Architects, Renovators, Builders, and Fragmenters: A Model for First-Year Students' Self-

Perceptions and Perceptions of Information Literacy

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Abstract

The transition from high school to college is fraught with academic, social, and emotional changes for first-year students. This year long qualitative study uses cognitive dissonance theory to examine first-year students' changing perceptions of their information literacy competencies throughout their freshman year. Through the examination of students' self-reflections and semi-structured interviews, the study produced cognitive dissonance in students, revealed four information literacy journeys, demonstrated the shifting of students' definitions of research, and shed light on the emotional labor involved in college-level research. Implications for information literacy instruction and future research are discussed.

Keywords: First-year experience, information literacy, cognitive dissonance, library instruction

First-Year Experience (FYE) defines a time of transition, usually between high school and college, where students enter a new culture of scholarship, personal and financial independence, and identity (Upcraft, Gardner, & Barefoot, 2004). This cultural shift goes beyond the classroom and includes establishing and maintaining interpersonal relationships, exploring identity development, deciding on a career and lifestyle, maintaining personal health and wellness, developing civic responsibility, considering the spiritual dimensions of life, and encountering new dimensions of diversity (Upcraft et al., 2004). FYE is a high impact practice, not simply "grade 13" (Hunter, 2006; Kuh, 2008; Murray, 2015).

On college campuses across the world, FYE has received increasing attention as college administrators work to increase retention and student success (US Department of Education, 2016). How does a university help students adjust to a cultural change that spans beyond academia to the personal and developmental? Transitions as significant as FYE call for a variety of partnerships in higher education. Academic libraries are natural partners for FYE initiatives: much of library instruction takes place in FYE courses like English composition (Hinchliffe, Rand, & Collier, 2018), and libraries see many opportunities in FYE to reach students early.

In addition to recognizing a good partnership opportunity, librarians appreciate the inherent connections between FYE competencies such as students' development as scholars and information literacy. Information literacy is defined by the Framework for Information Literacy for Higher Education as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (Association of College & Research Libraries, 2015, p. 3). But students are not blank slates when they arrive on a college campus, nor do they sit frozen in time from the moment they learn this

valued set of integrated abilities. After all, college is a time of transformative growth. As students' understanding of themselves as scholar and student changes, how does this cultural shift affect students' conception of themselves as researcher?

It is vital for the field of library and information science to understand students' shifting conceptions of self as scholar, researcher, and student. While many different approaches would be valid for this study, we chose to evaluate first-year students' self-perceptions of their information literacy using cognitive dissonance theory. More specifically, employing a cognitive dissonance approach allows us to expand our conception of student competency to include the possibility that students may believe multiple, contradictory things about their competencies as researchers. This qualitative study explores the effects of information literacy on FYE using a longitudinal psychological approach.

Literature Review

Three main areas of the existing literature apply to this study: the role and impact of information literacy in FYE courses, the psychological theory of cognitive dissonance, and its use in library and information science literature.

First-Year Experience

First-year experience courses are recognized as a high impact practice in undergraduate education in general (Kuh, 2008; Riehle & Weiner, 2013). High impact practices in the college or university setting are linked with positive student outcomes because they generate opportunities for deeper learning and stronger connections to their institution (Soria & Johnson, 2017). In addition to FYE courses, other examples of high impact practices include participating in learning communities, service learning, undergraduate research, and internships. First-year experience courses and seminars may focus on an academic, discipline-driven topic or the

transition from high school to college; however, the type of FYE course taken does not appear to have a statistically significant difference in student learning as measured by GPA (Zerr & Bjerke, 2016). Our study looks at the phenomenon of cognitive dissonance explicitly in the FYE in academically driven courses.

FYE and Information Literacy

Examining the 2014 NSSE (National Survey for Student Engagement) results of over 17,500 students from four-year and two-year institutions, Fosnacht found that 80% of first-year students had to complete an assignment that required use of an information source other than required readings, but only 37% of freshmen decided not to use a source due to questionable quality (Fosnacht, 2015). Librarian involvement with FYE courses extends back to the onset of the information literacy movement in the 1970s (Ball State Univ. IN. Dept. of Library Science., 1979) including the teaching of for-credit courses. The interaction between libraries and FYE is varied and can also include both optional and required workshops, library tours, article searching demonstration, and development of research assignments (Boff & Johnson, 2002).

