarely mentioned consulting experts, professionals, or librarians (AUTHOR, Lanclos, & Hood, 2013a).

These findings are supported by findings from Thomas, Tewell, & Willson (2017) that students were most likely to consult their instructors and peers for research help because they valued the insider knowledge and subject expertise that they perceived these human sources to have. In contrast, they were much less likely to mention asking librarians for help and reported being unsure of how librarians could help (Thomas, Tewell, & Willson, 2017). Students also mentioned consulting human sources when trying to determine the credibility of online information (Biddix et al., 2013).

3.2.3 Libraries

Despite V&R participants' limited mention of librarians, mentions of the use of the academic library was high (AUTHOR et al., 2017). For some participants, the library was embedded in their online courses, but they struggled to use the library website itself (AUTHOR et al., 2017). For others, particularly the students at higher educational levels, the library was envisioned as a physical space for studying and collaboration (AUTHOR et al., 2017). For participants in the emerging, establishing, and embedding stages, the library also was conceptualized as "a physical repository for books" (AUTHOR et al., 2017, p. 38). In contrast, experiencing participants did not mention the library in association with books (AUTHOR et al., 2017).

3.2.4 Decision-making factors

Convenience was the main factor that participants cited for why they made decisions around obtaining information (AUTHOR, Lanclos, & Hood, 2013a). Almost 90% of participants mentioned convenience as a motivation for selecting an information source (AUTHOR et al., 2017). Information quality is a secondary concern that people evaluate after they have chosen convenient sources (AUTHOR et al., 2017). Emerging stage participants mentioned reliability frequently when discussing their reasons for choosing sources (AUTHOR, Lanclos, & Hood, 2013a). They based their decisions of reliability on source domain, corroboration of information across sources, and a site's overall appearance (AUTHOR, Lanclos, & Hood, 2013a). Emerging stage participants also consistently mentioned authority/legitimacy as a decision-making factor. Mentions of authority/legitimacy were slightly lower among establishing participants and increased again for embedding and experiencing participants (AUTHOR, Lanclos, & Hood,

2013a). Participants in higher educational stages focused more on information quality, but convenience still was a factor (AUTHOR et al., 2017).

Biddix, Chung, and Park (2011) found that students' choice of source type was "directly tied to efficiency" (p. 180). However, students also were concerned with the credibility of the information in terms of trustworthiness and expertise (Biddix et al., 2011). Google and Wikipedia were valued for their ease of access and use, while peers were viewed as an effective way of determining which sources were usable (Biddix et al., 2011). It's worth noting, as both the V&R findings and the Biddix, Chung, and Park study illustrate, that convenience is not a unidimensional concept. What is convenient depends upon the individual's information need, context, and situation (AUTHOR, Dickey, and Radford, 2011).

4. Methods

4.1 Data collection

An online survey was distributed using the quota sampling method, with participants from each V&R educational stage, as well as earlier stage high school/secondary school students, from the US and the UK. Representatives were chosen to disseminate the survey based on prior relationships established between them and the team during the first two project stages. Representatives were predominately librarians and professors at research universities and high schools/secondary schools. Preference for university representatives was given to those that were in the Carnegie Classification of Research I and Research II.

Once a list of representatives was generated, recruitment emails were sent to university contacts explaining the study and asking them to disseminate it to their students. To extend the communication and reach of the survey, snowball sampling was used when these initial contacts were asked to forward an attached recruitment email to others who might be interested in

sending it to others. The recruitment email also contained a description of the study and a link to a short demographic screening questionnaire. This questionnaire was used to purposively select participants, creating a distribution that was as equal as possible by location, institution, educational stage, discipline, age, and gender. Possible participants who completed the demographic screening questionnaire were not awarded any honorariums. If, however, they were chosen for the online survey and accepted, they were awarded $20.00/£15.00 Amazon gift cards upon completion.

The survey was created and administered using Google Forms and took about 45 minutes to complete. It consisted of mostly open-ended questions that were designed based on the critical incident technique, which has participants reflect on a memorable incident to elicit specific details about the area of interest (AUTHOR & Radford, 2017). Participants were asked to describe three information-seeking situations: a satisficing or "making do" situation, an academic/professional situation, and a personal situation. For both the academic and personal situations, participants were asked to give an example of a successful search experience and one where they struggled.

For each situation, participants were asked to detail the situation, the approaches taken to address the situation, resources used, their ease of use, and why the participant preferred these specific resources. The survey was left open and available to complete from December 2013 to July 2014 with invitations going out periodically. A total of 150 survey responses were collected.

4.2 Data analysis

After the survey was closed, two team members coded 20% of the responses (n=30) using the V&R codebook (AUTHOR et al., 2011). This codebook was developed and tested in the prior project phases. Codes for the survey responses were applied qualitatively in multiple

question chunks with each code indicative of a larger theme or label (Charmaz, 2014). The codes were imported into NVivo to calculate inter-coder reliability (ICR). The average ICR values across all 30 surveys coded were 0.84 kappa and 95.88% agreement. These values are well within the level of excellent agreement (NVivo, 2017) and demonstrate the strength of the V&R coding scheme on multiple sets of data collected. The remaining 120 survey responses were then coded using NVivo.

4.3 Dependent variables

Previous V&R studies reported that search behavior varies based on context (AUTHOR et al., 2017). They also reported that one's V&R educational stage impacts their use of human and digital sources. The present study attempted to verify and further develop these findings by looking at the ways that a model of online searching, based on educational level and evaluation criteria, predicts one's use of digital and human sources differently in four different contexts.

Responses were coded every time the participant mentioned several different sources of information. Dichotomous measures were created for whether the participant mentioned any of the source categories within the parent categories of "digital" and "human" in the codebook. Participants received a score of 1 if they mentioned any of the sources in that category, and a score of 0 if they did not.

Human sources were then divided into those that a participant would know personally (e.g., a parent or friend) and those that they would know professionally (e.g., a professor or librarian). Similar to digital and human sources, dichotomous measures for "professional human" and "personal human" sources were created. This resulted in four source types: digital, all human, professional human, and personal human.

For example, a participant who mentioned using an online database, a university website, and Wikipedia to find information when describing a successful academic search would receive a score of 1 for digital sources, and a score of 0 for human sources, professional human sources, and personal human sources.

————————

Table 1 in here

————————

Summary statistics of the percentage of participants that mentioned each source type in each context are in Table 1. When describing successful searches, participants mentioned digital sources more often in academic contexts, and human sources more often in personal contexts. In searches where they struggled, they mentioned human sources more often than digital sources in both contexts. When participants did mention human sources, they mentioned professional human sources more often in academic contexts, and personal human sources in personal contexts.

4.4 Independent variables

This study looked at whether several of the independent variables related to educational background and evaluation criteria had an impact on the likelihood that participants attended to the source types described above.

4.4.1 Educational background

The V&R educational stage of each participant was identified. However, the original V&R framework did not include participants below their final year of high school/secondary school, as the present study did. As a result, a separate V&R educational stage was created for high school/secondary school students, which represent an area for future study in this

framework. There was no data distinguishing the year of each high school/secondary school participant, so all high school/secondary school students, including seniors, were included in the high school/secondary school educational stage rather than the Emerging stage. The distribution of participants among the V&R educational stages is shown in Figure 1.