A well-documented phenomenon in librarianship is the theoretically overconfidence of first-year students, though a systematic review of current studies was mixed. In 34 studies (64%) the evidence clearly showed that the participants overestimated their self-reported IL skills compared to their actual skills. In seven other studies (13%) a partial evidence of overconfidence was available. In this study, two studies (4%) fully and three studies (6%) partially provided evidence that the participants underestimated their skills (Mahmood, 2016). No doubt on the reasons that the research is mixed is the studies presented often had only one measurement of confidence and did not explore how confidence can be multi-variable, meaning someone is confident in some skills but not confident in other ways. Both are areas of exploration for this

study. Previous studies of information literacy and FYE have shed light on how library involvement and focus on information literacy skills can create a positive impact in the curriculum, often with long term effects (Briggs, 2016; Fain, 2011; Samson, 2010). Because the FYE curriculum varies in its robustness by institution, studies that examine information literacy instruction during the FYE range from focusing on the one-shot session (Karshmer & Bryan, 2011) to exploring embedded library partnerships (Kim & Shumaker, 2015; Philips & Case, 2013). In the latter case, embedded refers to information literacy instruction that may include a librarian-designed assignment or multiple instruction sessions with the librarian. These studies of information literacy in the FYE have taken a largely assessment-focused approach, and are most interested in whether a specific intervention creates behavioral changes, such as selection of more appropriate resources and better understanding of the library policies and procedures. They often center around incorporating best practices or active learning into information literacy instruction (Karshmer & Bryan, 2011) or focus on student, librarian, and faculty perceptions of information literacy skills (Kim & Shumaker, 2015). These studies serve as vital validation of library involvement with the FYE.

Studies tracking student learning of information literacy skills often focus on the first semester of students' first year. Missing from the literature are studies examining student learning across the entirety of the FYE. One reason is likely the difficulty in creating collaborative partnerships with faculty and instructors in the FYE curriculum. Angell (2018) found generating buy-in from faculty was one of the greatest challenges when librarians, whose positions are dedicated to working with FYE programs, work with classes in the FYE (Angell, 2018).

Few studies in the FYE focus on the effects information literacy may have cognitively on how students sees themselves, their skills, and the work they do as college students. One such study by Philips and Case (2013) showed that first-year students exposed to embedded information literacy modules in a FYE course had low levels of confidence about their information literacy skills, likely caused by students' recognition of their limitations. Our study focuses on these gaps in the literature and explores them through the lens of cognitive dissonance theory.

Use of Cognitive Dissonance in Information Literacy

Leon Festinger first defined cognitive dissonance in 1957 as a form of psychological stress where individuals must resolve inconsistent thoughts, actions, or beliefs (Festinger, 1957, p. 2). Festinger calls this resolution "discrepancy reduction," which can be accomplished by changing the original cognition, adding/subtracting cognitions (creating new attitudes, behaviors, or beliefs), or adjusting the importance of those cognitions (Festinger, 1957, p. 2).

Given that Festinger posits that people are not inclined to seek out new information when affected by cognitive dissonance, it is vital to reinforce good models and good research skills that foster reflection and critical thinking. Information literacy, loosely defined as the reflective use of information, has a long history in the interdisciplinary field of library and information science. Due to the nature of information, various different domains have been incorporated into the field, including psychology. Cognition is a central component of Kuthlau's landmark work "Seeking Meaning: A Process Approach to Library and Information Services" which re-positioned information literacy from a bibliographic to an affective, reflective process (Kuhlthau, 2004). Belkin, Brooks, and Oddy describe the constructive process of information seeking in terms of an anomalous state of knowledge (ASK) (Belkin, Oddy, & Brooks, 1982).

Recently, Savolainen's "Cognitive Barriers to Information Seeking: A Conceptual Analysis" divides cognitive barriers, meaning psychological obstacles impeding understanding of information, into two different categories: cognitive barriers related to identifying and articulating information needs, and cognitive barriers related to selecting and accessing information sources (Savolainen, 2015). While this article mentioned cognitive dissonance as one of the various theories that were examined, the nature of the article was as a review of many psychological theories that may have application in libraries and did not focus on any particular theory.

In a self-professed "first use," McElrath studied cognitive dissonance theory and methodology in the library organization environment (McElrath, 2004, p. 296). While the study used cognitive dissonance methodology, the study did not find cognitive dissonance, but provided institutional data and presented a model for how a methodology may be used. It was noted by McElrath that cognitive dissonance can only be measured indirectly, adding the challenge of assessing it in the library environment.

To date, there remain few cognitive dissonance measures in information literacy. Psychological theory in general also lacks reliable and valid cognitive dissonance measures, as this phenomenon often needs to be measured by directly confronting a research subject with their own dissonant beliefs. Since everyone holds different cognitively dissonant beliefs, it is therefore challenging to have a single, validated qualitative measurement. Reviewing cognitive dissonance studies, the methods are often indirect in terms of measurement (McElrath, 2004), and there remains no validated quantitative assessment (Mcleod, 2018).

Previous Relevant Work by the Authors

We previously conducted assessments of the courses included in this study. Previously the Institution B course had been flipped to aid student learning (Stonebraker, 2015). From assessment of student learning, we know the information literacy courses have a statistically significant impact on student learning (Stonebraker, 2015) and retain that impact over time (Stonebraker & Fundator, 2016). In addition, the specific pedagogies have been profiled in previous publications both in terms of approach to critical information and decision-making (Stonebraker, 2016; Stonebraker & Howard, 2018). This study focuses less on the pedagogical tools employed in the classroom or assessments of student learning. While such tools and assessments are important to our work as librarians, it is equally important to understand how information literacy affects the FYE.

Methodology

This study began with three research questions to explore students' perceptions of their information literacy skills throughout the FYE:

1. How does a student's perception of their own information literacy change from college transition through the FYE? How does previous information literacy experience affect student perception?
2. Do students abandon previous information literacy knowledge when new knowledge is presented, or do they hold both information literacy beliefs together?
3. When confronted with inconsistent beliefs, how do students react? How does their information-seeking strategy change?

We created a three-part qualitative study: a written self-reflection by the students at the start of the first semester, a written self-reflection by the students at the end of the first semester, and semi-structured interviews at the end of their first year.

We chose to use cognitive dissonance as a theoretical framework because it allows us to analyze inconsistent actions and beliefs together. Under a cognitive dissonance framework, a person can believe multiple inconsistent cognitions about themselves and others. Without

employing this framework it was only possible to examine students as good or bad self-identified researchers, but utilizing this framework, we can examine how a student simultaneously holds two conflicting self-perceptions. For example, a person can believe they are both a good and bad researcher at the same time. Previous frameworks imagine student change over time as being binary: a student either imagines themselves as good at research or bad at research. Recently studies have considered perhaps there are elements in between. But what if a student imagines them as both good and bad simultaneously?

In addition, using this framework is also helpful in allowing us to examine what information literacy principles students abandon in order to resolve discrepancies with their pre-existing believes about research. For example, a student may believe that research is something only professionals do, and therefore may be hesitant to gain skills in an area they believe is outside their professed self-image of themselves as businessperson or chemist.

Participants

The researchers recruited participants from two credit-bearing courses that they taught during the fall 2017 semester at their home institutions. The first institution (University A) is a large, public doctoral institution in the Mid-Atlantic region. The students from University A were enrolled in the Honors College and taking a required research methods course during their first semester of college. The second institution (University B) is a large, public doctoral institution in the Midwest. The students from University B were highly capable students directly admitted into the Business Management program taking an information literacy-based course during the first semester of college. In total, 178 reflections were included in the study, 89 initial self-reflections and 89 final self-reflections. Nineteen (79%, n=24) initial and final self-reflections came from the Institution A. Seventy (61%, n=115) initial and final self-reflections

came from the Institution B course. From these self-reflections and the informed consent

process, 12 students were selected for interviews. In terms of demographics, seven self-identified

as women, five as men. Five self-identified as white, five as Asian, one as African-American,

and one as Hispanic. These demographics were typical of the populations of Institution A and B;

however, because the participants are students from only the Honors College and Business

Management programs, this sample is likely not representative of each institution's population.