_____

Figure 1 in here

_____

The educational background of the participants' parent was used as an indicator of the participants' socio-economical levels. The educational background was measured based on one parent's highest degree completed, rather than their V&R educational stage. The second parent was not included because some participants did not identify a second parent. The highest degree for the participants' parents is shown in Figure 2.

_____

Figure 2 in here

_____

4.4.2 Evaluation criteria

The evaluation criteria that the participants mentioned when describing sources in each context were coded. Previous V&R research found that participants attend to convenience differently based on context (AUTHOR et al., 2017). For this study, the specific interest was the impact that mentioning convenience, credibility, and familiarity had in each context. The frequency of these variables in each context is shown in Table 2.

_____

Table 2 in here

_____

4.4.3 Academic discipline

It is possible that the use of digital and human sources could be influenced by specific aspects of one's discipline. For example, a historian might be more likely to attend to physical archival materials because they are working with material that has never been digitized, while a computer scientist might be more likely to attend to digital materials because of the nature of programming. In both of these cases, their behavior was a result of their discipline rather than their V&R educational stage. To avoid this possibility of confounding variables influencing results, the models control for the participant's academic discipline.

Participants self-identified as being part of six categories of academic disciplines, the professional sciences, the formal sciences, the social sciences, the humanities, the natural sciences, and high school/secondary school (where students do not generally have a specific discipline). The distribution of participants is shown in Figure 3. This variable is treated as a control variable in the model, meaning that it is held constant in interpretations of other variables, but does not receive any specific interpretation itself because it was not the primary interest of this study.

_____

Figure 3 in here

_____

4.5 Statistical model

Since we consider four different dependent variables in four different contexts, a total of sixteen regressions were run. The dependent variables are dichotomous in nature, meaning that they can only take values of either 0 or 1. Because of this, logistic regression was used. This shows the impact that an independent variable has on the natural log of the odds that the participant will have a score of 1 as opposed to 0. This allows us to see how each variable impacts the probability that a participant mentioned each type of source in each context.

Multivariate regression was used to identify the independent impact of each of the independent variables. This enables controlled comparisons to see the independent impact that each variable in the model had when the other variables were held constant. Results are presented with coefficients for each variable, with standard errors in parentheses, and results that are significant at the 90% level of confidence or greater denoted with bold text.

We report the substantive impact of all statistically significant variables by calculating their marginal effect on the dependent variable (the likelihood that they mentioned the source type) when all other variables in the model are at their mean. For example, for the convenience variable in the digital sources model, we report the predicted probability that the participant mentioned digital sources when they did not mention convenience, and the predicted probability when they did mention convenience. In both cases, these probabilities should are calculated with the other variables (education, evaluation criteria, and academic discipline) held at their means.

In the main text, we report the findings of the key independent variables (education and evaluation criteria). Full tables, including discipline variables, constants, and model statistics, are available in the appendix.

5. Findings

5.1 Results for digital sources

Models 1-4 in Table 3 show the impact that each of the independent variables had on the

likelihood that participants mentioned digital sources in each of the four different contexts.

_____

Table 3 in here

_____

5.1.1 V&R educational stage

V&R educational stage appears to matter for digital sources, but the impact differed

based on context. These results are shown in Figure 4.

_____

Figure 4 in here

_____

In the successful academic context, there is no evidence that participants at different

V&R educational stages were any more or less likely to mention digital sources. This can be

contrasted with the other three contexts, where participants at higher V&R educational stages

were more likely to mention digital sources. The predicted chance that a high school/secondary

school student will mention digital sources is around 10%. This increases throughout the V&R

educational stages, with those in the Experiencing stage having a 56% chance of mentioning

digital sources.

The relationship was similar in the struggle academic context, and participants were most

likely to mention digital sources here. High school/secondary school students have a predicted

23% chance of mentioning digital sources in this context. Once again, this increases throughout

the V&R educational stages, with those at the Experiencing stage predicted to have a 64%

chance of mentioning digital sources.

Finally, in the context of struggle personal searches, participants at the high

school/secondary school educational stage are predicted to have a 13% chance of mentioning

digital sources. At the Experiencing level, they have a 45% chance of mentioning digital sources.

User interviews indicate that this increase of the use of digital sources by more experienced

scholars is driven by the need to have digital literacy skills before one can use digital sources.

One female social science graduate student (26-34 years old) in the Experiencing stage captured

this sentiment in an interview, when describing teaching students to find information.

> "You have to know the right language to use to search for digitized materials like
> that, so it was somewhat hard to explain how I got to the resources for the student.
> And my ultimate goal is for them to be able to do it themselves. It's also
> sometimes hard for me to think from a student's POV when doing research,
> particularly in the catalog."

These findings highlight the importance of the digital literacy instruction that students

receive at different educational stages. Students want to be able to attend to digital sources, with

one male formal sciences undergraduate student (19-25 years old) in the Establishing stage

saying,

> "Ideally no human interaction would be necessary to procure most information,
> e.g. what can be easily searched online."

However, our research indicates that those at early V&R educational stages may not be

able to readily do so. One male professional and applied sciences graduate student (26-34 years

old) in the Embedding stage explained,

"Today's internet doesn't really get you answers when you write your question in a search box. So the ideal way is to ask and receive an answer, just like in human to human interaction."

Parent's educational level had a similar impact on the likelihood of mentioning digital sources in the personal context for both search types, even when one's own V&R educational stage is held constant. Those whose parent had a higher level of education were more likely to mention digital sources.

5.1.2 Evaluation criteria

All three evaluation criteria (convenience, credibility, and familiarity) were significant in the struggle academic context but were not significant in any other context. For each criterion, those who mentioned it were more likely to attend to digital sources.

Those who do not mention convenience have a 29% likelihood of mentioning digital sources. Those who do, on the other hand, have a 57% chance of mentioning digital sources. One female Experiencing scholar (26-34 years old) explained this by saying,

"I thought that digitized sources would be quicker and easier for the student to use and I knew how to get straight to them."

Another male graduate student (19-24 years old) in the Embedding stage explained the desire to find sources quickly and easily, saying,

"Asking people for help is time consuming both for me and for the other person as well. While a quick search is both efficient and more learning oriented."

A similar relationship occurs with credibility and familiarity. Mentioning credibility increases one's predicted chances of mentioning digital sources from 38% to 64%. Those who

mention familiarity have a 68% chance of mentioning digital sources, while those who do not

have a 41% chance.

5.2 Results for all human sources

Models 5-8 in Table 4 show the results of the impact that the independent variables have

on the likelihood that the participants mentioned any human sources.

_____

Table 4 in here

_____

5.2.1 V&R educational stage

Like with digital sources, the impact that educational stage had on the likelihood that the

participants mentioned human sources depended on the context. The context where this

relationship was seen for human sources, however, appears to differ from digital sources. The

significant relationships for human sources are show in Figure 5.

_____

Figure 5 in here

_____

While educational stage did not have a statistically significant impact on the likelihood

that the participant mentioned digital sources in the successful academic context, it appears to

have for human sources. Participants at higher educational stages were less likely to mention

human sources. High school/secondary school students have a 66% chance of mentioning human

sources when describing a successful academic search. For the Experiencing participants, on the

other hand, it is predicted that they have a 31% chance of mentioning human sources.

In the successful personal context educational stage had a statistically significant impact on the likelihood that the participant mentioned human sources, as it did with digital sources. Unlike digital sources, the impact was negative, with participants at the high school/secondary school educational stage having a predicted 85% chance of mentioning human sources and participants at the Embedding stage only having a predicted 39% chance of mentioning human sources.