Design

Initial self-reflection. Students completed a required self-reflection in the first two

weeks of class during the fall semester. This self-reflection asked students to provide short

responses about their experiences researching in high school. Additionally, students explained

whether or not they thought they were good information searchers and why (see the Appendix

for the assignment prompt).

Final self-reflection. Throughout the semester, students completed extensive research

projects – an intensive literature review or research proposal for students at University A and a

series of group challenges ultimately culminating in a consulting competition for a

pharmaceutical company at University B. During the final week of class during the fall semester,

students completed another required self-reflection. This assignment asked students to reflect on

the differences between researching in high school and college. Once again, students also

explained whether or not they felt they were good information seekers (see the Appendix for the

assignment prompt).

In accordance with human subjects procedures, we reviewed the informed consent

process with our respective students at the end of the fall semester after they completed the final

self-reflection. Students needed to consent for their initial and final self-reflections to be used in

the study. Students also could indicate at that time if they agreed to be contacted for an interview during the spring semester. We did not review the signed informed consent documents until after fall final grades were posted. If a student did not complete either the required initial or final self-reflection, they were excluded from the study.

Semi-structured interviews. After the fall semester ended, we conducted an analysis of the initial and final self-reflections to assess how students perceived their own skills. We coded student self-assessments into the following self-assessed categories: weak, strong, and average. As an example, here is a self-assessed strong researcher:

> I'd like to think that I'm a good information searcher. I am always very thorough in checking the sources that I use in my assignments. I check them for biases, credibility of authors, and relevance to my topic and in the time the paper is being written, as to not use outdated information. My works cited pages are always very eclectic in that they are full of online articles, well known books, lesser known blogs, scholarly essays, newspaper articles, and more.

Here is a self-assessed weak researcher:

> I wouldn't consider myself as a good information gatherer. I don't have a long of experience researching. And a lot of the times I have trouble finding information. But I'm looking forward to learn more about it.

A self-assessed average research was someone who was somewhere in between or it was hard to ascertain from the answer supplied.

A targeted smaller group of students from each of the classes (n=12, 6 from each institution) were contacted to participate in interviews during the last couple weeks of the spring semester. We recruited interview participants based on their self-perceptions of their information seeking skills in their self-reflections. We sought to recruit students whose self-assessments remained the same at the beginning and end of the semester because we hypothesized that these students would experience cognitive dissonance during the interviews. We also recruited students whose self-perceptions changed either positively or negatively during the semester for

comparison. During the interviews we asked students a similar set of questions to those in the self-reflections. Students discussed their definition of research and how they did or did not practice the research skills they learned in the fall semester throughout the remainder of their FYE.

Following these questions, we presented students with their initial self-reflection. Students read their response to the final question, "Do you think you're a good information searcher? Why or why not?" and were then asked if they agreed with their response at that moment. After students answered, we then gave participants their final self-reflection. Similarly, after reading their response to the final question, "Do you feel as though you are a good information searcher? Why or why not?" we asked students if they agreed with their response at that moment. This process created a cognitively dissonant moment for most students because they were confronted with two differing perceptions and asked to explain if they identify with them at the end of their first year of college.

The interviews concluded by asking students about how they believe they grew throughout their first year of college. If students failed to mention the research methods class they completed with the researchers, they were asked specifically if the class had an impact on their personal growth. It should be noted, that the researcher at University A did not ask this last question during the interviews, but followed-up with participants via email. Four of the six students interviewed at University A provided a written response.