Educational stage did not have a significant impact on the likelihood of mentioning human sources in either struggle context. Parent's educational level likewise did not have a significant impact on the likelihood of mentioning human sources in any context.

The continued reliance on human sources, even in the face of the convenience of digital sources, suggests the continued importance of relationships. As one male humanities graduate student (26-34 years old) in the Experiencing stage said,

> "There is something about human interaction that I deeply enjoy. Sometimes even though I know where to find something, I still go ask someone I enjoy talking to-- i.e. a friend or an adviser--so we can engage in a pleasant conversation as well as seeking information."

5.2.2 Evaluation criteria

For digital sources, all three evaluation criteria variables (convenience, credibility, familiarity) have a relatively similar impact in terms of their significance and direction in each context. This is not the case for human sources, where the three variables differ in terms of their impact in each context.

In the successful academic context, those who mentioned convenience were more likely to attend to human sources. Mentioning convenience increased one's predicted likelihood of

attending to human sources from 32% to 53%. The other evaluation criteria variables do not appear to be significant in this context.

For successful personal searches, those who mentioned credibility were more likely to mention human sources, with mentioning credibility increasing one's predicted chances from 57% to 73%. Familiarity also has a significant and positive relationship in this context, increasing one's chances of mentioning human sources from 55% to 84%. In this context, convenience did not appear to have a significant relationship.

In the struggle academic context, those who mentioned familiarity were more likely to mention human sources, with their predicted chances increasing from 32% to 61%. The other evaluation criteria variables did not appear to be significant in this context.

In the struggle personal context, the only evaluation criteria that was a significant predictor of mentioning human sources was credibility, which increased one's chances from 52% to 68%.

5.3 Results for professional human sources

Models 9-12 in Table 5 show the relationship between the independent variables in this study and the likelihood that a person will mention professional human sources in each context.

———————————

Table 5 in here

———————————

5.3.1 V&R educational stage

One's V&R educational stage significantly impacted their likelihood of mentioning professional human sources only in the successful academic context. In these cases, those at higher V&R educational stages were less likely to mention professional human sources. As

shown in Figure 6, someone in the high school/secondary school educational stage has a predicted 53% chance of mentioning professional human sources. In the Experiencing stage, on the other hand, that predicted probability only is 19%.

_____

Figure 6 in here

_____

One's parent's education level did not have a significant relationship with their likelihood of mentioning professional human sources in any context.

5.3.2 Evaluation criteria

The evaluation criteria that participants attended to impacted their likelihood of mentioning professional human sources, but only for struggle searches. In academic searches where participants struggled, those who mentioned credibility were less likely to mention professional human sources, with their predicted likelihood of doing so declining from 39% to 17%.

Interestingly, the opposite relationship was found for credibility in personal searches where participants struggled. Those that mention credibility have their predicted chance of mentioning professional human sources increase from 7% to 22%. In this context, those who mentioned familiarity were less likely to mention professional human sources, with their probability decreasing from 14% to 2%.

5.4 Results for personal human sources

The results for the likelihood that people will mention human sources known personally are shown in Models 13-16 in Table 6.

_____

Table 6 in here

_____

5.4.1 V&R educational stage

The only context where one's V&R educational stage had a significant impact on the likelihood of mentioning personal human sources was the successful personal context, where individuals at higher educational stages were less likely to mention personal human sources. As shown in Figure 7, those in high school/secondary school have a predicted 82% chance of mentioning human sources known personally. That declines throughout V&R educational stages, with those in the Experiencing stage only predicted to have a 21% chance of mentioning personal human sources.

_____

Figure 7 in here

_____

5.4.2 Evaluation criteria

Of the evaluation criteria analyzed, the only one that significantly impacted the likelihood of mentioning personal human sources was familiarity. It had a significant impact in every context except for the successful academic situation.

In successful personal searches, those who mention familiarity have a greater chance (72%) of mentioning personal human sources than those who do not (41%). A similar relationship exists in struggle personal searches, where those that mention familiarity have a 64% chance of mentioning personal human sources, and those that did not had a 37% chance. In struggle academic searches, the opposite relationship exists. Those who mention familiarity are

less likely to mention personal human sources (8%) than those who do not mention familiarity (28%).

5.5 Overall findings

The key findings for the relationship between educational stage and the likelihood that the participant mentioned each source type in each context are summarized in Table 7. The plus sign indicates a significant positive relationship, the minus sign indicates a significant negative relationship, and no sign indicates no significant relationship. Taken together, they suggest that a person's digital experience, using the V&R educational stage framework, has a significant impact on the types of source that people mention when they search. This impact, however, depends on context.

_____

Table 7 in here

_____

The key findings for choice variables are summarized in Table 8. This table presents the change in the predicted probability that each participant mentioned the source type when each choice variable is present in each context, when all other variables are held at their averages. For example, those who mentioned convenience were 28% more likely to attend to digital sources in the struggle academic context than those who did not. Together, these provide evidence that information-seeking behavior impacts the types of sources that people attend to, but this is dependent on context.

_____

Table 8 in here

_____

6. Discussion

A goal of this project was to validate previous V&R findings with a larger, more representative sample. This also provided an opportunity to compare findings from in-person semi-structured interviews and diaries with open-ended online survey questions. Broadly speaking, the findings and the methodology appear to be validated. Adding the statistically tested survey data to the previous major findings on the use of digital and human sources provides robustness and nuance to the picture of information behavior emerging from the V&R project.

6.1 Digital sources

Data from the in-person interviews and diaries indicated that those in lower educational stages mentioned digital sources less often (AUTHOR et al., 2017, p. 29). The statistical models of the interview data support this. In the academic struggle situation, and both personal context situations, those in the higher education stages are predicted to be more likely to mention digital sources. The direction of the relationship is the same in successful academic situations but is not significant.

In the successful academic context, the lack of a significant relationship between V&R educational stage and the use of digital sources is telling when contrasted with the struggle academic context. As participants get to higher V&R educational stages, and generally receive more training in digital research, one might expect those at higher educational stages to be more likely to use digital sources. This does not appear to be the case in successful searches.

The impact of one's V&R educational stage goes beyond academic life, and also impacts the way they search for information in their personal life. Users at higher V&R educational stages are more likely to mention digital sources in all personal contexts. This suggests that digital sources become an increasingly important part of people's lives as they move through the

educational stages, and that their academic training has an impact on their personal information-seeking behavior. The context where one's academic background seems to have the biggest impact on the tendency to mention digital sources is the successful personal search. Here is seen the largest magnitude of impact for the V&R educational stage, with it accounting for a 46% swing in the likelihood that a participant mentioned digital sources.

Taken together, these results for digital sources identify the journey that users take in their digital use as they move through their educational stages. While people at higher V&R educational stages are generally more attune to digital sources, this impact is felt more in their personal life than their academic life. Additionally, the training that comes with higher V&R educational stages seems to come into play more when participants struggle than when they are successful.

Librarians can address these discrepancies by carefully scaffolding information literacy instruction. Scaffolding enables the instruction given in the earlier educational stages to be built upon with more advanced skills and discipline-specific instruction that are needed by those in the higher educational levels for both their personal and academic lives. Our interviews indicate that even at the higher V&R stages, scholars continue to trust librarians, with one experiencing scholar saying, "The reputation of some of them and the recommendations of people my librarian and I knew helped us decide which of the possible resources to use."

6.2 Human sources

Previous analysis of the interview and diary data found that "Emerging scholars…consistently depended on human sources more frequently across all contexts (i.e. institutional, personal), as compared to people from the three other educational stages. They also relied less on digital sources compared to the three other groups" (AUTHOR et al., 2017, p. 29).

It was also found that "using parents as information sources is especially high among the participants in earlier education stages" (AUTHOR et al., 2017, p. 29).

The statistical models of the interview data broadly support those findings. In both the academic and personal contexts, participants at higher V&R educational stages are less dependent on all human sources. However, this is only true successful searches, not searches where the participant struggled. In the latter, V&R educational stage does not have a significant relationship with the likelihood that the participant attended to human sources.

As with the previous study, we do find that people in earlier educational stages are more likely to use personal human sources, but only in successful personal situations. While the present study included several human sources known personally, rather than just looking at parents, parents were a common resource in the group of human sources known personally. People at lower V&R educational stages also are more likely to mention professional human sources, such as teachers or librarians, but only during successful academic searches.

The findings for personal and professional human sources provide evidence that the significant negative relationship between V&R educational stage and all human sources was driven by different types of human sources in different contexts. In the academic context, it appears to be driven by professional human sources. In the personal context, this finding appears to be driven by personal human sources.

Parent's education level does not appear to significantly impact the likelihood of mentioning human sources known personally. This is surprising because parents were included in our coding of personal human sources. One might expect that participants would be more likely to rely on their parents if their parents have more education, but this does not appear to be the case. It also is interesting because one's parent's education level did have an impact on the

likelihood of mentioning digital sources in both personal contexts. This would provide evidence that parent's education does impact the way that the participants find information, but the impact is more evident in the way that they use digital sources than in using parents as a direct source of information.

The findings for all human sources suggest that situation matters for the kinds of help that librarians can provide for their users. More experienced scholars do not feel as much of a need to rely on human sources as less experienced scholars do, but only when discussing successful searches. In the struggle context, participants from all education levels are just as likely to rely on human sources. This highlights the fact that people, regardless of their own personal skills and knowledge, sometimes need help from another person when they are struggling. Librarians can use this as an opportunity to build relationships with students and scholars when they are struggling to find information. They can highlight library resources, especially through chat pop-ups, to connect users with human help when they are having trouble finding information.

Because users rely on both personal and professional sources in different contexts, the nature and quality of librarians' interactions with users can affect the contexts in which users are willing to approach them for help. By continuing to develop relationships with their users, libraries can ensure that they are top of mind as an information source when users face information needs across a variety of contexts.

7. Conclusion

As people move through the V&R educational stages, their experience searching for information is informed by both their context and their personal background. While some skills are gained organically through personal experience, other skills can come with the help of library instruction. As learning becomes increasingly digitized, human sources remain a vital means for

students and scholars to gain the digital literacy skills necessary to find the information that they need. Information literacy instruction should recognize the context-dependent nature of users' search strategies and work to scaffold skills that help users better utilize the full range of sources available to them by using core ideas of individual disciplines. This scaffolding approach supports threshold concepts introduced in the ACRL Framework for Information Literacy for Higher Education (2015), which are based on by building on disciplinary concepts as one advances for a deeper understanding of the discipline.

8. Appendix

_____

Table A1 in here

_____

_____

Table A2 in here

_____

_____

Table A3 in here

_____

_____

Table A4 in here

_____

References

Biddix, J. P., Chung, C. J., & Park, H. W. (2011). Convenience or credibility? A study of college student online research behaviors. *The Internet and Higher Education*, *14*(3), 175–182. https://doi.org/10.1016/j.iheduc.2011.01.003

Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

AUTHOR, L. S., Lanclos, D., White, D., & Le Cornu, A. (2011). *Code book for visitors & residents interview transcripts.* http://www.oclc.org/content/dam/research/activities/vandr/resources/vandr-codebook.pdf.

AUTHOR, L. S., Dickey, T., J., & Radford, M. L. (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*(3), 179-190.

AUTHOR, L. S., Kitzie, V., Hood, E. M., & Harvey, W. (2017). *The many faces of digital visitors & residents: Facets of online engagement*. A. Benedetti, A. Canals, L. Gregori, E. O. Espinet, D. Lozano, M. Man, J. C. Morales, S. G. Ricetto, R. Melgrati, E. M. Méndez Rodríguez, A. Sada, P. Sidorko, P. Sirito, V. Steel, T. van der Werf, & E. Woo (Contributors). Dublin, OH: OCLC Research. doi: 10.25333/C3V63F.

AUTHOR, L. S., Lanclos, D. M., & Hood, E. (2013). "I always stick with the first thing that comes up on Google..." Where people go for information, what they use, and why. *EDUCAUSE Review Online*. http://www.educause.edu/ero/article/i-always-stick-first-thing-comes-google-where-people-go-information-what-they-use-and-why.

AUTHOR, L. S., Lanclos, D. M., & Hood, E. (2013). "I find Google a lot easier than going to the library website." Imagine ways to innovate and inspire students to use the academic

library. *Proceedings of the Association of College & Research Libraries (ACRL) Conference 2013*, 289-300. Indianapolis, IN: ACRL. http://www.ala.org/acrl/sites/ala.org.acrl/files/content/conferences/confsandpreconfs/2013/papers/AUTHOR_Google.pdf.

AUTHOR, L. S., & Radford, M. L. (2017). *Research methods in library and information science* (6th ed). Santa Barbara: Libraries Unlimited.

AUTHOR, L. S., White, D., Lanclos, D. M., & Le Cornu, A. (2013). Visitors and residents: What motivates engagement with the digital information environment? *Information Research 18*(1), paper 556. http://InformationR.net/ir/18-1/paper556.html.

Framework for information literacy for higher education. (2015). Chicago: Association of College & Research Libraries.

Head, A. J. (2013). *Learning the ropes: How freshmen conduct course research once they enter college*. Project Information Literacy. https://www.projectinfolit.org/uploads/2/7/5/4/27541717/pil_2013_freshmenstudy_fullreport_v2.pdf

NVivo. (2017). Run a coding comparison query. Retrieved from http://help-nv11.qsrinternational.com/desktop/procedures/run_a_coding_comparison_query.htm.

Perruso, C. (2016). Undergraduates' use of google vs. library resources: A four-year cohort study. *College & Research Libraries*, *77*(5), 614–630. https://doi.org/10.5860/crl.77.5.614

Salisbury, L., Laincz, J., & Smith, J. J. (2012). Students' Preferences in Selecting Information Resources Used to Find Scholarly Information: A Comparative Study Between Undergraduate and Graduate Students. *Journal of Agricultural & Food Information*, *13*(3), 250–266. https://doi.org/10.1080/10496505.2012.694305

Thomas, S., Tewell, E., & Willson, G. (2017). Where students start and what they do when they

 get stuck: A qualitative inquiry into academic information-seeking and help-seeking

 practices. *The Journal of Academic Librarianship*, *43*(3), 224–231.

 https://doi.org/10.1016/j.acalib.2017.02.016

Valenza, J. (2019, June 17). Isn't it time to stop Wikipedia shaming? [Blog post]. Retrieved from

 http://blogs.slj.com/neverendingsearch/2019/06/17/isnt-it-time-to-stop-the-wikipedia-

 shaming/

Webb, E. J., Campbell, D. T., Schwartz, R. D., & Sechrest, L. (1966). *Unobtrusive measures:*

 Nonreactive research in the social sciences, vol. 111. Chicago: Rand McNally.