Analysis

Each researcher analyzed the student work and interviews from their institution. The purpose of the analysis was not to compare across institutions, but to observe patterns across students' information literacy rich experiences during their first semester of college. With this in

mind, we first reviewed our students' initial self-reflections to find evidence of a rich or inadequate information literacy experience in high school. We reviewed our students both for logistical reasons and because of the differing research assignments in our respective classes. Next, we compared the initial and final self-reflection responses for perceptions of self as information seeker.

Per this method of looking for exploratory patterns across three separate time points, the interviews were recorded, but not transcribed. In lieu of transcription, copious notes were taken upon listening to the recordings multiple times. As applicable to the research questions, verbatim quotes were transcribed. Using these notes and the self-reflections, we began to search for patterns in experiences across the variables of high school information literacy experience, perceptions of self as information searcher at the three time points in the study, and self-perceived personal growth throughout the FYE.

Results

In-depth analysis of the participants' self-reflections and interviews revealed a variety of information literacy experiences throughout the FYE. While each student's progression throughout this transformative year differed, four themes emerged from the analysis, which will be highlighted using the participants' own words as appropriate.

Change in Research Understanding

One of the objectives of this study was to examine whether student perception of what constituted "research" and "researcher" changed during the FYE. These terms became stand-ins for "information literacy," a highly jargoned library science term. Based on students' initial and final self-reflections completed during their for-credit courses we found that in all cases, the students' understanding of research changed from the beginning of the fall semester to the end,

and often changed again when interviewed in the spring semester. An example of how some students' perceptions of research changed over the year is highlighted in Table 1.

Looking at Participant 102, her initial self-reflection focused on passion and community, at the end of class she defined research as a process, and finally in her interview she gave a hybrid version of the two. Across the participants, we noticed increased complexity in the definitions of research from the start of the fall semester to the end, but by the end of the first-year during the interviews, students' definitions often lost some of that sophistication.

Table 1
Students' evolving definitions of research

Participant	Initial Self-Reflection	Final Self-Reflection	Interviews
102	"I believed that research was an opportunity to emphasize a topic which I was passionate about expressing to the literary community … I felt as if I was given the undeniable right of expressing my true thoughts on a subject without having to face the ongoing criticism of individuals who were unaware of my initial opinion."	"Research is an imperative process in which information is obtained through sources that are analyzed to pursue a research question and/or thesis."	"I think of a person who is genuinely interested in a particular topic and then they look into the different subtopics that are related to the main topic in which they can invoke some kind of opinion… And they can expand more by the analysis of different resources."
114	"Research basically meant that I would need to utilize outside sources when writing an essay, but majority of the time those sources were simply articles or videos from simple google searches rather than scholarly journals or book publications."	"I would define research as the process of gathering new information to contribute to finding an answer to a question or providing more evidence to an existing topic/argument. It is the development and accumulation of ideas."	"I think before it was some abstract concept that was unattainable . . . [it's] collecting information on a topic."
219	"Personally, I viewed research as the first step in any written assignment or presentation. It was just	"'Research' to me means information searching, not information finding. It's important to have an	Research is "pulling information towards a goal" and always trying to pull information from

something that had to be done to fill in the information I did not yet know. Typically, research consisted of simple internet searches and short trips to the public library which provided all of the necessary material."	idea of what realm of information is out there before the research even begins. Utilizing key terms while searching will lead to more refined results. I always try to plan out which area I'm looking to find more details about before I start my information gathering process now."	different sources

Four Journeys in the First-Year Experience

Through the iterative analysis of the self-reflections and interviews, we grouped students according to their holistic approaches to their FYE. From this method we found that students had four main approaches, or journeys, as it pertains to information literacy and self- perception. They are as follows: architects, renovators, builders, and fragmenters. Table 2 lists participants, their demographics, and their respective FYE journeys. Table 3 includes summary characteristics of each journey.