White, D. (2011). The learning black market [Blog post]. Retrieved from

 https://tallblog.conted.ox.ac.uk/index.php/2011/09/30/the-learning-black-market/

White, D. (2008). Not "natives" & "immigrants" but "Visitors" & "Residents" [Blog post].

 Retrieved from https://tallblog.conted.ox.ac.uk/index.php/2008/07/23/not-natives-

 immigrants-but-visitors-residents/

Author Biographies

Christopher is an Associate Research Scientist at OCLC. He holds a Ph.D. in Political Science from the University of Colorado, and a BA in Political Science and History from the Ohio State University. Prior to his time at OCLC, Chris was an Assistant Professor of Political Science at Eastern Kentucky University, and an ABD Fellow at the One Earth Future Foundation. His research interests include information seeking behavior and the impact of the library in the local community.

Brittany Brannon is a Research Support Specialist at OCLC Research. She received her MLIS from Kent State University, an MA in Rhetoric and Composition from the University of Kansas, and a BA in English Literature and Philosophy from Denison University. She is working on several multi-institutional grant-funded research projects that investigate how people find and evaluate information. Her research interests are in information seeking behavior, academic research skills, and scholarly communication.

Lynn Silipigni Connaway is the Director of Library Trends and User Research at OCLC Research. She holds a Ph.D. in Library and Information Studies from the University of Wisconsin, an MLIS from the University of Arizona, and a BA in Library Science from Edinboro State University. Lynn also has served as the President of ASIS&T and was the chair of the ACRL's Value of Academic Libraries Committee. Prior to her time at OCLC, Lynn was the Vice President of Research and Library Systems at NetLibrary and has held administrative and faculty positions at the University of Denver and the University of Missouri. Her research focuses on library and library users, research design and methods, and evaluation and assessment. She also was one of the creators of the Digital Visitors & Residents framework.

Table 1: Occurrence of Dependent Variables

	Successful academic	Successful personal	Struggle academic	Struggle personal
Digital	62%	32%	46%	29%
All human	48%	62%	58%	57%
Professional	33%	19%	36%	14%
Personal	16%	49%	27%	43%

Table 2: Occurrence of Evaluation Criteria Variables

	Successful academic	Successful personal	Struggle academic	Struggle personal
Convenience	71%	71%	58%	35%
Credibility	39%	34%	27%	30%
Familiarity	19%	22%	14%	16%

Table 3: The Use of Digital Sources by Context

	Digital sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(1)	(2)	(3)	(4)
Education				
V&R stage	0.190	**0.601*****	**0.442****	**0.417***
	(0.197)	**(0.224)**	**(0.210)**	**(0.214)**
Parent education	0.095	**0.495****	0.245	**0.529****
	(0.176)	**(0.209)**	(0.192)	**(0.206)**
Evaluation criteria				
Convenience	0.574	0.672	**1.135*****	0.084
	(0.395)	(0.479)	**(0.418)**	(0.421)
Credibility	0.106	-0.105	**1.068****	0.672
	(0.390)	(0.434)	**(0.462)**	(0.424)
Familiarity	0.634	-0.726	**1.110***	-0.338
	(0.506)	(0.505)	**(0.601)**	(0.560)
Note:	*p<0.10 **p<0.05 ***p<0.01			

Table 4: The Use of Human Sources by Context

	All human sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(5)	(6)	(7)	(8)
Education				
V&R stage	**-0.368***	**-0.544****	0.111	-0.284
	(0.202)	**(0.220)**	(0.188)	(0.192)
Parent education	-0.292	-0.215	-0.034	-0.137
	(0.179)	(0.201)	(0.171)	(0.171)
Evaluation criteria				
Convenience	**0.839****	-0.303	-0.082	0.220
	(0.413)	(0.448)	(0.364)	(0.384)
Credibility	0.275	**0.753***	-0.194	**0.681***
	(0.387)	**(0.447)**	(0.412)	**(0.408)**
Familiarity	0.092	**1.451*****	**-1.205****	0.716
	(0.469)	**(0.537)**	**(0.553)**	(0.517)
Note:			*p<0.10 **p<0.05 ***p<0.01	

Table 5: The Use of Professional Human Sources by Context

	Professional human sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(9)	(10)	(11)	(12)
Education				
V&R stage	**-0.399***	-0.198	-0.081	-0.176
	(0.209)	(0.255)	(0.204)	(0.274)
Parent education	-0.176	0.025	0.032	0.061
	(0.181)	(0.212)	(0.179)	(0.239)
Evaluation criteria				
Convenience	0.475	-0.676	-0.091	0.053
	(0.434)	(0.466)	(0.387)	(0.549)
Credibility	-0.050	0.036	**-1.146****	**1.295****
	(0.398)	(0.480)	**(0.490)**	**(0.540)**
Familiarity	0.301	0.058	-0.787	**-1.861***
	(0.494)	(0.517)	(0.682)	**(1.084)**
Note:			*p<0.10 **p<0.05 ***p<0.01	

Table 6: The Use of Personal Human Sources by Context

	Personal human sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(13)	(14)	(15)	(16)
Education				
V&R stage	-0.082	**-0.705*****	0.248	-0.237
	(0.264)	**(0.218)**	(0.219)	(0.193)
Parent education	-0.156	0.045	-0.004	-0.145
	(0.229)	(0.192)	(0.191)	(0.171)
Evaluation criteria				
Convenience	0.078	0.380	-0.340	0.057
	(0.532)	(0.429)	(0.412)	(0.391)
Credibility	0.601	0.620	0.645	0.234
	(0.498)	(0.416)	(0.447)	(0.398)
Familiarity	0.342	**1.303*****	**-1.469*****	**1.063*****
	(0.602)	**(0.479)**	**(0.821)**	**(0.494)**

Note: *p<0.10 **p<0.05 ***p<0.01

Table 7: The Impact of V&R Educational Stage on Source Type by Context

	Successful academic	Successful personal	Struggle academic	Struggle personal
Digital		+	+	+
All human	-	-		
Pro human	-			
Pers human		-		

Table 8: Marginal Effects of Evaluation Criteria on Source Choice

Source Type and Context	Evaluation Criteria	Change in Prob of Mentioning Source Type When Evaluation Criteria Present
Digital Sources		
Struggle Academic	Convenience	28%
	Credibility	26%
	Familiarity	27%
All Human Sources		
Successful Academic	Convenience	21%
Successful Personal	Credibility	16%
	Familiarity	29%
Struggle Academic	Familiarity	-29%
Struggle Personal	Credibility	16%
Professional Human Sources		
Struggle Academic	Credibility	-22%
Struggle Personal	Credibility	15%
	Familiarity	-12%
Personal Human Sources		
Successful Personal	Familiarity	31%
Struggle Academic	Familiarity	-20%
Struggle Personal	Familiarity	27%