Table 2
Participant demographics with IL journeys

Participant Number	Intended Major	Type of Journey	Initial Self-Perception of IL skills	Final Self-Perception of IL skills	Self-Perception of IL Skills during Interview
101	Social Sciences	Architect	Average	Average	Average
104	Engineering	Architect	Strong	Strong	Average
114	Social Sciences	Architect	Average	Strong	Strong
202	Business	Architect	Weak	Strong	Strong
212	Business	Architect	Weak	Weak	Average
119	Social Sciences	Renovator	Weak	Strong	Strong
220	Business	Renovator	Weak	Weak	Weak
102	Natural Sciences	Builder	Strong	Strong	Strong
219	Business	Builder	Weak	Strong	Strong
287	Business	Builder	Average	Average	Average
109	Engineering	Fragmenter	Average	Weak	Weak
255	Business	Fragmenter	Weak	Average	Average

Table 3
Summary of the characteristics of the four IL journeys

Journey Type	High school IL Experience	Concepts of Research	Distinguishing Characteristics
Architect	Poor or nonexistent	Research is generally a new concept and they are learning about it from scratch	• Hold negative self-perceptions of themselves as researchers despite describing growth
Renovator	Poor or nonexistent	Recognize growth in their research skills but describe it in relation to the whole self, not only the academic self	• Discussions about research and the FYE center around personal development and maturation
Builder	Strong foundational knowledge of IL	Modify or refine their understanding of research from high school during the FYE	• Whether or not their understanding of research was correct, these students modify it without abandoning incorrect knowledge • Research behaviors change, but not their conceptual understanding of research
Fragmenter	Varies from nonexistent to in-depth IL instruction	Conflicting definitions of research between what they learned in high school and during the FYE	• A critical incident in their FYE pulls them from one of the other three journeys • Combative attitudes toward learning about the research process

Architects. Architects create new cognitions about research because they lacked an information literacy experience in high school, had a poor information literacy experience in high school, or completely abandoned what they learned about information literacy in high school. For architects, information literacy is a completely new topic in which they are learning the basics.

Additionally, architects generally exhibited a very negative self-perception of themselves as researchers. Participant 114 demonstrated this during her interview:

I write here [in my first self-reflection] that I've only ever Googled, which is so accurate. So like I now know what a database is, and I know how to search a database, and use key

terms and how to pick out key terms and narrow down which ones are going to help me, or maybe even use databases to pick out a topic.

Students in this group often self-assessed their skills as low at the beginning of the course, and may also have self-assessed their skills as poor at the end of the class.

Renovators. Renovators are cleaning house of what they know about information literacy, research, and themselves. Often they recognize the growth of their research skills, but they are experiencing a transformation that transcends academics. This transformation has direct implications for how they conceive of themselves as researchers. Participant 119 demonstrates this when he described a maturation he experienced, which affected every aspect of his life during the FYE:

> I feel like I've become much more responsible and mature than I was before… I was tired of always being sort of "mid-tier" and knew I could do better. . . . [my Honors classes] have taught me how good it feels to finish something you've tried your absolute best on. There's no feeling like it and that's what I'm trying to constantly pursue from here on out.

Another Renovator, Participant 220, detailed an in-depth story about completing a fictional quiz that sorted her into a different Hogwarts house (from the Harry Potter franchise) than she was previously sorted in high school. She grappled with the implications of this with her new college friends and her twin sister, trying to determine which version of herself truly represented who she was after her FYE.

The Renovators observed in this study had weak information literacy experiences in high school, but because of the small sample size in this study, it is unclear if this is a defining characteristic of Renovators. The illustrative characteristic of this group was their emphasis of their co-curricular experiences, emerging adulthood, and social lives as central to their academic experiences, including the development of their information literacy skills.

Builders. Builders enter college with a preconception of what information literacy entails. While they do not experience a change in their cognitions about information literacy, they build upon, modify, or refine their existing conceptual understanding of it. They change their research behavior, not their cognitions about what research and information literacy are. Participant 219 exemplified this during his interview:

> It's all about pulling information towards a goal. I kind of thought about it that way before the class and the class just solidified that for me . . . It was all about refining [research] skills . . . I had a pretty good grasp on what it was coming in. It's not a hard concept … I had an idea but now I'm getting better at it.

Builders also all shared an information literacy rich research experience in high school. This included writing multiple research papers, conducting independent research using their high school's databases, or some other similar experience. Other groups also had rich research experiences, but builders differ in that they collectively do not abandon their previous information literacy definition. This is not to say they shared a single research definition but rather they viewed this experience as foundational to college research and one that only needed to be built upon, not reconstructed.

Fragmenters. Fragmenters hold conflicting concepts of research - their conception of information literacy in high school and a new one they learn during the FYE. You can see how Participant 109 holds two such beliefs in his response to defining "research" and "researcher" during his interview:

> [A researcher] is someone who works in a lab environment… researchers can be anyone, like you can be sitting at a computer and be a researcher. You can analyze other people's research that they went out and got data for, analyze that, and you can still be a researcher.

Fragmenters start as an architect, renovator, or builder and split off at a critical incident in their learning. Examples of critical incidents include receiving negative feedback on an assignment,

gaining work experience in a scientific lab, and participating in library-based research projects. Fragmenters also displayed combative attitudes towards the research process. They demonstrated this through verbal comments with the instructor or through their resistance to following their assignments as outlined.

Reductions of Magnitude of Cognitive Dissonance

This study differs from previous library and information science studies in that the researchers were able to observe multiple instances where students considered them both good and bad researchers simultaneously. We created multiple incidents of cognitive dissonance for the participants. Participants in this study exhibited all four types of responses to cognitive dissonance observed by Festinger (1957). These cognitively dissonant moments occurred when confronted with their descriptions of themselves as information seekers in their initial and final self-reflections. We asked them whether at this moment they agreed with themselves, and did with both self-reflections. These cognitions were often contradictory, such as being both a good and bad researcher. They also occurred in some participants with their conflicting definitions of research and researcher. Table 4 lists the four ways to reduce cognitive dissonance and how students presented these when confronted with their own contradictory beliefs about themselves and research. Students were able to hold multiples believes about research at the same time. For example, that research was something that only scientists did, and that research was something involving library resources that had nothing to do with the science definition. So based on their multiple definitions of what it meant to be a researcher, they were both good and bad at research and knew more and less about research over time.

Table 4
Examples of reducing the magnitude of cognitive dissonance

Type of Reduction	Participant Example
Change the behavior or	"Looking back, before I took your class,

cognition	I don't think I was a good researcher… In my mind, I thought good research was just a Google search."
Justify the behavior or the cognition, by changing the conflicting cognition	"I compare myself on a bigger scale."
Justify the behavior or the cognition by adding new cognitions	"The way of thinking that we thought was research versus what research actually pertains I think was the most difficult thing to master."
Ignore or deny information that conflicts with existing beliefs	"I just feel like I need to learn more about myself as a researcher, more direct experience. It's my personal belief there's always more room to grow."

While we observed all four types of magnitude reduction in the participants, these did not correspond with the four journeys described in the previous finding of this study. They appear to be distinct at this point, and given the sample size, it cannot be said that an architect or builder is more or less likely to exhibit one type of magnitude reduction than another. In most instances, participants utilized more than one reduction type during the interview.

Lack of Transfer Opportunities in the First-Year Experience

All students interviewed found their respective courses useful, but only 4 of the 12 participants used the new information and skills in the remainder of their first year. Many acknowledged they might use it for a later assignment but had yet to have another assignment where they had to use sources not provided by the instructor. This questioned many of our assumptions about the FYE. We assumed students would have research assignments in at least one other course throughout the FYE. Given the large number of introductory courses first-year

students take, which are typically content driven (Hoag & Browne, 2009), students had few opportunities to practice their research skills.

Research is an Emotional Labor

The framing of library-based research is often as an intellectual labor rather than an emotional one. The participants of this study contradicted that assumption. Library literature is rich with studies examining library anxiety, but these studies often position this anxiety in relation to Mellon's (1986) findings related to the physicality of the building, information overload, and discrete information searching skills. Our study revealed not only that emotional labor pervades the entire research process regardless of students' comfort level with discrete information seeking skills, but also that this emotional labor emerged in many of the students' recollection of their research experiences. Participants certainly understood the research process as an intellectual one, indicating they would advise themselves on the first day of classes to make a plan (Participant 119) or better manage their time (Participant 202). However many students indicated that they would tell themselves that everything will be OK (Participant 101), that they should get used to the frustrations of research (Participant 212), or to take things slowly and not "stress out" (Participant 287). Some participants, like Participant 104, demonstrated a combination of the intellectual and emotional labor of research. She said she would tell herself, "Don't freak out and take it one step at a time. Don't rush anything. Really take in what you're researching." Even as an intense emotional labor for many students, some students indicated that there was a pay-off for that work. Participant 114 noted, "I felt really proud of what I completed."