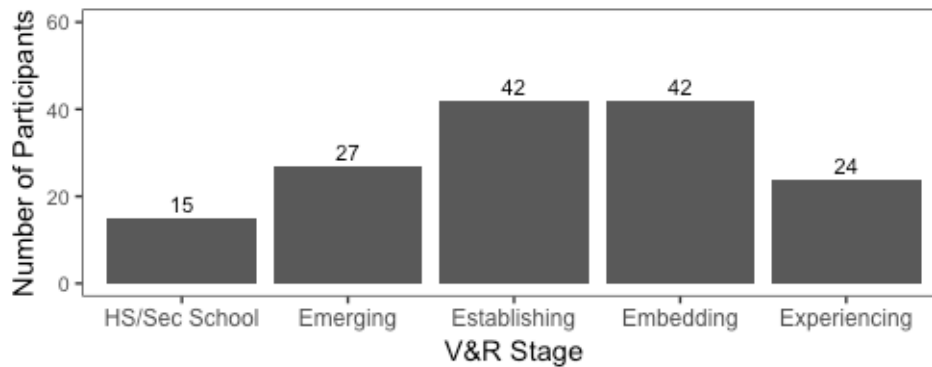**Figure 1: V&R Educational Stage of Participants**

Figure 2: Education Level of Participants' Parent
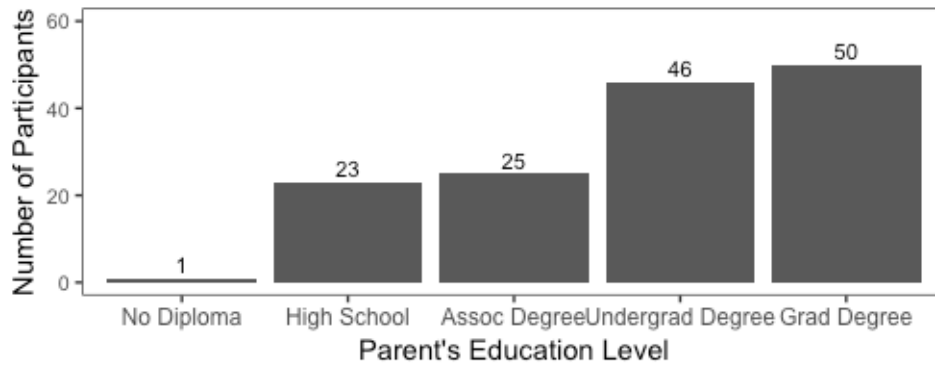
Figure 3: Academic Discipline of Participants
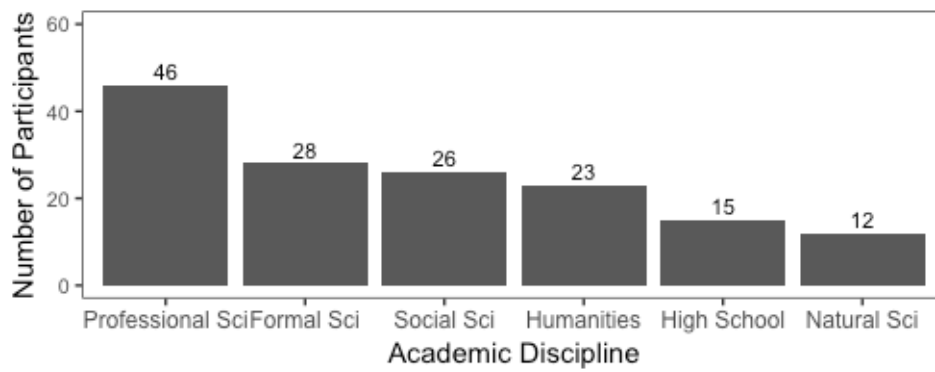
Figure 4: Chance That Participant Attended to Digital Sources Based on V&R Educational Stage by Context

Figure 5: Chance that Participant Attended to Human Sources by V&R Stage, Separated by Context

Figure 6: Chance that Participant Attended to Professional Human Sources by V&R Stage, Successful Academic Context
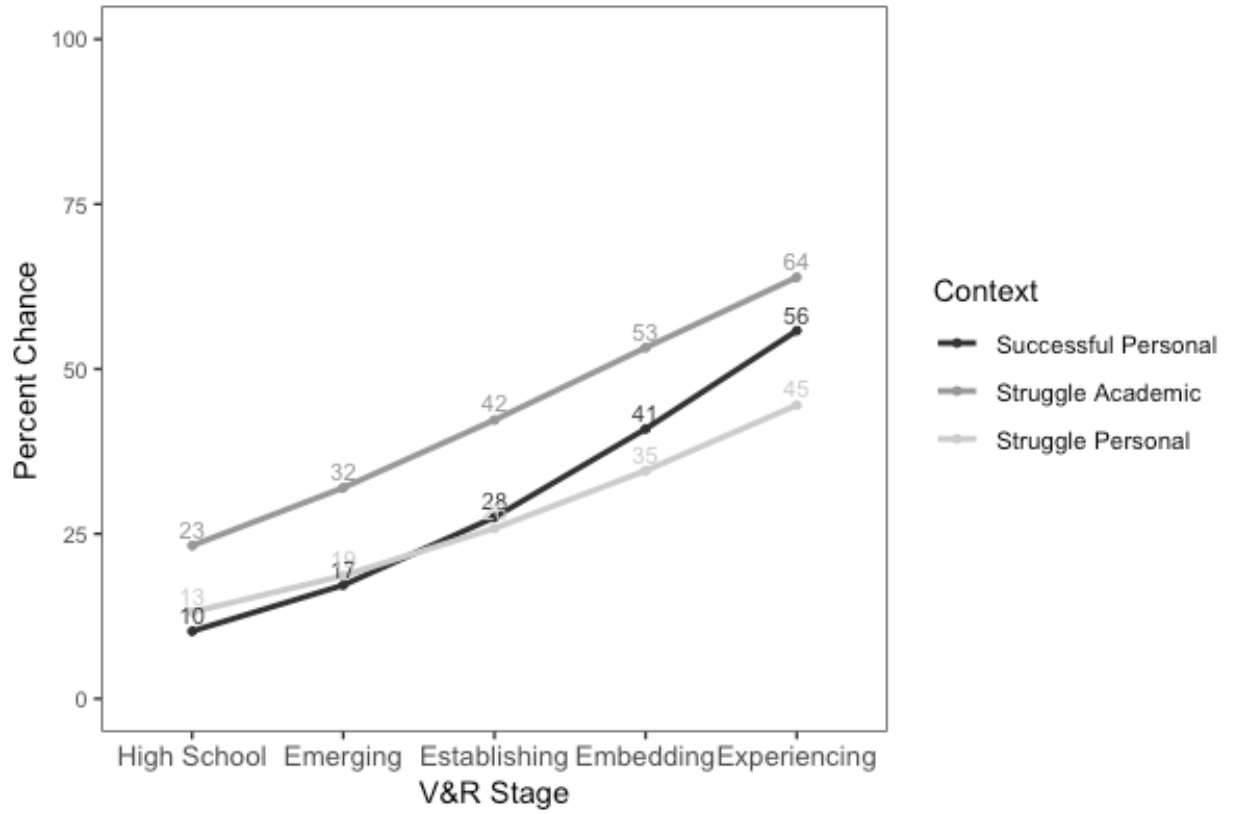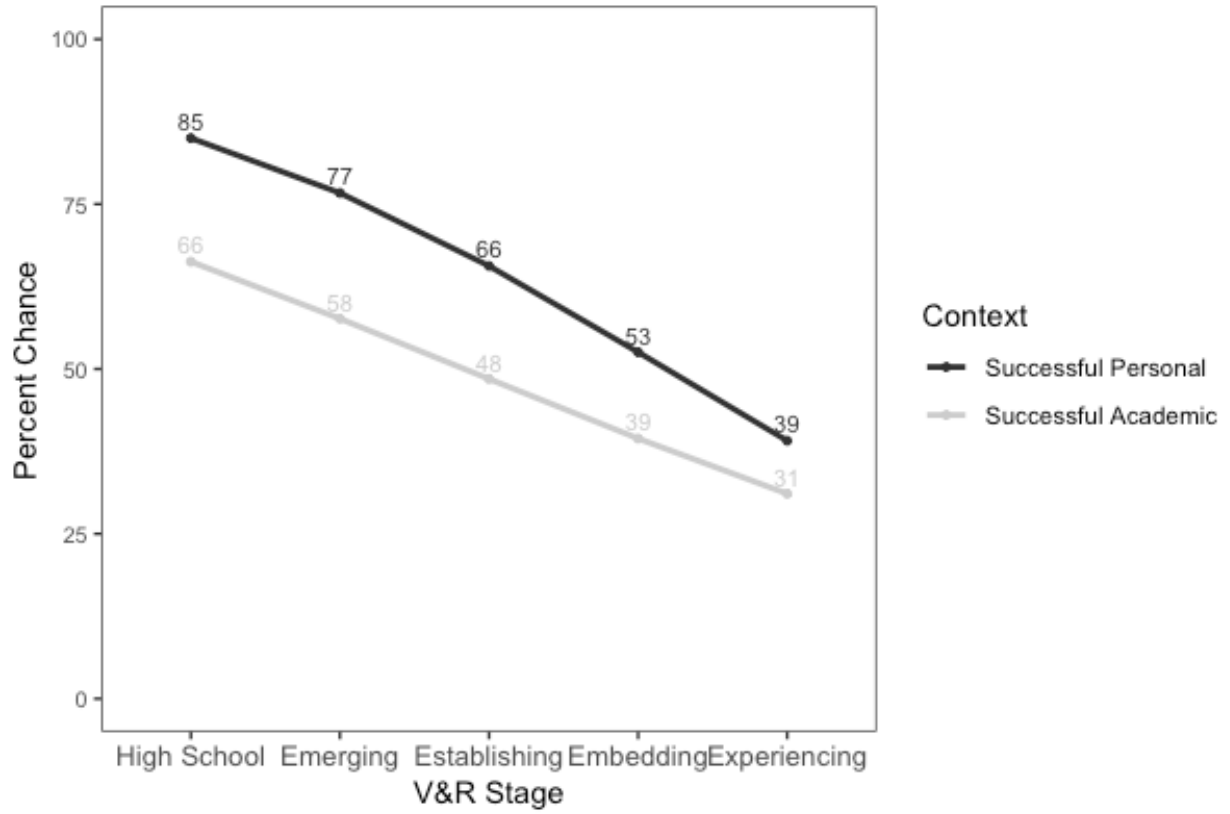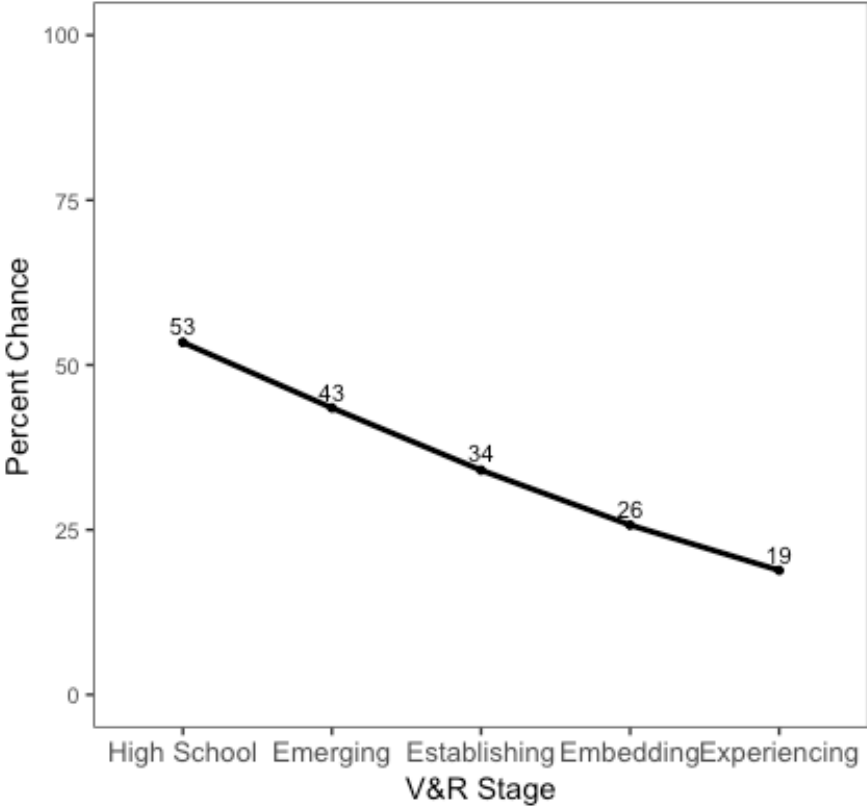
Figure 7: Chance that Participant Attended to Human Sources Known Personally by V&R Educational Stage, Successful Personal Context
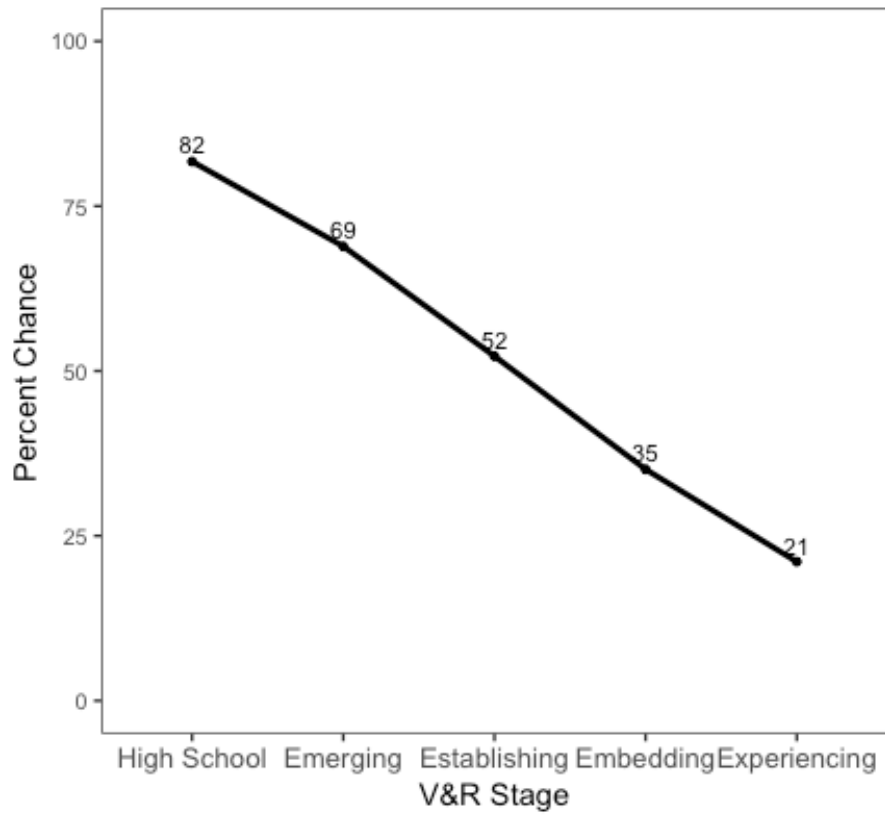
Table A1: The Use of Digital Sources by Context