Not every student described the emotional labor of research. Some students displayed little to no emotion about the research process. This could be attributed to a number of

possibilities including skill level, confidence level, or inability to recollect the research experience. Further research on the emotional labor of the research process is needed to understand this finding or determine if it is unique to this sample or common in many first-year students.

Implications and Conclusion

The results of this study reveal a number of places where librarians need to reflect upon their assumptions about first-year students. First, librarians need to consider how they use the word "research" when talking with students. Through the three phases of this study, it became evident that students not only grapple with multiple understandings of this word, but also have a consistently shifting definition of it. While librarians may use "research" to mean library-based, information searching, many students hear "research" and think about laboratory research. In order to effectively teach first-year students, librarians and students need a shared understanding of "research." After the first year of study students' definition of "research" will continue evolving as they progress in their studies and choose a field of study. Librarians should continue trying to arrive at a shared definition of "research" with their student population.

Our study indicates that students often transform their own understanding of information literacy over time. An important element of constructionist learning writ large is the concept that students build on their preexisting knowledge. But students also have the capacity to believe more than one thing, often contradictory things, about themselves and information literacy. A classroom with diverse learner journeys such as these requires a more nuanced approach to what it means to be information literate. If we wish to meet students where they are on their journey, we need to prepare information literacy assessments that address these four journeys in the FYE in order to improve overall student learning. As an example, asking students at the beginning

and at the end of a class to rate their information literacy skill will likely not reflect the complicated, emotional and nuanced changes to not only their skills but their understanding of what research and college means.

This study demonstrates the value of teaching using affective learning outcomes. Whether designing one-shot, embedded, or credit-bearing information literacy classes, librarians should consider the emotional labor of research as well as the socio-emotional learning occurring during the FYE. Students' struggle with research and information literacy concepts may have more to do with the tumultuousness of their FYE than with their academic abilities. Those using affective learning outcomes could look to the Framework, which provides support for a variety of affective outcomes in each frame's list of dispositions.

Librarians are becoming more embedded in FYE than ever before (Pun & Houlihan, 2017). This qualitative study explores the connections between FYE and information literacy through a cognitive dissonance psychological approach. It found that students perceive of themselves and researchers in very different ways based on their developmental paths. We hope with this study to help librarians better understand their students' progressions as researchers, and serve as a model for how to evaluate student's progression as researchers in the future. We also hope that this model will help others in library and information science who are interested in studying cognitive dissonance as it relates to information literacy.

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Appendix

Self-Reflection Assignment Prompts

Initial Self-Reflection

Recall a research assignment you had in high school where you had to incorporate outside sources about a topic. Describe how you found information for your assignment. Questions to answer:

1. How did you begin your search process? Where did you search for information?
2. Can you describe what "research" meant to you when you were in high school?
3. Did you find the search process easy or difficult? Why?
4. Did you ever have to research something you did not agree with? How did your information searching change?
5. Describe someone who you would consider a good information searcher.
6. Do you think you're a good information searcher? Why or why not?

Respond to each question in at least 75 words.

Final Self-Reflection

Reflect upon your research this semester and how you developed as an information searcher. Questions to consider:

1. Recall how you searched for information in high school. Is searching for information in college different than how you searched in high school? Provide a specific example to demonstrate how they are similar or different.
2. Describe your information searching process. Where do begin when searching for information? Define "research."
3. What has changed how you use information this semester? What has not?
4. Describe someone who you would consider a good information searcher.
5. Do you feel as though you are a good information searcher? Why or why not?

Respond to each question in at least 75 words.