	Digital sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(1)	(2)	(3)	(4)
Education				
V&R stage	0.190	**0.601*****	**0.442****	**0.417***
	(0.197)	**(0.224)**	**(0.210)**	**(0.214)**
Parent education	0.095	**0.495****	0.245	**0.529****
	(0.176)	**(0.209)**	(0.192)	**(0.206)**
Evaluation criteria				
Convenience	0.574	0.672	**1.135*****	0.084
	(0.395)	(0.479)	**(0.418)**	(0.421)
Credibility	0.106	-0.105	**1.068****	0.672
	(0.390)	(0.434)	**(0.462)**	(0.424)
Familiarity	0.634	-0.726	**1.110***	-0.338
	(0.506)	(0.505)	**(0.601)**	(0.560)
Discipline				
Humanities	0.234	-1.379	1.702	-0.802
	(0.882)	(0.982)	(1.085)	(1.024)
Formal science	0.342	**-2.296****	0.221	-0.831
	(0.796)	**(0.905)**	(1.025)	(0.887)
Professional science	0.825	**-1.783****	0.942	-0.759
	(0.788)	**(0.867)**	(1.001)	(0.889)
Social science	0.416	**-2.343****	1.611	-1.103
	(0.838)	**(0.990)**	(1.046)	(0.980)
Natural science	0.464	**-2.784****	1.018	-0.982
	(0.918)	**(1.149)**	(1.121)	(1.058)
Constant	-1.447*	-2.641***	-4.382***	-3.203***
	(0.843)	(0.928)	(1.158)	(0.953)
Observations	145	145	145	145
Log Likelihood	-92.154	-79.809	-81.118	-80.348
Akaike Inf. Crit.	206.308	181.618	184.237	182.696
Note:			*$p<0.10$ **$p<0.05$ ***$p<0.01$	

Table A2: The Use of Human Sources by Context

	All human sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(5)	(6)	(7)	(8)
Education				
V&R stage	**-0.368***	**-0.544****	0.111	-0.284
	(0.202)	**(0.220)**	(0.188)	(0.192)
Parent education	-0.292	-0.215	-0.034	-0.137
	(0.179)	(0.201)	(0.171)	(0.171)
Evaluation criteria				
Convenience	**0.839****	-0.303	-0.082	0.220
	(0.413)	(0.448)	(0.364)	(0.384)
Credibility	0.275	**0.753***	-0.194	**0.681***
	(0.387)	**(0.447)**	(0.412)	**(0.408)**
Familiarity	0.092	**1.451*****	**-1.205****	0.716
	(0.469)	**(0.537)**	**(0.553)**	(0.517)
Discipline				
Humanities	0.205	-0.044	-0.859	-0.041
	(0.886)	(0.978)	(0.959)	(0.892)
Formal science	0.770	1.111	**-1.555***	0.395
	(0.802)	(0.903)	**(0.861)**	(0.791)
Professional science	1.034	0.886	**-1.517***	0.396
	(0.788)	(0.881)	**(0.856)**	(0.787)
Social science	1.570*	**2.023****	-1.230	1.070
	(0.862)	**(1.025)**	(0.906)	(0.886)
Natural science	1.000	**2.323****	-1.374	0.588
	(0.936)	**(1.153)**	(0.982)	(0.918)
Constant	0.307	1.517*	1.498*	0.769
	(0.832)	(0.874)	(0.888)	(0.783)
Observations	145	145	145	145
Log Likelihood	-92.006	-80.666	-93.085	-93.195
Akaike Inf. Crit.	206.011	183.331	208.171	208.389
Note:			*p<0.10 **p<0.05 ***p<0.01	

Table A3: The Use of Professional Human Sources by Context

	Professional human sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(9)	(10)	(11)	(12)
Education				
V&R stage	**-0.399***	-0.198	-0.081	-0.176
	(0.209)	(0.255)	(0.204)	(0.274)
Parent education	-0.176	0.025	0.032	0.061
	(0.181)	(0.212)	(0.179)	(0.239)
Evaluation criteria				
Convenience	0.475	-0.676	-0.091	0.053
	(0.434)	(0.466)	(0.387)	(0.549)
Credibility	-0.050	0.036	**-1.146****	**1.295****
	(0.398)	(0.480)	**(0.490)**	**(0.540)**
Familiarity	0.301	0.058	-0.787	**-1.861***
	(0.494)	(0.517)	(0.682)	**(1.084)**
Discipline				
Humanities	0.875	-1.148	-0.809	-0.884
	(0.905)	(1.138)	(0.937)	(1.514)
Formal science	0.291	-0.664	-0.886	-0.438
	(0.849)	(0.942)	(0.829)	(1.218)
Professional science	0.837	-0.309	-0.499	0.692
	(0.806)	(0.897)	(0.806)	(1.108)
Social science	1.369	-0.050	0.402	0.857
	(0.861)	(0.973)	(0.861)	(1.146)
Natural science	**1.646***	-0.062	-0.356	0.794
	(0.948)	(1.046)	(0.952)	(1.260)
Constant	-0.153	-0.126	0.278	-2.065*
	(0.861)	(0.905)	(0.822)	(1.140)
Observations	145	145	145	145
Log Likelihood	-87.248	-67.292	-85.590	-52.264
Akaike Inf. Crit.	196.496	156.583	193.181	126.528

Note: $^{*}p<0.10$ $^{**}p<0.05$ $^{***}p<0.01$

Table A4: The Use of Personal Human Sources by Context

	Personal human sources:			
	Successful academic	Successful personal	Struggle academic	Struggle personal
	(13)	(14)	(15)	(16)
Education				
V&R stage	-0.082	**-0.705*****	0.248	-0.237
	(0.264)	**(0.218)**	(0.219)	(0.193)
Parent education	-0.156	0.045	-0.004	-0.145
	(0.229)	(0.192)	(0.191)	(0.171)
Evaluation criteria				
Convenience	0.078	0.380	-0.340	0.057
	(0.532)	(0.429)	(0.412)	(0.391)
Credibility	0.601	0.620	0.645	0.234
	(0.498)	(0.416)	(0.447)	(0.398)
Familiarity	0.342	**1.303*****	**-1.469***	**1.063****
	(0.602)	**(0.479)**	**(0.821)**	**(0.494)**
Discipline				
Humanities	-1.034	1.267	-1.058	-0.822
	(1.463)	(0.952)	(0.962)	(0.902)
Formal science	0.580	**1.674****	**-1.984****	-0.329
	(1.104)	**(0.850)**	**(0.902)**	(0.790)
Professional science	0.771	**1.725****	-1.243	-0.486
	(1.067)	**(0.835)**	(0.843)	(0.783)
Social science	0.879	**2.475*****	-1.383	0.241
	(1.113)	**(0.952)**	(0.901)	(0.851)
Natural science	-0.282	**3.126*****	**-2.509***	-0.277
	(1.429)	**(1.070)**	**(1.285)**	(0.912)
Constant	-1.788	-0.407	-0.361	0.872
	(1.141)	(0.841)	(0.852)	(0.784)
Observations	145	145	145	145
Log Likelihood	-59.806	-84.642	-76.888	-91.864
Akaike Inf. Crit.	141.613	191.285	175.777	205.728
Note:				*p<0.10 **p<0.05 ***p<0.01